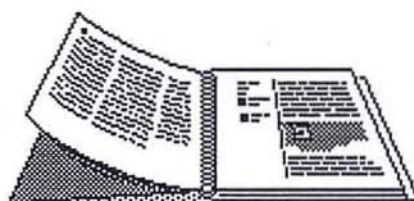


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Approaching the Grammar of Adjuncts

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Real Adjuncts in Instrumental in Russian*

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Abstract

An adjunct-DP in the free instrumental case occurs in a number of surface positions where the DP is syntactically optional, does not depend on any element in the sentence, and has a number of different interpretations. We introduce Bailyn's proposal which postulates a uniform syntactic environment for all the uses of *instr*. This calls for a uniform semantics of these DPs which can nevertheless accommodate the different interpretations. Starting with the hypothesis of Roman Jakobson about the semantics of the instrumental case we formulate a semantic interpretation theory based on abduction. We give a uniform semantics for three different adjunct uses of *instr* in this framework. In the concluding part of the paper we discuss some possible alternatives and ramifications as well as questions and objections raised with respect to the treatment proposed in this paper.

1. Explaining the problem: how are free DPs in instrumental interpreted in Russian?

Russian has six morphologically distinguishable cases¹. DPs in the nominative or accusative are usually interpreted in the positions of verb arguments, where their interpretation can be easily described as basically that of a (generalised) quantifier which binds the occurrence of an argument variable of the verb. Instrumental case occurs in a number of surface positions where a DP is syntactically optional and does not depend on any element in the sentence. This use may be termed *free* (DPs in the) instrumental case. The syntactic role of a free DP in the instrumental is usually that of an adjunct.

We start by showing these uses, describing the problem of interpretation which these free DPs pose and our assumptions about the syntactic environment in which *instr* occurs in the uses we intend to examine. We choose a proposal which postulates a uniform environment for all the uses of *instr*, introduce the hypothesis of Roman Jakobson about the semantics of the instrumental case and formulate our technical semantic interpretation apparatus which is based on abduction. Then we formalise some selected uses of DPs in the instrumental and explain those properties of them which seem to be amenable to the treatment proposed. In the concluding part of the paper we discuss some possible alternatives and ramifications as well as questions and objections raised with respect to the treatment proposed in this paper.

The problem is how to characterise the semantics of such free DP adjuncts in the instrumental. The number of their rather different possible interpretations is great and we do not want to ascribe every such meaning to all possible DPs in *instr*, creating an unmotivated and extreme polysemy. The move to assign some kind of meaning to the instrumental case, similar to the meaning of a preposition, is slightly better, but it nevertheless simply shifts the problem of extreme polysemy to this case meaning. Wierzbicka (1980), for instance, argues that there are seventeen very general meanings of instrumental.

* We would like to thank Ilse Zimmermann for her comments on the draft.

¹ Opinions differ. Some, like Jakobson, see 8 cases.

We see this problem as a part of the larger problem of how to construct meanings in context. Consequently, we will propose a treatment which constructs these meanings from different ingredients in the context of interpretation. We will use an abductive theory of interpretation in this treatment.

Some of the occurrences of the instrumental illustrating the difficulty will be reviewed now. We shall abbreviate the name of the morphological case-form to *instr* and the corresponding bunch of morpho-syntactic features as INSTR. The example is taken from Jakobson (1936) reprinted in Jakobson (1984). The translations of the DPs in the instrumental are in italics.² The brackets introduce the terminology.

- (1) a. On el reb'onkom_{*instr*} ikru
 He ate childINSTR caviar
 He ate caviar *as a child* (temporal 1)
- b. On el pudami_{*instr*} ikru
 He ate pudINSTR caviar
 He ate caviar *by the pood* (36lbs) (manner)
- c. On el ložkoj_{*instr*} ikru
 He ate spoonINSTR caviar
 He ate caviar *with a spoon* (instrument)
- d. On el dorogoj_{*instr*} ikru
 He ate roadINSTR caviar
 He ate caviar *on the way* (path)
- e. On el utrom_{*instr*} ikru
 He ate morningINSTR caviar
 He ate caviar *in the morning* (temporal 2)
- f. On el grešnym_{*instr*} delom_{*instr*} ikru
 He ate sinfulINSTR matterINSTR caviar
 He ate caviar I am sorry to say (idiomatic)

The italicised prepositions clearly show that different relations between the DP in the instrumental and the rest of the sentence are involved. All these uses seem to be syntactic adjuncts.³

It is not obvious what the second term related to the DPs in *instr* should be, what the relations are and how they are associated with the syntax.

Jakobson proposed an interesting hypothesis to the effect that the meaning of the instrumental arises from its opposition to some other case forms in Russian on the one side, and from the interaction with the context on the other side:

... The instrumental itself denotes nothing more than peripheral status; it occupies the same position among the peripheral cases than the Nominative does among the full cases: that of the unmarked category. ... Everything other than peripheral status is given in individual uses of the I by the actual meaning of its referent and by the context, but not by the case form (Jakobson, 1936).

² The literal translation of the idiom would be *sinful matter*.

³ We do not insist that they are DP-adjuncts, however. In fact, we will use a different syntactic adjunct structure of which the DP is a part.

While we do not seek to explain all the uses of instrumental by this hypothesis, we will investigate what one implementation of this hypothesis amounts to in cases where it seems to apply best, i.e. some of the uses which can be semantically treated as intersective modifiers. We will define the term in a moment⁴.

The uses are Instrumental of transport (which was not listed in (1f)), Instrumental of path, and the two temporal uses in in (1f).

INSTRUMENTAL OF TRANSPORT.

- (2) On exal poezdom
He drove train-instr
He was going by train

A SPATIAL PREDICATE (INSTRUMENTAL OF PATH).

- (3) On šel dorogoj
He went road-instr
He was going on the road

A TEMPORAL ADVERBIAL (1 AND 2).

- (4) Reb'onkom on bolel
Child-instr he ill-past
He was ill as a child
- (5) Letom on bolel
Summer-instr he ill-past
He was ill as a child

Sometimes objections are raised to examples like (3) that they are ill acceptable. The impression vanishes, if a context is provided. In particular, a contrastive context which emphasises alternatives makes the example absolutely acceptable.

- (6) Do reki on šel dorogoj. Tam ona končilas'.
He walked to the river on the road. There it ended

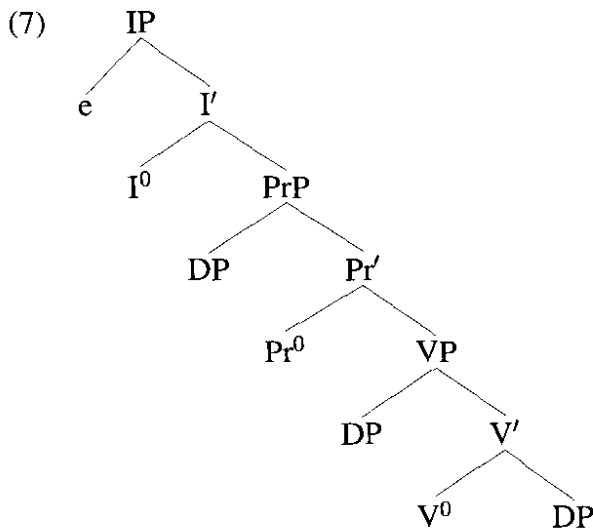
There also is a difference between our example with a verb of motion and Jakobson's example with the verb unrelated to motion. We will return to this effect in section 4.2. There we shall also discuss the restrictions on DP_{instr} in these constructions. A theory which ascribes case meanings to the instrumental must postulate at least three different meanings associated with INSTR, and provide some kind of meaning shift which maps people onto times when they were children in addition.

We will argue that an abductive theory of interpretation allows us to treat all these uses uniformly as instances of predication on different discourse referents denoting participants in the situation in a context. So the context-independent meaning of INSTR is very simple, but the role of context (including systematic world knowledge about types of situations) increases.

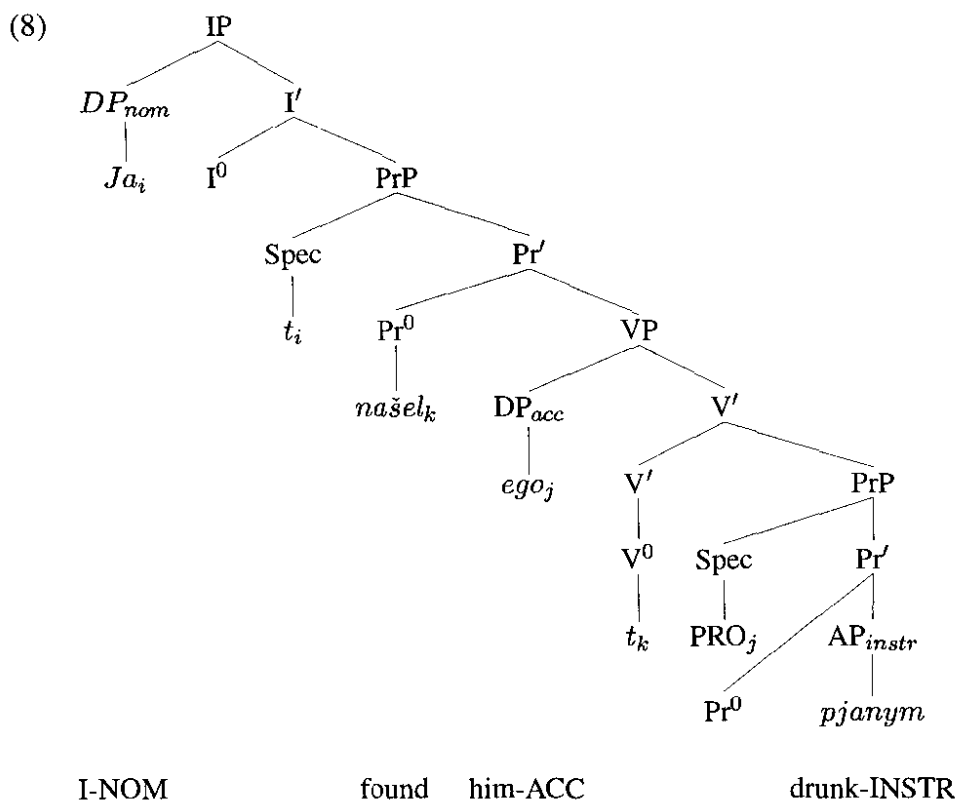
⁴ Following Jakobson we assume that all grammatical cases of Russian are sorted into two groups, the central and the periferal cases. We wish to avoid formally reconstructing Jakobson's ideas on this issue here, but see Demjjanow and Strigin (1999b) for an partial attempt. The essence of Jakobson's ideas can be summed up by his quotation "... what is specific to the periferal cases is not that they indicate the presence of two points in the utterance, but only that they render one periferal with respect to the other... [the periferal point] could be omitted without impairment to the central one, as is the effect of the periferal cases."

1.1. Where to assign the instrumental case? A syntactic unification.

John Bowers (Bowers, 1993) argued that some interesting syntactic consequences follow, if we adopt a special functional projection which is responsible for the predication in the sentence. He calls this projection *Pr* for *Predicative element*, and assumes (7) as the structure for simple clauses of English. It is immaterial at this stage whether *I(nfl)* is split into a number of separate phrases or not.



Here, the *SpecPr* is the subject of the clause and *SpecV* is the direct object of the clause. *SpecPr* is the external argument wrt. the verb, *SpecV* is its internal argument. Bailyn (1995) has applied this hypothesis to Russian to account for all non-idiosyncratic uses of instrumental. The net effect of this proposal is a syntactic unification under which INSTR is a structural case assigned by *Pr*⁰, i.e. the case of predication. Bailyn applied his proposal to secondary predication structures. The typical case of an object oriented depictive has then the structure given in (8), with *PrP* being an *V'*-adjunct small clause.



We shall adopt this hypothesis. The proposal to introduce a new functional projection which marks predicational aspects did not seem to draw much attention, and we shall discuss the degree to which our proposal depends on it and whether the structure it postulates can be supplanted by a different one in the concluding part of the paper. It should be noted, however, that this is the only proposal known to us which provides a uniform syntactic environment for all the uses of the instrumental, which is an interesting hypothesis in its own right.

That we adopt this structure is not without difficulties, in particular considering the use we are going to put it to. Since *PrP* is the structure of predication we have to provide a uniform semantics to it⁵. We will explore the straightforward semantic proposition that all of the interesting uses of instrumental are basically predicative on some discourse referent in the situation described by the sentence. In which case we have to stipulate that Russian has a kind of semantically defined control of *PRO*⁶. Ordinarily, *PRO* is controlled either by the subject or by the object or has arbitrary interpretation with a kind of generic reading. We have to say how the semantic control works in Russian.

We intend to analyse these three uses of *instr* as adjunct small clauses *PrP*. For the moment we may also accept the assumption that these small clauses in the cases we want to analyse are adjuncts to IP in (8).

1.2. Interpretation

An interpretation of a sentence *S* with a *DP_instr* includes

⁵ Bowers provides a predication semantics for his proposal in case of English. The predication relation is defined in the property theory. This semantics is clearly insufficient for Russian, since the predication Bowers is concerned with covers only cases of secondary predication with the subject or with the direct object as a controller.

⁶ Already Nichols (1982) proposed that there is a control relation at work in secondary predication in Russian.

- the determination of the relation between the interpretation of $\|DP_{instr}\|$ and the interpretation of the rest of the sentence;
- the determination of the information status of this relation and of the $\|DP_{instr}\|$.

Broadly speaking, we are interested in the semantic and in some systematic pragmatic aspects of the interpretation of a sentence S with a DP in I. Since our conception of interpretation does not consider the difference between semantics and pragmatics be a difference of kind and rather emphasises the similarities, this attention to both aspects is explainable.

As far as the determination of the relation between the interpretation of $\|DP_{instr}\|$ and the interpretation of the rest of the sentence is concerned, we make a model case, as we already noted. We proposed that the uses of DP_{instr} in (2, 3, 4 5) to be well described in terms of introducing an intersective modifier on situations.

Situations are theoretical entities and will need justification. For the moment we may think of them as states of the world being described by sentences and consider the terms referring to them as explicit reference to models.

- (9) A DP in *instr* in a sentence S is an intersective modifier on situations, if it is interpreted by $\|DP_{instr}\|$ in $(\|DP_{instr}\| \& \|S'\|)(s)$ where S' is S without the DP_{instr} .

An intersective modifier on situations is then simply a predicate on situations, like the sentence it which it occurs or the matrix sentence which is obtained by dropping the modifier. The modifier *by train* is a predicate on situations collecting those ones in which someone is going by train. The matrix sentence *Peter is going* is a predicate on situations in each of which Peter is going by some means somewhere. So the conjunction of the two makes the interpretation of the sentence with the intersective modifier. Thus, if Peter is going by train, then any situation making the sentence true would contain Peter who is going somewhere and is doing so by train. Obviously some kind of temporal indexing is involved in the notion of situation for this definition to make sense. We assume such an indexing implicitly for the moment.

The definition provides some semantic properties we should look for in the sentences in question. Thus, we should have $(\|DP_{instr}\| \& \|S'\|)(s) \models \|S'\|(s)$, since each conjunct follows from a conjunction. That the modifier itself does not constitute a complete sentence is not detrimental. We may use some paraphrase, e.g. *it was by train* in *Peter was going to London. It was by train*. Note that we must stick to the same situation on both sides of the \models sign.

On this understanding of situations as models their explicit mentioning is not essential, because explicit statements about models are made in the meta-language. In this case the situation argument could be dropped. As we shall see there is a use for a slightly different notion of situation, and therefore we shall retain the argument.

To begin with, (3) and (2) seem to satisfy our expectations about entailments. The example with the train was already discussed above. Example (3) also satisfies them: if someone is walking on a road, he is walking and he is on the road. Consider now (4). If someone was ill as a child, s/he was ill at some time. And she was a child. The latter entailment is somewhat tautological for people, but we may substitute *direktor* (director) for *reb'onok* (child), and obtain (10).

- (10) Direktorom on bolel
 Director-instr he ill-past
 He was ill when he was the director

With this sentence, the entailment seems to be more readily obtained: he was a director at some time or other.

But now let us add a quantifying adverb, e. g. (11).

- (11) Reb'onkom on často bolel
 Child-instr he often ill-past
 He was often ill as a child

We have a difficulty with the expected entailments: the sentence (11) without the DP_{instr} modifier does not follow from (11). It was different without the adverb: clearly, if someone was ill as a child in some circumstances, he was ill at some time under these circumstances. But if someone was often ill as a child under the circumstances, he need not have been often ill in general under these circumstances. The quantificational adverb needs a restrictor. We seem to implicitly change the situation which restricts the quantificational adverb *často* (often). The only observable change made was to drop the modifier. Therefore we must conclude that the temporal instrumental constrains the restrictor clause in the quantificational structure of the sentence. Dropping the restriction amounts to changing the reference of the situation term. Our entailment test is not applicable to this case, hence it is actually vacuously satisfied. But the problem of the place of *instr*-modifiers in the quantificational structure of the proposition remains, and we will return to it. This will lead us to determining the pragmatic status of the interpretation of intersective modifier DP_{instr} .

2. The theory

We understand the hypothesis put forward by Jakobson in the way which allows us to say that we infer the interpretation of DP_{instr} in the context (where the notion of interpretation is as discussed above). We consider interpretation to be an instance of inferential activity. The kind of activity we mean is hypothetic inference, often termed *abductive inference* or *abduction*. The context we mean includes the representational description of the situation the sentence characterises. Technically we shall provide such a description by giving a discourse representation associated with the sentence. We need to be very explicit, however, as far as our understanding of the terms *situation* and *abductive inference* are concerned, since they often give rise to misunderstanding and sometimes to a - in our opinions often misplaced - critique.

Our general position can be summed up in (12).

(12) The hypothesis of interpretation.

In all the cases under investigation we have an *abductive interpretation* of the predication relation introduced by the syntactic structure $[_{PrP} PRO [_{Pr^0} Pr^0 DP_{instr}]]$ which embeds a DP_{instr} .

We shall now explicate the hypothesis.

2.1. Abductive inference

For simplicity we will ignore here the contexts of interpretation which go beyond simple clause. The formalisation draws on Poole (1989) and Poole (1988). We consider P to be an explanation of ϕ according to (13).

(13) $\Gamma \cup P$ explains ϕ if the following holds:

- (i) $P \cup \Gamma \models \phi$
- (ii) $P \cup \Gamma$ is consistent

Consider Γ in (14). This is a set of background facts.

$$(14) \Gamma = \left\{ \begin{array}{l} \textit{rained-last-night} \rightarrow \textit{grass-is-wet} \\ \textit{sprinkler-was-on} \rightarrow \textit{grass-is-wet} \\ \textit{grass-is-wet} \rightarrow \textit{shoes-are-wet} \end{array} \right\}$$

If we observe $\phi = \textit{shoes-are-wet}$ and want to explain it in this technical sense, we could have two explanations. The two hypotheses (the explanations) of $\textit{shoes-are-wet}$ are $P_1 = \{\textit{rained-last-night}\}$ and $P_2 = \{\textit{sprinkler-was-on}\}$. We can choose one of them.

The hypotheses may include rules, i.e. implications. If we agree to use rules as hypotheses, whenever consistent, though subject to competition and choice, we have the concept of a default rule. Hypotheses in general are used when there is evidence for them, i.e. some observation which requires an explanation. Defaults are simply hypotheses which are used whenever possible.

Consider (15). The hypothesis can be treated as a default, and if we inquire what can be said about the flying abilities of *bob*, we have to use the default.

$$(15) A_{\textit{birds}} = (\Gamma, \Pi)$$

$$\Pi = \{ \textit{bird}(X) \rightarrow \textit{flies}(X) \},$$

$$\Gamma = \left\{ \begin{array}{l} (\forall X)(\textit{emu}(X) \rightarrow \textit{bird}(X)), \\ (\forall X)(\textit{emu}(X) \rightarrow \neg \textit{flies}(X)), \\ \textit{emu}(\textit{polly}), \\ \textit{bird}(\textit{tweety}) \end{array} \right\}$$

Since we know nothing else about *bob*, we only get a conditional assertion. We know that *tweety* is a bird, so we can explain its flying. We cannot explain the flying of *polly*, since this would contradict the facts.

This simple sketch of the use of abduction suffices for the moment to draw a sketch of interpretation by abduction.

2.2. Interpretation by abduction

In general, what is interpreted by abduction is an underspecified semantic representation. We must determine where this representation comes from and how the syntactic structure enters the interpretation.

We assume the hypothesis of Logical Form being the contribution of grammar to semantics and use the term "the logical form of the sentence" accordingly. Logical Form is a level of syntactic representation which specifies the propositionally relevant aspects of syntactic structure. This representation is converted to representations of propositions. The latter are thus very abstract *semantic values* of logical forms which we may call semantic forms of sentences. The representational module can be called Semantic Form (SF), by analogy. We will not specify

the conversion algorithm LF - SF, but but we will assume that a grammatical relation of syntactic structure (i.e. a relation like *subject*) may be directly associated with a semantic value or with a special inference pattern. Moreover, we split this associated contribution into two parts reflecting both the syntactic and the semantic contribution of LF. Thus, we may transcribe the propositional impact of the subject relation between two nodes in a logical form by introducing the relation $gfsubject(i, j)$ whose terms are the discourse referents associated with the nodes. The associated semantic value may be specified as $argsubject(i, j)$, standing for something like *i is the argument of j which stands to it in the subject relation*.

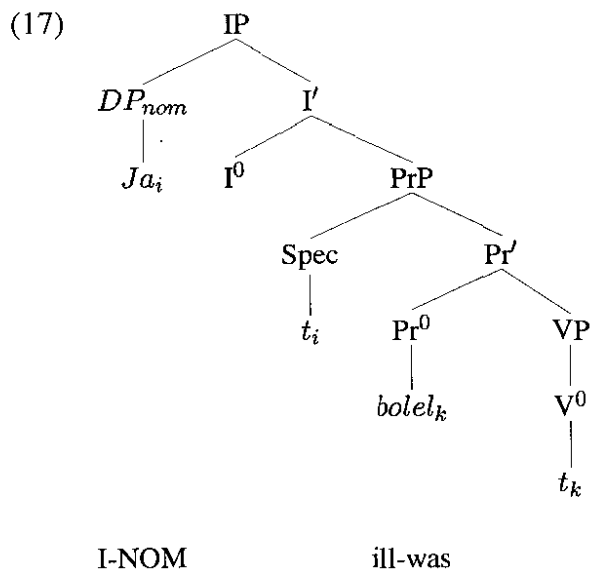
This split has a special function. In interpreting syntactic structure semantic values are input to the abductive component of inference which further specialises them, depending on the context they are in, e.g. on the verb which provides the referent *j*. The grammatical context (things like $gfsubject(i, j)$) enters the interpretation as facts which may be used to constrain the interpretation, but not as observations. Our defaults which are involved in the interpretation should therefore be indexed by contexts, e.g. be bound to a lexical entry.

To write semantic values we use Discourse Representation Theory of Kamp and Reyle, DRT. The basic reference is Kamp and Reyle (1993), a more recent one is Kamp and Rossdeutscher (1994). We assume that the syntactic representations which serve as an input for constructing semantic representations are Logical Forms (Szabolcsi, 1997, has proposed this approach). LF has tree structures labelled with syntactic information. We shall also assume that subcategorising syntactic relations are registered in the lexical entries, so that syntactic structures of lexical entries are trees.

As far as the machinery of DRT is concerned, we will refrain as far as possible from introducing it formally and only provide illustrations in cases where semantic representations are necessary. Appendix A contains some basic definitions.

Under these assumptions (17) is the logical form of (16) and (18) is its semantic representation in the DRT format.

(16) Ja bolel
I was ill



(18)	<table style="border-collapse: collapse; width: 100%;"> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">s, t_s, now</td> <td style="padding: 2px 5px;">u</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;">$before(t_s, now)$</td> <td style="padding: 2px 5px;">$myself(u)$</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">$argsubject(u, s)$</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">$ill(s)$</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px 5px;"></td> <td style="padding: 2px 5px;">$gfsubject(u, s)$</td> </tr> </table>	s, t_s, now	u	$before(t_s, now)$	$myself(u)$		$argsubject(u, s)$		$ill(s)$		$gfsubject(u, s)$
s, t_s, now	u										
$before(t_s, now)$	$myself(u)$										
	$argsubject(u, s)$										
	$ill(s)$										
	$gfsubject(u, s)$										

The semantic representation records that the situation is the one of being ill, $ill(s)$. The discourse referents (DR) s and t_s are introduced by *INFL*, together with the condition $before(t_s, now)$ (t_s is the time of the situation). The discourse referent u and the condition $myself(u)$ are introduced by *I*. The DR plays the role of the subject argument, which is expressed by $argsubject(u, s)$. Moreover, there is a record coming from the logical form of the sentence that the subject relation (grammatical function) holds between the two referents indicated, $gfsubject(u, s)$. We do not distinguish discourse referents in the syntactic relations from those in semantic relations. The underspecified interpretation which is the observation to be explained is $argsubject(u, s)$. The interpretation is done by abductive inference. We may specialise $argsubject(u, s)$ in the context of the situation s characterised as $ill(s)$ by hypothesising that this relation can be explained by myself being the theme of the situation of being ill, i.e. the person who is ill. This may be done using first order theories like (19) and (20).

$$(19) \quad A_{theme} = (\Pi)$$

$$\Pi = \left\{ theme(E, X) \rightarrow argsubject(X, S) \right\}$$

$$(20) \quad A_{ill} = (\Gamma)$$

$$\Gamma = \left\{ \begin{array}{l} ill(S) \rightarrow is - ill(X, E) \\ is - ill(X, E) \rightarrow theme(E, X) \end{array} \right\}$$

The theory in (19) contains a default to the effect that themes are subject arguments. Being a default, this rule can be overridden by the fact that whenever an agent is present in a situation, it will be realized as subject. Then another realisation of theme must be codified as a default, but one which is weaker⁷. The theory in (20) says that a situation s labelled $ill(s)$ is built up around an eventuality (i.e. process or state) in which someone is ill, and this individual X plays a role classifiable as theme, $theme(E, X)$. The latter condition may also be rendered by $theme(E) = X$, if the relation is considered to be functional. The explanation of $argsubject(u, s)$ is given by (21), on the assumption that $ill(s)$ holds, i. e. that this is the situation we have.

$$(21) \quad \{ is - ill(u, E), theme(E, u) \rightarrow argsubject(u, s) \} \models argsubject(u, s)$$

Since we are indeed in the situation $ill(s)$, $is - ill(u, E)$ helps to explain $argsubject(u, s)$. Which is to say the sentence is interpreted as *I am ill*.

The theory of interpretation sketched here is presented in more detail in Strigin (1999).

⁷ Strigin (1999) has a more complete treatment of such a thematic role theory in an abductive framework.

3. Interpreting *instr* abductively

Given the abductive framework we sketched, there are two possibilities to proceed with the interpretation of the *PrP*.

3.1. Interpreting INSTR: First version

We could postulate default rules which interpret some underspecified semantic relation R_{instr} which is associated with this case as its interpretation. Suppose (22) is such a rule where $msoftransport(S, E, X)$ is the predicate which is true of a means of transport X in situation S which contains some movement event E . Then (23) is a partial representation of (2). The referents ls, lg denote the implicit source and goal in S (Kamp and Rossdeutscher, 1994).

$$(22) \quad A_{instr} = (\Gamma, \Pi)$$

$$\Pi = \left\{ msoftransport(S, E, X) \rightarrow R_{instr}(S, E, X) \right\}$$

s, t_s, now	u, e, z, ls, lg
$before(t_s, now)$	$he(u)$
(23)	$move(e, u, ls, lg)$
	$theme(e) = u$
	$msoftransport(s, e, z) \text{ train}(z)$

Under this approach we must explicitly register all the interpretation possibilities of R_{instr} along the lines of (22). The particular hypothesis is always available, but it can only provide the $msoftransport(S, E, X)$ part of the representation as an interpretation of R_{instr} , if $msoftransport(S, E, X)$ is already contained in the situation! What new contribution the rule provides is relating $train(Y)$ to $msoftransport(S, E, X)$. The approach predicts that this particular reading is obtainable in situations which can accommodate it by actually having a referent for the means of transport.

A technical point is to specify which structure is interpreted by the relation R_{instr} . It can be the (abstract) case itself, or the predication structure.

3.2. Interpreting INSTR: Second version via predication relation

We do think that the first approach does not fully exploit the possibilities of abduction. We would rather take R_{instr} to be more specific and postulate that it is basically the relation of predication which allows to hypothetically identify the subject of predication, cf. (24). The expression $\|DP_{instr}\|$ stands for the interpretation of DP_{instr} , big X may be identified with any DR in the domain of the representation of situation s .

$$(24) \quad A_{instr} = (\Gamma, \Pi)$$

$$\Pi = \left\{ s : X = x \ \& \ \|DP_{instr}\|(x) \right\}$$

This is a sweeping claim, since it provides an interpretation schema for all referents $u \in U$ of the discourse structure with the universe U interpreted in the domain Dom_s of situation s .

We shall see where it will get us. The colon : delimits the conjunctive condition on situations here. The condition can be taken as the interpretation of the small clause containing DP_{instr} . Therefore we must specify its mode of composition. We resort to abduction here, too, by using (25).

$$(25) \frac{p \ \& \ q \quad (p \ \& \ q) \rightarrow q}{q}$$

We can conceive q as an indication that $p \& q$ is the case. If we have no evidence that p and q are somehow related, the assumption $p \ \& \ q$ seems to be unwarranted. But if a number of observations established that q is often accompanied by p , then the reverse use of this instance of modus ponens amounts to assuming that in the case under observation the situation is the same, though we have no observed data on p . The point here is context-dependence of the criteria of what is a good assumption. Since $(p \ \& \ q) \rightarrow q$ is a tautology, we can always use modus ponens to make the assumption that $p \ \& \ q$, given q , but in some contexts it is a good hypothesis, in some a less good one. If I see an unknown dog carrying a newspaper in the maw, I am inclined to think that the owner must be around, too. If it were just an unknown dog without any embellishments, the hypothesis seems to be ill justified.

From a somewhat different point of view, we can take $(p \ \& \ q)$ to be a hypothesis about the relation between p and q , given that we have to explain q on the assumption that p . There is a linguistic sense to this move: if q occurs in the presence of p , then they probably must be conjoined. An adjunct can therefore be always conjoined, by default. Hence, this default is an least one possible interpretation of the syntactic adjunct relation. The conjoined hypothesis is a predicate on some discourse referent in the universe of the situation. Since we interpret conjunction within the one and the same situation, the situation argument is left implicit.

We shall adopt this course of investigation and apply it to the three uses of *instr*.

4. The three cases of *instr*

4.1. *Instr* of transport

This is probably the easiest case. Conjoining a predicate with a DRS amounts to simply importing this predicate into it. If a situation characterised by the DRS contains the referent for the means of transport, this referent can be hypothetically taken to be the value of X in (24).

- (26) On exal poezdom
 He drove train-instr
 He was going by train

(27)	s, t_s, now	u, e, z, ls, lg, w
	$before(t_s, now)$	$he(u)$
		$move(e, u, ls, lg)$
		$theme(e) = u$
		$msoftransport(e, z)$
	$z = w \ train(w)$	

The proposal also predicts that the reading is only possible with situations which already have the appropriate referent. We can check this prediction in (28).

- (28) *On spal poezdom
He slept train-instr
He slept while being transported by train

The sentence is unacceptable. It is of course quite possible to characterise the situation with the help of a locative PP.

- (29) On spal v poezde
He slept in train
He slept on the train

The reason for the difference under our theory is the difference in the interpreting relations: locatives relate events within the situation to a location, whereas the instrumental of transport merely identifies two referents one of which is a means of transport.

There is another curious fact which can probably be explained under the predication interpretation of *instr*. If a quantified distributing DP is put into predicational *instr*, the result is unacceptable, cf. (30). If we manage to indicate that there is a need for the wide scope of *každydym poezdom*, as in (31), the sentence becomes acceptable.

- (30) *On exal každydym poezdom
He went every train-instr
He drove on every train

- (31) On exal každydym poezdom dva časa
He went every train-instr for two hours
He drove two hours on every train

Similar effects are known for copula structures in English where quantifying-in gives some sentences an acceptable interpretation⁸.

4.2. *Instr* of path

The treatment is essentially the same. Some new points of interest arise, however. We have (34) as a partial representation of (33).

- (33) On šel dorogoj
He went road-instr
He was going on the road

⁸ Partee (1987) proposed a number of type-shifting operations to account for the semantic NP-type ambiguities. None of them would allow a distributive generalised quantifier like *every* to be a predicate. Examples like (32) seem to contradict it.

(32) This house has been every colour

They motivated Partee to propose that nouns like *colour* are predicates of those properties which are among the entities of the domain of type *e* of individuals and (32) are cases of quantifying-in into contexts forming predicates out of properties.

	s, t_s, now	u, e, z, ls, lg, w
(34)	$before(t_s, now)$	$he(u)$ $move(e, u, ls, lg)$ $theme(e) = u$ $path(e, z)$ $z = w road(w)$

The availability of the path discourse referent in the representation of the situation is a necessary prerequisite, as the pair (35) and (36) shows.

- (35) On šel asfaltovoj dorogoj
 He went asphalt road-instr
 He was going on the asphalt road

- (36) ??On spal asfaltovoj dorogoj
 He slept asphalt road-instr
 He was sleeping on the asphalt road

The example (37) and the fourth example in (1f) seem to contradict this generalisation.

- (37) On spal dorogoj
 He slept road-instr
 He was sleeping on the road/way

It can be argued, however, that *dorogoj* (*way-instr*) is an adverb. The semantics of this adverb is a generalisation of the part of any situation of movement which contains the referent for the path.⁹ The accommodation of such an adverb in case of (37) can proceed by extending the representation of any situation which allows some participant to undergo movement simultaneously with the main eventuality of the situation. The extension is with that part of the movement situation which is associated with the adverb.

There are some restrictions on what can be a path in this use of instrumental, but they are difficult to state. Paths in instrumental should be more or less natural. Thus, if the movement is within a city, the city provides a natural path. If, as in case of perfective verbs, we are interested in the state at the end of the path, a city is no longer a good path, whereas a road still is one, cf. (38), (39) and (40).

- (38) On šel Parižem
 He went Paris-instr
 He was going/walking through Paris

- (39) *On prišel Parižem
 He arrived on foot Paris-instr
 He arrived through Paris

⁹ Traditional Russian grammar theory often describes e. g. temporal uses of nouns in the instrumental case like in (4) as adverbs and speaks of adverbial derivation. However, Isačenko (1962) noted that this kind of derivation does not really allow to form new adverbs. He proposed to characterise the process of forming occasional adverbs as *entstehung* (coming into being, emergence) rather than derivation. Some uses of DP_{instr} gradually become adverbialized. Such development is a separate topic of investigation, however.

- (40) On prišel dorogoj
 He arrived on foot road-instr
 He arrived via a road

Similarly for *voda* (water) in (41). There is nothing wrong about water being the surface on which the transportation takes place, as (42) shows.

- (41) ??Oni dobralis do goroda vodoj
 They reached to town water-instr
 They reached the town by water

- (42) Oni dobralis do goroda po vode
 They reached to town on water-prep
 They reached the town by/through water

The restrictions become explainable, if considerations of conceptual characterisations are involved in deciding whether to choose the referent as a good hypothesis. Thus, Paris probably ceases to be a good hypothesis in the context of a telic verb, because it cannot be portioned in pieces with a declared end. Similarly for water, but not for roads.

Quite in parallel to the use of instrumental to mark means of transportation, distributive quantification with narrow scope is bad with the instrumental of path, but not in general for paths, as (43) and (44) show.

- (43) ??On projexal každydym gorodom
 He went through every town-instr
 He went through every town

- (44) On projexal po každydomu gorodu
 He went through upon every town-dat
 He went through every town

4.3. Temporal *instr* 1

The temporal use of instrumental presents more difficulties. We assumed at the start that the default mode of combination of a *PredP* with the matrix sentence is that of simple conjunction. The temporal use is difficult, as (45) shows, for although the predication is of the subject, the sentence does not assert merely the simple conjunction of the matrix sentence and the predicate expressed by the DP_{instr} . Thus, (45) does not simply mean that at some time in the past he was a child and was ill.

- (45) Reb'onkom on bolel
 Child-instr he ill-past
 He was ill as a child

The correct interpretation seems to be derived by constructing a temporal characteristics for any model which is relevant to the evaluation of the sentence on the basis of the direct predication. To construct the temporal characteristics we restrict our attention to the time at which the $\|DP_{instr}\|$ is true, i. e. restrict the situation (the model) to that time, and then assert the

matrix sentence relative to this restricted situation. This assertion relative to a time cannot be adequately rendered by the simple truth-functional conjunction, as it seems. The point needs some elaboration.

One way to represent the temporal reading of the instrumental is to postulate a regular lexical process forming temporal predicates from temporally dependent nouns. The derived predicates should then be used like temporal adverbs, e.g. *yesterday* or *on May, 21*. The interpretation would also be similar e.g. *the time which is May, 21* vs. *the time when x was a child*. The conjunction of the matrix sentence and the adverb would yield an interpretation like *there is a time satisfying the temporal predicate at which the matrix sentence is true*. It is immaterial here, that we resort to lexical processes, since we could mimic this lexical process via an inference in the context. The point is this would not be adequate.

First, we noted that (11) violates our expectations about the entailments, and suggested that DP_{instr} provided a condition for the restrictor of the adverb of quantification *často* (often). What we now suggest is that there is a certain quantificational structure of the proposition even if there is no adverb of quantification. The structure of a proposition is always a restrictor and a nuclear scope, i. e. a predication. Moreover, we suggest that relativisation is not always a conjunct formally speaking.

Suppose we use a different temporally dependent noun which does not imply that there is a single homogeneous time period associated with every member of the extension of the noun¹⁰, e. g. (10).

- (46) Direktorom on bolel
 Director-instr he ill-past
 He was ill as a director/whenever he was a director

The time period of being a child associated with somebody is homogenous. Not so the period of being a director associated with a person. There may be several periods when the *he* of (46) was a director which are separated by times when he was not. Now, what (10) may mean is that at least some times when he was a director he was ill, but may also mean that each time he was a director he was ill. The second reading is no longer a conjunction, but rather a conditional. We seem to relativise the assertion that he was ill to either some or to all relevant periods. The accompanying change seems to be from the conjunction to the conditional. This change is easily explainable, if we note that we have a distribution of $||DP_{instr}||$. In other words, if the restriction of the situation can distribute, we get a conditional, if not, a conjunction. Such effects are well-known with definite plural DPs. The interesting thing is that we do not have a plural here.

Second, there is a certain pragmatic implicature in case of (45). This sentence is perfectly OK *only when* the person referred to by *he* is not a child at the time of utterance! Otherwise it is infelicitous. This implicature is unexpected, if we have to do with a simple conjunction. But it can be explained by pragmatic factors, if we assume that the temporal interval provided by the predicate in the instrumental should play a role different from the one played by time of the utterance or the time of the situation which sets the index of the model, and should restrict

¹⁰ A set S with the join operation \sqcap is homogenous, iff for any two objects

(i) if $e_1 \in S$, $e_2 \in S$, then $e_1 \sqcap e_2 \in S$ (cumulativity),

(ii) if $e \in S$, and $e = e_1 \sqcap e_2$, then $e_1 \in S$, $e_2 \in S$ (distributivity).

As usual, *join* is a binary commutative and associative operation.

the situation.

To render these intuitions about restrictions formal we need the possibility of referring to separate temporal stages of the same individual plus the *reference time* of the situation, t_s , and not simply the time of the situation. The difference is this: whereas we took the time of situation to be simply the temporal index of a model, the reference time of a situation is a restriction of this index for the purpose of making some part of predication in the situation only with respect to the restricted index. We will retain the notation t_s for the reference time, and will not bother to explicitly specify the time of situation any longer, since reference times of situations seem to be sufficient. We shall comment on our use of the term *situation* in a moment, and suggest a first approximation to the semantic representation of (45).

We must restrict the situation in which there exists a person referred to by *he* to the time specified by the DP_{instr} *reb'onok* (child), and then evaluate the rest of the sentence with respect to the restricted temporal interval. But to be able to accommodate the implicature that the person is no longer a child, we separate the universe of the discourse structure into two universes. The one is the general universe of the situation, the other is the universe of the restrictor. This gives us a quantifier-like representation, in which the overall situation of utterance is not represented by a discourse referent, whereas the restricted situation is represented. The restrictor is the left sub-box, the predication is the right sub-box.

u now	
s t_s	e
$before(t_s, now)$	$he(u)$
$t_s = t$	$be-ill(e, u)$
$child_t(x)$	$theme(e) = u \ x = u$

Here t in the abbreviation $child_t(x)$ denotes the time when $child(x)$ is true. Evidently, the additional predication $t_s = t$ is a new hypothesis. The interpretation of the whole structure is like this: the sentence is true in a model if the DR embeddable. It is embeddable, if

- (i) the restrictor is embeddable, and
- (ii) the embedding of the restrictor may be extended to that of the predication

What happens is the following: we hypothesise that the subject is the referent of the predication associated with the instrumental. Presumably because there is already one predication structure for the subject (built on the main verb), and the addition of a new parallel predication structure is achieved via a conjunction, a different hypothesis is put forward. This hypothesis is to take temporally dependent DPs as restrictors of the situation. It yields a quasi-quantificational structure of the situation. Note that this cannot be simply a conjunction, because this is a different hypothesis. In fact, as we shall discuss at the end of next section, the restrictor is a kind of presupposed information.

The relation between the reference time of the situation and the time of the event associated with the verb is indirect. *On* (he) in (45) need not be ill all through the time he was a child. Therefore we need an additional event referent. The identification of the two discourse referents for the individuals is possible on some additional assumptions, e. g. that a child grows up to become an adult, but remains the same person.

Now the use of the situation becomes a deviation from the standard DRT-apparatus, and we will try to clarify our use of the term.

4.4. Situation

There are different traditions of the use of situations in semantics. The most widespread one is to conceive of them as total models and relativise all the pertinent semantic relations to a model, if necessary, and not refer to situations explicitly (Chierchia and McConnell-Ginet, 1990). This is the classical Fregean approach. Situation theory with its starting point in Barwise and Perry (1983) is a radical departure from the bulk of assumptions of Fregean-type natural language semantics. Situations are conceived here as information objects. Yet another way of using situations is to take them to be a kind of object in itself, a kind of individual in the sorted domain of different kinds of individuals. This use is found in Kratzer (1989) and Berman (1987). If semantic interpretations of situations are used at all, this is the closest to our demands.

But we need somewhat different aspects of situations. Situations should serve as reference points which specify the information available in them, but we would not like to identify them with that information. We therefore divorce situations from information and make them entities in the domain on the one hand. But on the other hand we will treat them as contexts which guide interpretation and provide useful information for that purpose.

Consider (48). The date provides a temporal anchor for the event of Peter's sleeping.

(48) On March, 21, 1990, Peter slept.

As is well-known, if some such anchors are not available, they are obtained by inference. If the information which can be inferred is not enough, the sentence sounds strange or infelicitous. Thus (49) is hardly interpretable as an assertion at all out of the context, because the temporal anchors are very weak and we cannot resolve the temporal ambiguity.

(49) Peter slept.

The date in (48) is not necessarily predicated of the time of sleep. The exact nature of the relation between the temporal anchor and the time of sleep is not definitely specified. His sleep need not take place during the whole time characterised as March, 21, 1990, and the relation may be more like that of inclusion. So we may resort to the concept of situation and say that the time of this situation was on March, 21, 1990, and Peter slept at some time during the situation. We thus temporally specified a context of inferential behaviour.

It might seem that this move is representationally superfluous, but actually this indexing by a context has interesting consequences. Further discourse may shift the context by extending the situation with material from common ground or in other ways which involve temporal indexing. Therefore, inferences about temporal indexes could become dependent on the situation.

Let (50) be the continuation of the story of Peter.

(50) This was a good thing to do, because March, 21, 1999, was a bleak and cold day

We would like to infer that Peter slept at some time during the day and that day was a part of March, 21, 1999. We cannot consider the inference about Peter's sleeping during the day as generally given. It depends on the assumption that the causative relation should connect relevant statements, and bleak days are the reason for the characteristics *good* for sleeping only if it takes part during them. So we treat the situation description as a kind of context and limit our inference that Peter slept during the day to this context.

We would not speculate here on what information from the sentence can serve as an anchor, except the temporal and the existential. But we would like to be able to collect all relevant anchors from a sentence separately. The rest of the representation of the sentence is then taken relative to these anchors. To give an example, (51) is the first attempt at a partitioning into the anchors and the assertion part the representation for (48). Here, s is the discourse referent (DR for short) of situation, now is the time of now, p is the DR for Peter.

(51)

	s t_s	now p
	$before(t_s, now)$ $peter(p)$	e
	$March_{21}(t_s)$	$sleep(e, p)$

We have two kinds of anchors here: the temporal information and the condition introduced by the proper noun. We also implicitly index the predicate $sleep(e, p)$ to the time of situation t_s , i.e. we put it into a context. Putting things into contexts is what situations are for.

The notion of situation is thus dependent on the notion of context, which is just as rubbery and needs a theory. The theory of context we would like to have should be modelled after McCarthy (1993) and McCarthy and Buvač (1997)¹¹. For theoretical reasons these two papers make a distinction between contexts and situations, but make it possible to assign a context to any situation. We see no need to follow them in this paper.

Collecting some information about a situation separately as anchors gives this information a kind of presuppositional status: whether we assert something about the situation anchored in a particular way or deny something about it, it should remain the same situation due to the anchoring. We may now identify the anchors with the restrictor on situations which we needed to account for the temporal use of the instrumental. This move has some explanatory power, because in the case of the temporal use of *instr* this presuppositional status can indeed be observed. The temporal restriction by a DP_{instr} is like a kind of presupposition. A denial of the assertion still refers to the period when the person was a child (52).

- (52) On reb'onkom ne bolel
 He child-instr not ill was
 He was not ill as a child

This fact is reminiscent of Frege's argument about existential presuppositions of proper names. Frege argued that if the names were not presupposing their bearers, but rather asserting their existence, the denial of

- (53) Kepler discovered Neptun

would have been equivalent to

- (54) Kepler did not discover Neptun, or there was no Kepler.

which is usually not the intended meaning. Similarly with (52) or (55).

- (55) On diektorom ne bolel
 He director-instr not ill was
 He was not ill as a director

¹¹ See Strigin (1999) for an attempt to integrate their theory into a linguistic description.

The normal interpretation is the one which denies that he was ill when he was a director, and not the disjunction of the negations.

4.5. Temporal *instr* 2

There are some interesting problems with the temporal use of the instrumental case. The most interesting one is that of temporal nouns in instrumental. We call these nouns distributive temporal predicates, for reasons which will immediately become obvious.

A noun like *leto* (summer) is predicated of a temporal discourse referent, and not of the subject. We consider this referent to be the reference time of the situation, i.e. a temporal anchor of the situation.

- (56) Letom on bolet
 Summer-instr he ill
 He was ill this summer/in summer

The representation is straightforward.

	<i>now</i>	<i>u e z</i>
	<i>s t_s</i>	
(57)	<i>before(t_s, now)</i>	<i>he(u)</i>
	<i>t_s = t</i>	<i>be-ill(e, u)</i>
	<i>summer(t)</i>	<i>th(e) = u</i>

The curious thing about this use is that some rather similar temporal uses of nouns denoting temporal measure units are impossible.

- (58) *Časom on čital
 Hour-instr he read
 He was reading for an hour/this hour

If the unit is used in the accusative, the sentence is OK with the durative reading of the *DP_{acc}*.

- (59) Čas on čital
 Hour-acc he read
 He was reading for an hour

Distributive temporal predicates e. g. *den'* (day), can be used in both ways. But only in the use requiring the instrumental such words cannot be modified by *celyj* (whole).

- (60) on čital (*celym) dnem
 He read (*whole-instr) day-instr
 He was reading the whole day

- (61) on čital (celyj) den
 He read (whole-acc) day-acc
 He was reading (the whole)/for a day

We proposed that DP_{instr} in such use are situation restrictors, i. e. anchors. We may therefore provisionally conclude, that temporal measure units are probably bad anchors. The accusative is then the case which is reserved for duratives.

If so, there must be some characteristics distinguishing good temporal anchors from durative use. Indeed, there is a substantial difference between the two kinds of temporal predicates. The ones we call distributive predicates are really distributive. Any part of summer is summer. Units are not: no part of a week is a week. The modifier *celyj* (whole) disallows ditribution. Distribution correlates with quantificational structures. So, if we assume that the anchoring function of temporal predicates (i. e. their functioning as restrictors) requires the preservation of the potential for distributivity, temporal units are excluded.

However, one may think that if temporal units are pluralized, they should acquire the ability to distribute, if the theory of plural in Krifka (1989) is assumed. This seems to be born out at first, because temporal unit nouns in plural can be used in free instrumental.

- (62) Časami on čital
 Hour-instr he read
 He was reading for hours on end

However, there is still a difference with distributive predicates. A plural temporal unit is probably best regarded as predicated of the event or state of the situation, and not of its reference time.

This can be easily shown. Perfectivizing the verb immediately blocks the interpretation with the plural unit, but not with distributive temporal predicates in singular.

- (63) *Časami on pročital knigu
 Hour-instr he read the book
 He read the book in hours
- (64) Večerom on pročital knigu
 Evening-instr he read the book
 He read the book (to the end) in the evening

The complex *event : state after it* which is characteristic of Russian perfectivisation is not distributive. It should be, however, because of the homomorphic requirement associated with the distributive nature of the temporal referent of *časami* (hours-instr). This homomorphism is the cornerstone of the theory in Krifka (1992). No homomorphism is required from temporal noun anchors, which are singular and distribute on demand, and not maximally. Thus, (65) is OK, (66) is out, but if we let *dvaždy* (twice) have scope over *nedel'asami* (weeks-instr), the sentence becomes OK with the durative reading for *nedel'ami*, (67) .

- (65) Letom on dvaždy bolel
 Summer-instr he twice ill
 He was twice ill this summer/in summer
- (66) *Nedel'ami on dvaždy bolel
 Weeks-instr he twice ill-past
 For weeks he was twice ill

- (67) On dvaždy bolel nedel'ami
 He twice ill-past weeks-instr
 He was twice ill for weeks.

The same operation can be done on (65). The interpretation is that he was twice ill in summer (different summers), but not that he was twice ill during the whole summer (different or same).

We may cautiously conclude that the additional hypothesis which interprets the DP_{instr} which is temporally dependent or a ditributive temporal predicate is that it characterises the reference time of the situation, and that this time is not identical with the time of the event of the situation. What we still did not explain is the strange requirement on such DP_{instr} of ditributivity on demand, which seems to be associated with this hypothesis. We do not have a good explanation at present.

5. Discussion and conclusions

We would now like to sum the developments of the paper up.

We proposed that the three adjunct uses of DP_{instr} should be treated as having a uniform structure. This is the structure of predication within a small clause. The choice forced us to postulate a uniform interpretation for DP_{instr} in such structures. This presented a problem of accounting for the polysemy in the three free DP_{instr} -adjuncts.

We proposed an abductive theory of interpretation which can handle this problem without assigning these three different meanings to each DP_{instr} . It is based on inferring the referent of predication within the description of the situation, and possibly making additional hypotheses. The theory seems to work, but there are some questions to be answered yet.

Is there a better alternative using another syntactic structure? Sentences like (68) show that some syntactic constraints are operative¹², so the structure is important. There is no reading on which the advice was given when Peter was a child. Under the syntax of PrP the dative object is the complement to V^0 , and not the specifier of PrP , and cannot control PRO .

- (68) *On uže reb'onkom_i sovetoval Petru_i begat
 He already child-instr advised Peter to run/jog
 He advised Peter to jog already as a child

While the theory of Bailyn explains this, we are not aware of other comparable syntactic solutions which would explain this restriction and treat the assignment of INSTR uniformly. If Bailyn's theory is adopted, however, we see no way of a lexical treatment of instrumental adjuncts in the way Wunderlich (1997) proposes for secondary predication. Wunderlich's proposal is suggestive here, because the instrumental case can be the case of secondary predication, too.

Note that since the PrP clause responsible for the cases under consideration is attached to the IP node we can speculate on the role of syntactic scope. We spoke about semantic control in Russian in section 1.1.. We actually meant the possibilities of the identification of the discourse referent introduced by PRO with some discourse referent in the domain of the DRS. We might define an accessibility order on the universe of the DRS which depends on syntactic scope, i.e. on the c-command relation. We can postulate that the identification of a DR u with the DR of PRO (i. e. semantic control) can take place only if the PRO -node discourse referent

¹² We are working on the problem of how to handle these syntactic constraints in inference.

can access u in the c-command ordering. if this convention is adopted, then the attachment site at IP would only allow the identification of the discourse referents which have no syntactic realisation. The temporal use 1 case, when the subject provides the DR to control PRO would then have the same structure, as (8). Indeed, this position might be a good alternative proposal for all kinds of PrP -Adjuncts. We have not yet clarified the relative merits of the two proposals.

Another problem is that of the scope of the treatment. We proposed that any discourse referent in the domain of the situation can serve as the subject of predication. Some discourse referents in the domain of the discourse representation of the situation seem never to be able to be the subjects of *instr*-predication. This can be formally reflected, but is conceptually unsatisfactory without an explanation. We used discourse referents for the source and the goal of movement in movement situations, for instance, following Kamp and Rossdeutscher (1994). But these referents do not seem to enter the predication relation. However, it can probably be argued that *ls* and *lg* are not legal semantic referents for either core or periferal grammatical cases, since they are narrowly connected to PP-adjuncts. This line of thought requires a more elaborate picture of situation types and their discourse referents (Strigin, 1999, discusses some similar cases). In case it is viable, it can also be a contribution to a theory of the semantic PRO-control in Russian.

The three uses of the free instrumental are not the only ones, as (1f) showed. We intend to extend the theory to all non-idiosyncratic uses of the instrumental case, including the construction of secondary predication in Russian, but this is future work.

What we hope to obtain as a side effect of providing an interpretation of sentences with a DP_{instr} is

- to provide a contribution to the constructional conception of meaning (meaning in context);
- to provide a contribution to the study of the interpretation of adjuncts;
- to further develop the inferential approach to semantic interpretation.

A Appendix. The Semantic Basics of DRT

For the sake of better integration of the results of this work into general semantic theory we present a small portion of the discourse representation theory, DRT. The main references are Kamp and Reyle (1993), Kamp and Rossdeutscher (1994), Cooper et al. (1994), Asher (1993). The exposition here follows mostly Cooper et al. (1994). The definition of the part of a language of DRT used in this paper is given in (1).

- (1) The vocabulary of a simple DRS language consists of
- (i) a set *Cons* of individual constants, e. g. *now*
 - (ii) a set *Ref* of discourse referents
 - (iii) a set *Pred* of predicate constants
 - (iv) a set *Sym* of logical symbols, e. g. =, \rightarrow
- The set of terms $Terms = \{Const \cup Ref\}$

A discourse representation structure (DRS) is essentially a set of discourse individuals (the universe of DRS) with a set of conditions on them which are required to hold in a situation modelled.

- (2) DRSs and DRS conditions are usually defined by simultaneous recursion, but since our example DRS are all simple, we leave the recursive portion of the definition of conditions out.
- (i) if U is a (possibly empty) set of discourse referents $x_i \in Ref$, CON a (possibly empty) set of conditions con_j , then $\langle U, CON \rangle$ is a DRS and U is its universe
 - (ii) if $x_i, \dots, x_j \in Ref$, then $x_i = x_j$ is a condition
 - (iii) if $c_i \in Const$ and $x_j \in Ref$, then $c_i = x_j$ is a condition
 - (iv) if P is an n -place relation name in *Rel* and $t_1, \dots, t_n \in Terms$, then $P(t_1, \dots, t_n)$ is a condition

DRS are defined in (i), atomic conditions in (ii)-(iv). There are no complex conditions in our language. There are two logical symbols used in the examples which do not occur in the definition of a condition, $\&$ and \rightarrow . Neither is needed in the standard development of the DRT. We use them in their standard logical meaning only to compute the semantic representations and do not want to use any of the deduction rules of the DRT for this purpose. The move is harmless, but since we do not attempt to integrate the logical terminology, we simply take care that standard model-theoretical notions of DRT are defined on DRS which contain the results of abductive inferencing and no expressions containing $\&$ and \rightarrow .

In the model theory of this fragment of DRT we represent the world by a total model $\mathcal{M} = \langle \mathcal{U}, \mathfrak{S} \rangle$ with \mathcal{U} the domain of individuals of \mathcal{M} and \mathfrak{S} the interpretation function of \mathcal{M} , which maps constants in *Const* into elements of \mathcal{U} and n -ary relation names in *Rel* into elements of the set $\wp(\mathcal{U}^n)$. A total model evaluates all sentences of the language we model as either true or false. We want a discourse representation structure (DRS) $K = \langle U, CON \rangle$ to come out true in \mathcal{M} , if its discourse referents $u \in U$ are mapped into the elements of \mathcal{U} in such a way that under this mapping all the conditions $con_i \in CON_K$ come out true in \mathcal{M} . Let $g[y] f$ be an

extension g of f , i. e. a function such that $Dom(g) = Dom(f) \cup y$

- (3)
- (i) $h \models_{\mathcal{M},g} \langle U, CON \rangle$ iff $h[U]g$ and for all $con_i \in CON$:
 $\models_{\mathcal{M},h} con_i$
 - (ii) $\models_{\mathcal{M},g} x_i = x_j$ iff $g(x_i) = g(x_j)$
 - (iii) $\models_{\mathcal{M},g} c_i = x$ iff $\mathfrak{S}(c_i) = g(x)$
 - (iv) $\models_{\mathcal{M},g} P(t_1, \dots, t_n)$ iff $\langle g(t_1), \dots, g(t_n) \rangle \in \mathfrak{S}(P)$

A mapping from K to \mathcal{M} like in (3) is called *a verifying embedding of K into \mathcal{M}* .

- (4) A DRS K is true in a model \mathcal{M} with respect to an assignment g iff there *exists* a verifying embedding h for K in \mathcal{M} with respect to g . In mathematical terms, $\models_{\mathcal{M},g} K$ iff $h \models_{\mathcal{M},g} K$.

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Reinterpretations in Adverbial Modification: A General Approach*

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Abstract

This paper is concerned with the fact that a number of adverbial modifications involve a systematic reinterpretation of at least one of the expressions connected by the operation in question. It offers an approach in which such transfers of meaning turn out to be a result of contextually controlled enrichments of an underspecified as well as a strictly compositionally structured semantic representation. The approach proposed is general for three reasons: First, it takes into account not only reinterpretations in temporal but also such in non-temporal modification. Second, it allows considering so-called secondary predications as a particular kind of adverbial modification. Third, it explains the respective reinterpretations within a uniform formal framework of meaning variation.

1. Introduction

Sometimes, modifications by temporal adverbials seem to be more than a simple composition of meaning of the original expressions. Certain occurrences of this operation give the impression that they involve also a reinterpretation of at least one of the syntactic constituents connected by adjunction. Illustrations are e.g. sentences like (1) and (2) containing durative adverbials as modifiers of verbal expressions, with which, strictly, they should not be combinable.¹

- (1) Eva hat zehn Minuten (lang) geniest.
'Eva sneezed for ten minutes.'
- (2) Udo hat zwei Stunden (lang) den Roman gelesen.
'Udo read the novel for two hours.'

Sentence (1) does not characterize Eva's single but her repeated sneezing as lasting ten minutes. (2) does not describe the state of affairs that it took Udo two hours to read a novel. It conveys, rather, how long he was busy reading the novel without reading it to the end. Therefore, in both cases, the adverbial does not specify an event appertaining to the original denotatum of the expression modified. Evidently, the given modification can be realized only if the latter is used in an accordingly adapted meaning.

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¹ Traditionally, compatibility with time adverbials is considered a crucial criterion for classifying verbal expressions into states, activities, accomplishments and achievements (see Dowty 1979). According to it, durative adverbials may modify only states or activities but not accomplishments or achievements. In contrast, time-span adverbials permit only a modification of accomplishments. Not least because of the 'exceptions' to be discussed here, the justification of these determinations has often been called in question (see e.g. Smith 1991, Klein 1994).

In this paper, I will first argue that the observation described above does not reflect merely singular occurrences of the modifying combination of meanings. Particularly, I will show that the proposal developed in Moens & Steedman (1988) of an adaptation of the situational reference of verbal expressions coerced by temporal adverbials does not cover all cases where such operations influence the interpretation of the components concerned. On the one hand, there are numerous occurrences of non-temporal adverbials that, when investigating meaning transfers of this type, have to be included as well. Moreover, from the given point of view, also so-called secondary predications can be understood as a special kind of adverbial modification. On the other hand, meaning transfers can be observed not only in the modified constituents but also in the expressions used as modifiers.

Second, I will demonstrate how systematic reinterpretations considered here can be analyzed within a multi-stage model of meaning representation. Starting from the idea that in understanding an utterance the information conveyed by it has to be disclosed step by step, the model makes above all a distinction between two types of operations – operations of computation of context-independent and, thereby, underspecified meaning, and such of a subsequent contextual specification of meaning. As a consequence, one and the same expression can receive several interpretations dependently on the context of use. Unlike other, largely similar approaches it is a characteristic feature of my proposal that the variation potential of meaning can be systematically extended by the obligatory application of special semantic operators. The strategy followed by the model has several advantages. At first – in contrast with the proposals of Pustejovsky (1995) and Jackendoff (1997) – the principle of semantic compositionality is entirely maintained in its validity. In addition, the approach opens up the possibility of explaining reinterpretations in adverbial modification not simply as coerced by the immediate linguistic context but also of allowing for global factors as triggers. And finally, the phenomena considered appear to be instances of a more general kind of meaning transfer within the model chosen, namely, insofar as the operations underlying them furnish the precondition to variants of interpretation as well in other fields of conceptual structuring.

The structure of the paper is as follows: Section 2 gives a survey of relevant data of reinterpretation in the modification by temporal adverbials. In Section 3 it is tested in how far such meaning transfers can be considered a result of more or less concrete adaptational operations. Section 4 offers, as an alternative, an outline of the multi-stage model of meaning representation. In Section 5 its application in the analysis of the problem area concerned is presented by way of example. In Section 6 and 7 the approach proposed is extended to further configurations. Section 6 is to furnish an explanation for reinterpretations in modification by adverbials of manner and location, Section 7 one for depictive and resultative constructions.

2. Temporal Modifications with Reinterpretation

Let me begin with a closer consideration of sentences (1) and (2) where, in usual view, an achievement and an accomplishment, respectively, are modified by a durative adverbial. The deviation from literal meaning observed in sentence (1) is based on an iterative understanding of the verb *niesen* ('to sneeze'). While, originally, this verb denoted only a property of momentaneous eventualities, or more simply, of moments, after its reinterpretation it can denote a property of processes composed of immediately successive acts of sneezing.² Suppose that *p* and *m* are variables for processes and moments, respectively, *AG* and *CONST* are predicates for the relations 'agent of' and 'constituent of', respectively, and τ is a functor mapping a

² Cf. (as well as with most other cases dealt with in this section) the analysis in Moens & Steedman (1988). For the assumption that processes are constituted by events or moments, see e.g. Piñón (1996).

situation to its 'run time'. Then, apart from factors irrelevant here, the core of the statement of (1) can be identified by the structure given in (1a).³

- (1) a. $\exists p$ [AG(eva, p) & $\forall m$ [CONST(m, p) \rightarrow SNEZZE(m) & AG(eva, m)]
& $\tau(p) \geq 10\text{min}$]

Thus, sentence (1) indicates the duration of a sneezing process performed by Eva.

In the case of (2), in analogy with (1), an iterative interpretation of *den Roman lesen* ('read the novel') in the sense of a chain of immediately repeated events, during which one and the same novel is read, would of course be conceptually possible. But in view of the time usually necessary and, according to (2), available for reading through novels such a procedure is hardly feasible. In order to meet the conditions of the adverbial, here the possibility is returned to of illuminating the internal structure of events and of limiting oneself in reflexion only to its so-called developmental phase. In its imperfective interpretation, the V'-expression *den Roman lesen* then denotes the set of those processes of which an event of reading a novel is composed, apart from its culminating completion.⁴ Using COMPL as a predicate for the relation of completion between events and processes, the information conveyed by (2) can be represented simplistically as follows:

- (2) a. $\exists p$ [AG(udo, p) & TH(novel, p) & $\exists e$ [COMPL(e, p) & READ(e) & AG(udo, e)
& TH(novel, e)] & $\tau(p) \geq 2\text{hour}$]

Udo so appears as an agent in a process lasting at least two hours that is part of a reading event, the subject of which is a certain novel.

Also for a sentence like (3) where again an accomplishment occurs in combination with an durative adverbial, a process-related interpretation is possible.

- (3) Anna hat fünf Minuten (lang) das Fenster geöffnet.
'Anna opened the window for five minutes.'

While an imperfective interpretation of *das Fenster öffnen* ('open the window') seems to be adequate only in particular contextual conditions, the V'-expression can be interpreted in the iterative sense without difficulty. If, however, such an understanding is not explicitly suggested by the context such a sentence will exhibit a clear preference for a third kind of interpretation, namely that where, in a derived sense, the adverbial determines the duration of the state produced by the event described. In this use (3) conveys that Anna opened the window and the resulting state of its being open lasted at least five minutes. This is represented in (3a) where *s* is used as a variable for states and RESULT and HD, respectively, as predicates for the relations 'resultative state of' and 'holder of', respectively.⁵

³ In the following, the representations of the meaning of verbal expressions are based on the neo-Davidsonian representation format as used e.g. in Krifka (1989, 1992) or Parsons (1990). (See also Dölling 1998). For the determination of phrases of measure cf. Krifka (1989, 1992) and Kamp & Reyle (1993) with some simplifications made by me for reasons of presentation.

⁴ My assumption of the temporal structuring of events is based on those that can be found e.g. in Bach (1986), Moens & Steedman (1988), Parsons (1990), Kamp & Reyle (1993), Piñón (1996) and Engelberg (1998). According to Steube (1998) events can be distinguished by whether their processual phase is focussed or not.

⁵ For the understanding of states and their holders see Parsons (1990), Kratzer (1994) and Dölling (1998, 1999). In terms of +BE_OPEN a 'blocking' manner of representation is used for the complex predicate proper. For comments see the running text below.

- (3) a. $\exists e$ [AG(anna, e) & OPEN(e) & TH(window, e) & $\exists s$ [RESULT(s, e)
& ⁺BE_OPEN(s) & HD(window, s) & $\tau(s) \geq 5\text{min}$]]

This understanding of (3) involves that – unlike the cases considered so far – the adverbial modifier is reinterpreted in accordance with the conditions of *das Fenster öffnen*.⁶ In sentence (4), the adverbial *drei Wochen (lang)* ('for three weeks') does certainly not specify the duration of a process.

- (4) Jutta ist drei Wochen (lang) zu spät angekommen.
'Jutta arrived too late for three weeks.'

The expression *zu spät ankommen* ('arrive too late') that, in its original meaning, falls into the class of achievements, is to be understood in the given use in habitual interpretation, rather.⁷ Therefore, (4) refers to Jutta's state lasting at least three weeks, the realization of which consisted in repeated but not immediately successive situations of arriving too late.

- (4) a. $\exists s$ [HD(jutta, s) & $\forall b$ [REAL(b, s) \rightarrow ARRIVE_TOO_LATE(b)]
& $\tau(s) \geq 3\text{week}$]

Here, *b* is a variable for borderline situations, or more simply, borders, as characterized e.g. by the verb *ankommen* while REAL stands for the relation of 'realization of'.⁸

Now let me turn to the analysis of cases where time-span adverbials occur as modifiers of achievements, states or activities. Since e.g. *den Gipfel erreichen* ('reach the summit') as well as *ankommen* denote a property of borders, in a sentence like (5) the adverbial *in zwei Tagen* ('within two days') cannot serve to modify this expression in its literal meaning.

- (5) Ede hat in zwei Tagen den Gipfel erreicht.
'Ede reached the summit within two days.'

But sentence (5) can be understood in a way that Ede was the agent of an event finished within two days by reaching the summit and thus culminating in it. Using FINIT as a predicate denoting the relation of 'the end of', (5a) can be considered the content of (5).

- (5) a. $\exists e$ [AG(ede, e) & $\exists b$ [FINIT(b, e) & REACH(b) & TH(summit, b)]
& $\tau(e) \leq 2\text{day}$]

⁶ This possibility of using durative adverbials, which seems to be specific to German, is usually not mentioned in the literature orientated mostly towards English. (But see Worm 1995.) For the reinterpretation of the adverbial to be stated here, a proposal for explanation was formulated in Dölling (1998), which will here serve as a starting point. Piñón (1999) argues against the necessity of a meaning transfer in such cases. He assumes that a verb like *öffnen* ('to open') contains, in its argument structure, its own variable of state, to which the durative adverbial has immediate access in modification. For various reasons, I hold such an approach to be unacceptable. In particular, it seems to be inadequate that in most cases of using the verb the argument position in hand has to be saturated by means of a doubtful operation. As further shown in Dölling (1998), however, with adverbials of the type of *für*-PP, which can also specify the duration of a resultative state, a direct combination with the according V'-expression is possible. The presentation in Piñón (1999) is correct insofar as an actualistic and a modal interpretation of such adverbials should be distinguished. (For the ambiguity of *for*-PPs in English in contrast with German *für*-PPs cf. Dowty 1979.)

⁷ Such an interpretation is suggested e.g. in Smith (1991) and de Swart (1998).

⁸ For the understanding of achievements as expressions of situations forming the beginning and the end, respectively, of states, processes and events and thus limiting them, see Piñón (1997).

It is the core of this egressive understanding that *den Gipfel erreichen* changes from a predicate of borders to a predicate of events finding their completion in such a situation. In a similar way a sentence like (6) can be treated.

(6) Sarah war in fünf Minuten wach.
'Sarah was awake within five minutes.'

(6) a. $\exists e$ [TH(sarah, e) & $\exists s$ [RESULT(s, e) & ${}^+$ BE_AWAKE(s) & HD(sarah, s)]
& $\tau(e) \leq 5\text{min}$]

As follows from (6a), Sarah is characterized as the theme of an event that results in her being awake within five minutes at most. This understanding of (6) includes that the expression *wach sein* ('to be awake') denoting originally a property of states is changed to a predicate of events having an according resultative state.⁹

It is somewhat more complicated to assign to a sentence like (7) an event-related interpretation.

(7) Peter rannte in fünfundvierzig Sekunden.
'Peter ran within forty-five seconds.'

Here, it would be necessary to understand the process predicate *rennen* ('to run') – in a complementary way as it were, to the case *den Gipfel erreichen* – as an predicate that can describe an event, the developmental phase of which is formed by processes of running. Then, the content of (7) can be identified with (7a) where the predicate SUBST denotes the relation 'substratum of' between processes and events.

(7) a. $\exists e$ [AG(peter, e) & $\exists p$ [SUBST(p, e) & RUN(p) & AG(peter, p)]
& $\tau(e) \leq 45\text{sec}$]

Evidently, such an understanding can be justified only by presupposing contexts, from which an according culmination can be drawn – here by way of information of a certain running distance.

Another possibility is to assign to sentences like (7) an ingressive reading. Then, the time-span adverbial indicates a contextually determined interval, at the end of which the described process began. Interpretations of this kind where, accordingly, not the run time of an event is specified are based on the fact that such adverbials can operate also at a higher verbal projection stage and, then, permit a differentiation of internal meaning.¹⁰ They are not only or not at all the result of a meaning transfer within a verb-adverbial complex. For this reason, ingressive interpretations which, in analogy, are also possible in cases like (5) and (6) can be ignored here.

⁹ Arguments for an understanding of copula-predicative constructions like *wach sein* ('to be awake') as predicates of states are provided in Dölling (1999) (cf. also Parsons 1990). Let me here start from the fact that an adjective like *wach*, in its basic meaning, is to be represented as $\lambda o.AWAKE(o)$, where o is a variable for objects. Only when combined with the copula, it is reinterpreted, by means of the procedure originally assumed by me only for DP- and PP-predicatives, as state predicate $\lambda s.\forall o[HD(o, s) \rightarrow AWAKE(o)]$. The latter structure can then be abbreviated, in a simplified way, by $\lambda s.{}^+AWAKE(s)$, which in turn is used in (7a) in the 'blocking' representation used for *wach sein*.

¹⁰ For the conditions of an ingressive and egressive interpretation, respectively, see Engelberg (1994). Cf. also Kamp & Reyle (1993) and Klein (1994).

3. Reinterpretation by Sort Coercion?

Meaning transfers occurring in connection with modification by durative or time-span adverbials have already been documented more or less extensively in the literature, and various proposals have been advanced for their explanation. Basic deliberations can be found in Moens & Steedman (1988) where a systematic even if informal analysis of reinterpretations in temporal modification was made. There, time adverbials (as well as aspectual auxiliaries) were considered functions which, under particular conditions, can induce changes of meaning of the verbal expressions to be modified by them, in a way that their reference to situations of one sort is transformed into a reference to situations of another sort. Such coerced changes of reference based on an accordingly differentiated network of ontological relationships were called *type coercion* by the authors.¹¹ How the respective adaptations are to be accomplished in detail, however, still calls for explication.

It could be assumed that such adverbials trigger semantic operations, by which the verbal expressions are directly reinterpreted in a suitable way and thus the prerequisites to according modifications are produced. So, if a conflict arises between the sortal selection restrictions of an adverbial modifier and the semantic sort of its argument, a concrete operator is wanted that can be applied to the verbal predicate with the aim of sort coercion. For example, the reinterpretation stated in (2) could then be explained simply in the way that *den Roman lesen* is transferred, by utilizing a special adaptation operator and meeting the requirements of the adverbial, from a predicate of events to a predicate of processes and, thus, simultaneously changing its internal meaning structure.

However, such a mechanism of direct semantic adaptation leaves a number of questions unsettled. As discussed in regard of (2) the occurrence of a sort conflict between temporal adverbial and verbal expression does not at all clearly determine the form of its solution by the underlying conceptual ontology. A first problem consists in how, out of the set of conceptually possible operators and in a both systematic and economical way, those operators can be chosen that provide exactly the adequate reinterpretation concerned. It is only certain that such a choice cannot be made without resorting to resources of encyclopaedic knowledge and allowing for specific pragmatic restrictions. Then, a second and more serious problem follows from it that, with such an insertion of adaptation operators, additional parts of meaning are introduced. Obviously, under this condition, the general validity of the principle of semantic compositionality can no longer be upheld.¹² Particularly in face of the lack of a convincing alternative such a renunciation of a strictly regulated calculation method of the context-independent meaning of expressions is not acceptable.

As a possible way out, it could be offered a procedure according to which necessary reinterpretations have to be realized in two steps: In a first step, a semantic representation is constructed in terms of compositionality. Here, if a conflict of sorts results this is resolved by inserting a now largely underspecified operator. In a second step, it is tried to justify this

¹¹ The concept of 'type coercion' of an argument by its functor was dealt with, from a more general view point, also in Pustejovsky (1991a, 1995). There, reinterpretations in adverbial modification, however, play only a minor role. Following the tradition of logical semantics, I prefer to use the term *sort coercion* rather than that of *type coercion*. In my opinion, it is obvious that the phenomena considered are related not to the problem of separating expressions into semantic types but to that of separating them additionally into semantic sorts. For the use of operators of type coercion in the strict sense see e.g. Partee (1992, 1995), Dölling (1992, 1997) and in the running text below.

¹² Indeed, Jackendoff (1997) – cf. also Jackendoff (1991) – sees in the required enrichment in reinterpretations an important argument against the standard hypothesis of „syntactically transparent semantic composition“ (p.48). Referring to deliberations as can be found in Pustejovsky (1991a, 1995), Jackendoff pleads instead for treating the meaning of complex expressions as a function of the meanings of its parts and their syntactic combination only as a default in a wider range of options.

hypothetical adaptation of sorts by suitably specifying the operator concerned by means of encyclopedic, situational and discourse knowledge. So, it is only in this step that meaning transfer proper, if possible, is realized.¹³

Taking up this idea, then, it can be assumed that for the reinterpretations discussed here, only two underspecified adaptation operators, namely one for constructions involving durative adverbials and one for those involving time-span adverbials are required. According to the sortal requirements of adverbials, the first of them should permit to transfer predicates of events, borders or moments to predicates of processes or states; the second to transfer predicates of borders, processes or states to predicates of events. These conditions are largely met by the operators proposed in (8) and (9) where $e/b/m$, p/s and $b/p/s$ are provisional variables for situations of the respective supersorts and Q , C and R respective parameters for the quantifiers \exists and \forall , for the connectors $\&$ and \rightarrow , and for relations between situations of individual sorts, respectively.

$$(8) \quad \lambda P \lambda p/s. Qe/b/m [R(e/b/m, p/s) C P(e/b/m)]$$

$$(9) \quad \lambda P \lambda e. Qb/p/s [R(b/p/s, e) C P(b/p/s)]$$

Now, if e.g. (8) is used in the compositional construction of the semantic representation of (10), the structure given in (10') can be – including further provisionals – assumed to be the result of this derivation.

(10) Ilse hat einen Tag (lang) die Sonate gespielt.
'Ilse played the sonata for one day.'

$$(10') \quad \exists p/s [AG/HD(ilse, p/s) \& Qe [R(e, p/s) C PLAY(e) \& TH(sonata, e)] \\ \& \tau(p/s) \geq 1day]$$

Then, conceptually possible specifications of (10') will result in (10a) to (10c).

$$(10) \quad a. \exists p [AG(ilse, p) \& \forall e [CONST(e, p) \rightarrow PLAY(e) \& TH(sonata, e)] \\ \& \tau(p) \geq 1day]$$

$$b. \exists p [AG(ilse, p) \& \exists e [COMPL(e, p) \& PLAY(e) \& TH(sonata, e)] \\ \& \tau(p) \geq 1day]$$

$$c. \exists s [HD(ilse, p) \& \forall e [REAL(e, s) \rightarrow PLAY(e) \& TH(sonata, e)] \& \tau(s) \geq 1day]$$

Which of the alternatives can really provide the conceptual content of an utterance of (10), i.e. whether it refers to a process of continuously repeated playing the sonata concerned, to part of the process of an individual playing event or to a state realized by repeated but not interrupted playing the sonata has to be decided in dependence on stereotype knowledge and other contextual information.

But such a procedure, where semantic sort adaptation and context-related reinterpretation are separated, will also lead to difficulties.

¹³ In general, such a concept is advocated e.g. in Dölling (1992) and in Hobbes et al. (1993). In the field of modification by temporal adverbials this course was first followed in Worm (1995). De Swart (1998) can be considered an advancement and systematization of the latter study. Finally, similar ideas are presented in Pulman (1997).

First, its functioning has to meet the condition that the meaning transfer can proceed only in one direction, respectively.¹⁴ A non-appliance of this condition follows alone from sentences like (3) where, beside the reinterpretation of the verbal expression only allowed for generally, at least also that of the modifying expression is possible. Therefore, the starting point of a required meaning transfer is not at all clearly determined a priori. So, it has to be decided to which of the expressions involved an adaptation operator is to be applied. However, decisions of this kind are not compatible with a strictly compositional semantic derivation.

Second, following this approach it is left out of consideration that not every meaning transfer in adverbial modification has to result from a direct conflict of sorts.¹⁵ For example in (11) *joggen* ('to jog') fulfills the sortal selection restriction of durative adverbials insofar as this verb represents a predicate of process.

- (11) Renate hat zehn Jahre (lang) gejoggt.
 'Renate jogged for ten years.'

Accordingly, (11) can imply that Renate's activity of incessant jogging lasted at least ten years.

- (11) a. $\exists p$ [AG(renate, p) & JOG(p) & $\tau(p) \geq 10\text{year}$]

Unless the person in question disposes of extraordinary abilities our accessible stereotype knowledge of jogging will let us have our doubts about the justification of this process reading. It has to be followed that (11) refers to Renate's state realized by according activities of jogging, lasting ten years. Here, the adequate habitual interpretation is represented in (11b).

- (11) b. $\exists s$ [HD(renate, s) & $\forall p$ [REAL(p, s) \rightarrow JOG(p) & AG(renate, p)]
 & $\tau(s) \geq 10\text{year}$]

Sentence (11), however, can be understood in this sense only if the verb is subjected to an according reinterpretation based on more complicated conceptual interconnections.

4. Reinterpretation as Specification of the Inflected Semantic Form

Let me now develop an approach that, unlike previous attempts, can be called adequate from the aspect of both content and methodology. In particular, the strategy of analysis to be proposed has to meet the following, partly interrelated requirements: First, the present state of research should be met by treating, in any case, adverbial modifications strictly by the principle of semantic compositionality. Second, reinterpretations in modifying meaning combination should not simply be accounted for by occurring conflicts between the semantic sorts of the expressions involved. Third, finally, a mechanism as general as possible should be found by which any kinds of systematic meaning transfers can be performed, both of modified expressions and of modifiers.

¹⁴ In most of the investigations known to me, this assumption was made, but especially in Moens & Steedman (1988), Bierwisch (1989), Pustejovsky (1991a, 1991b, 1995), Jackendoff (1991, 1997), Worm (1995), Pulman (1997) and de Swart (1998). For the general possibility of different starting points and, thus, directions in reinterpretation see Nunberg (1995) and Dölling (2000).

¹⁵ Also this erroneous assumption is shared by almost all authors concerned with the phenomenon discussed here.

In the investigation of meaning variations in different fields of conceptual structuring, I have – see Dölling (1997 - 2000) – developed a model meeting these requirements. Its basic idea is that in grasping the information conveyed with an utterance it has to be determined over several stages of representation.

The beginning of the process of conceptual understanding is formed by the level of the *semantic form SF* of expressions where their context-independent meaning is represented.¹⁶ From this task of SF there follow its two crucial characteristics: First, SF representations are structured strictly compositionally, i.e. they are calculated exclusively in accordance with the morpho-syntactic structure of the expressions concerned. Thus, any interferences in the autonomously organized semantic structuring by references to extra-language fields of knowledge – be they of direct or indirect kind – are excluded. Second, SF representations are radically underspecified insofar as they contain different parameters, by the fixing of which the meaning of expressions can be varied accordingly. It is crucial for the approach that such SF parameters occur not only as elements of semantic entries of lexical units. Rather, in semantic composition this primary variation potential of meaning is systematically extended under strictly defined conditions by adding supplementary SF parameters. Accordingly, two sub-types of SF can be distinguished.

- (12) a. The *basic semantic form SF_B* of an expression is that SF connected with a lexical expression or with a syntactically complex expression as a result of the direct combination of its parts.
- b. The *inflected semantic form SF_I* of an expression results from its SF_B by introducing additional parameters by means of operations – so-called *SF inflections* – obligatorily performed on expressions of its semantic type.

As will be shown, it is the extended variation potential given by SF_I that enables meaning transfers of the type considered.¹⁷

With SF the basis is available to which interpretation operations of various kinds apply. Then, the meaning of an utterance is, step by step, specified more and more with resort to encyclopedic, situational and discourse knowledge and with regard to pragmatic principles and rules so that, at the end of this process, the *conceptual content CC* of the utterance is determined. In this connection, the procedure of abductive interpretation plays a major role, which ‘explains’ the utterance concerned, at long last, by deriving its SF by deduction from a suitable conceptual knowledge basis.¹⁸ An intermediate result of this derivation is the so-called

¹⁶ Cf. e.g. Bierwisch (1988, 1989), Bierwisch & Lang (1989), Zimmermann (1992, 1999) and Maienborn (1998, 2000).

¹⁷ Maienborn (1996, 1998, 2000) assumes, in a similar way, that, under certain conditions, new SF parameters are introduced in meaning composition independent of whether there is a semantic incompatibility or not. The possibilities of meaning transfer thus given are, however, only partial insofar as this systematic extension of interpretation potential is limited to individual types of adverbial modification. (See the respective notes in Section 6.) Also the concept of reinterpretation followed by Egg (2000) is similar to the approach proposed by me. Here, by an underspecified semantic description formalism specific sites are marked in the meaning structure of expressions, where material mediating between semantically conflicting constituents can be inserted in terms of concrete operators. It is evidently an advantage of the procedure that it permits an integrative treatment of very different kinds of semantic ambiguity, among them also ambiguities of scope. (Cf. also Pinkal 1996.) However, I can see weaknesses in that, first, the principles of a systematic marking of the respective sites remain obscure and, second, with the mere statement of such sites the material inserted is not structured at all.

¹⁸ This mechanism conceived by Hobbes et al. (1993) and having, on the whole, still to be elaborated in the future, cannot be dealt with in more detail here. It was demonstrated particularly in Dölling (1997) what an application in the multi-stage model of meaning representation could look like. For further demonstrations see Dölling (1998) and Maienborn (1998, 2000).

parameter-fixed structure PFS of this utterance. This is generally understood as a stage of meaning representation immediately succeeding SF and differing from it by substituting the parameters in SF by concrete conceptual units. Thus, PFS representations are a first contextual specification of the meaning of expressions. They also represent the very level at which systematic meaning variations are realized.

Now, the operators used in SF inflection still have to be determined in greater detail. In a number of papers, I have advanced several proposals in search of schemata that, on the one hand, are sufficiently specific to furnish the necessary salient points for the PFS desired and, on the other, general enough to cover in fact all cases observed of meaning transfer. The SF operator *met* proposed in Dölling (2000) seems to be a suitable means by which all expressions of the type of one-place predicates of first order can be reinterpreted.¹⁹ Particularly, this operator enables us to understand meaning transfers in the modification of verbal expressions as instances of an accordingly generalized notion of metonymic interpretation.

In order to simplify matters, not the respective operator itself but only its reduced version shall be used here. Let me assume the inflection parameter *met'* where x and y are individual variables and Q_n , C_n and R_n parameters for the quantifiers \exists and \forall , for the connectors $\&$ and \rightarrow and for relations between elements of ontological sorts, respectively.²⁰

$$(13) \textit{met}' : \lambda P \lambda x. Q_n y [R_n(y, x) C_n P(y)]$$

According to condition (14) *met'* is to be applied to every one-place predicate occurring as SF_B of an expression α .

$$(14) SF_B(\alpha) \text{ of type } \langle e, t \rangle \text{ changes to } SF_I(\alpha) \text{ so that it holds: } SF_I(\alpha) = \textit{met}'(SF_B(\alpha)).$$

The following fixing conditions of SF_I of α determine in which way special parameters are substituted for the SF parameters introduced with *met'*:

(15) $SF_I(\alpha)$ changes to $PFS(\alpha)$ so that it holds:

- (i) Q_n and C_n in $SF_I(\alpha)$ are fixed by \exists and $\&$ or by \forall and \rightarrow , respectively;
- (ii) R_n in $SF_I(\alpha)$ is fixed by $=$ or by a predicate of relations between elements of two different sorts;
- (iii) in the case of default Q_n , C_n and R_n are fixed by \exists , $\&$ and $=$, respectively.

Here, condition (iii) warrants that whenever there is no reason for a meaning transfer of α the contribution to interpretation made by *met'* in PFS is finally empty.

5. Demonstration of a Reinterpretation

Let me illustrate the application of inflection operator *met'* and the possibilities of its specification by sentence (3), repeated as (16) below.

¹⁹ The term *met* is to indicate that the respective operator provides the necessary prerequisites for explaining, within a uniform formal framework, particularly metonymy and metaphor as basic kinds of meaning transfer.

²⁰ Cf. also Dölling (1998, 1999). As will be shown, this hypothetically assumed operator has to be somewhat extended in order to cover also other cases of reinterpretation in adverbial modification.

- (16) Anna hat fünf Minuten (lang) das Fenster geöffnet.
 ‘Anna opened the window for five minutes.’

In (17a) the segment of SF derivation relevant to our problems is given for *fünf Minuten (lang) das Fenster öffnen* (‘open the window for five minutes’).

- (17) a. *das Fenster öffnen*; SF_B: $\lambda x. \text{OPEN}(x) \ \& \ \text{TH}(\text{window}, x)$
- | *met*’: $\lambda P \lambda x. Q_1 y [R_1(y, x) \ C_1 \ P(y)]$
- | /
- | *das Fenster öffnen*; SF_I: $\lambda x. Q_1 y [R_1(y, x) \ C_1 \ \text{OPEN}(y) \ \& \ \text{TH}(\text{window}, y)]$
- | *fünf Minuten (lang)*; SF_B: $\lambda x. \tau(x) \geq 5\text{min}$
- | *met*’: $\lambda P \lambda x. Q_2 y [R_2(y, x) \ C_2 \ P(y)]$
- | /
- | *fünf Minuten (lang)*; SF_I: $\lambda x. Q_2 y [R_2(y, x) \ C_2 \ \tau(y) \geq 5\text{min}]$
- | *MOD*: $\lambda Q \lambda P \lambda x. P(x) \ \& \ Q(x)$
- | /
- | *fünf Minuten (lang)*; SF: $\lambda P \lambda x. P(x) \ \& \ Q_2 y [R_2(y, x) \ C_2 \ \tau(y) \geq 5\text{min}]$
- | /
- | *fünf Minuten (lang) das Fenster öffnen*;
- SF_B: $\lambda x. Q_1 y [R_1(y, x) \ C_1 \ \text{OPEN}(y) \ \& \ \text{TH}(\text{window}, y)]$
- & $Q_2 y [R_2(y, x) \ C_2 \ \tau(y) \geq 5\text{min}]$
- | *met*’: $\lambda P \lambda x. Q_3 y [R_3(y, x) \ C_3 \ P(y)]$
- | /
- | *fünf Minuten (lang) das Fenster öffnen*;
- SF_I: $\lambda x. Q_3 y [R_3(y, x) \ C_3 \ Q_1 z [R_1(z, y) \ C_1 \ \text{OPEN}(z) \ \& \ \text{TH}(\text{window}, z)]$
- & $Q_2 z [R_2(z, y) \ C_2 \ \tau(z) \geq 5\text{min}]$

The following remarks about (17a) are appropriate: First, the derivation makes it clear that a representation format for SF is preferred where no sorted individual variables and, thus, no variables for situation sorts are used.²¹ Instead, differentiations of sorts are made by using ontological restrictions in terms of axioms for the constants concerned. Second, the three occurrences of *met*’ indicate that, in the SF derivation, exactly as many predicates appear in the role of an SF_B and therefore, in agreement with (14), require an according number of operator applications. The last application of *met*’ is given only for the sake of completeness because the SF parameters introduced with it are possibly relevant for the reinterpretations of the results of modification but not for those of their components. Third, finally, a special operator for type coercion is used in terms of *MOD*, by which expressions of the predicate

²¹ The reason for this omission is that, on the one hand, the network of ontological sorts is anyway much too differentiated to be actually allowed for in an adequate number of variables. On the other hand, the very presence of sorted variables in SF would impair the use of general operators like *met*’.

type can be transferred to such of the type of modifier. In this sense, the application of the **MOD** operator represents a condition for modifying combination of meanings.²²

Starting from the result of (17a) a SF can be assumed for sentence (16) as – simplified in several respects – represented in (16a).

$$(16) \text{ a. SF: } \exists x [\theta(\text{anna}, x) \ \& \ Q_3y [R_3(y, x) \ C_3 \ Q_{1z} [R_1(z, y) \ C_1 \ \text{OPEN}(z) \\ \& \ \text{TH}(\text{window}, z)] \ \& \ Q_{2z} [R_2(z, y) \ C_2 \ \tau(z) \geq 5\text{min}]]]$$

Here, θ is an additional SF parameter which has to be fixed by predicates of participation relations like AG, HD or TH. It is part of a structure that can be considered the SF contribution of the functional category AGR_S .

$$(18) \ \text{AGR}_S; \ \lambda P \lambda y \lambda x. \ \theta(y, x) \ \& \ P(x)$$

Thus, AGR_S fulfills the semantic function of extending the SF of the respective V'-expression by an argument place for grammatical subjects.²³

The compositionally calculated SF of (16) is now to be interpreted against the background of contextual knowledge (in the broadest sense) where, as a first step, the parameters occurring in it have to be fixed. Evidently, the knowledge required is highly diverse. At first, it includes axioms like (19a), (19b) and (20), laying down the conditions of use for more special conceptual units and configurations.

$$(19) \text{ a. } \Box \forall x [\text{OPEN}(x) \rightarrow \exists y \text{AG}(y, x) \ \& \ \exists z \text{TH}(z, x)] \\ \text{ b. } \Box \forall x [\text{OPEN}(x) \rightarrow \exists y [\text{RESULT}(y, x) \ \& \ \text{BE_OPEN}(y)]]$$

$$(20) \quad \Box \forall x [\exists y [\tau(x) \geq y] \rightarrow \text{EVENT}(x) \vee \text{STATE}(x)]$$

Thus, (19a) characterizes every opening as a process involving an agent and a theme as participants; (19b) lays down that every opening implies a resultative state of being open. The axiom formulated in (20), however, can be considered that condition which restricts the use of durative adverbials. Moreover, above all axioms of conceptual ontology are required as well, characterizing the basic properties and relations of different sorts of situations. Such general determinations are made e.g. by using (21a) to (21d) or (22a) and (22b).²⁴

²² Cf. for example Partee (1992), Zimmermann (1992, 1999), Wunderlich (1997), Dölling (1998). It could be that in modifications, instead of the Boolean conjunction, actually a non-commutative restriction operation is used. For the properties of the logical operator hardly studied so far see Bierwisch (1989) or Zimmermann (1992).

²³ Here, I follow an idea of Kratzer (1994) where the category of *voice* was used as such a provider of argument places. See also Dölling (1999).

²⁴ The axioms in (21b) and (21d) allow for the fact that, in contrast to a widespread view, not all events are changes of states. In Egg (1994, 1995) it was proposed to distinguish between 'changes' and so-called *intergressives* as denoted e.g. by predicates like *ein Lied singen* ('sing a song') or *ehundert Meter schwimmen* ('swim a hundred meters'). Piñón (1999) pleads for explicitly characterizing expressions of change by including a component of resultative state in their semantic representation and, accordingly, supplementing their argument structure by a variable of state. In this way, simultaneously the reinterpretation required by sentences like (3) and (16), respectively, is to be avoided. In Footnote 6 I have expressed my doubts about this proposal. Starting from basic deliberations, I follow the principle of looking upon semantic representations as guideposts as simple as possible, rather, for necessary differentiations by using detailed conceptual axioms.

- (16) b. PFS: $\exists x$ [AG(anna, x) & OPEN(x) & TH(window, x) & $\exists y$ [RESULT(y, x) & $\tau(y) \geq 5\text{min}$]]

Beside the parameters introduced into the PFS of (16) by *fünf Minuten (lang) das Fenster öffnen*, θ is fixed as AG due to (19a). After further steps of specification returning, among others, to axioms like (19b) and (21c), the process of interpretation is completed with the conceptual content CC of (16). In simplified form, this can be identified with the structure in (16c).

- (16) c. CC: $\exists x$ [AG(anna, x) & OPEN(x) & TH(window, x) & $\exists y$ [RESULT(y, x) & ${}^+\text{BE_OPEN}(y)$ & HD(window, y) & $\tau(y) \geq 5\text{min}$]]

Unlike (16b) the meaning of (16) is determined more exactly by the fact that, now, on the one hand, the resultative state is demonstrated to be that of being open and, on the other hand, its holder to be that object that is also the theme of the respective event (cf. (3a)).

6. Further Adverbial Modifications with Reinterpretation

Reinterpretations of the kind considered do not only hold – as almost generally assumed in literature – for the modification by temporal adverbials. At first it has to be stated that also the use of adverbials of manner may involve a change in meaning of the verbal expression modified. For example, in analogy with one of the interpretations of (5), (23) can be understood as characterization of an event, the agent of which was Claudia and which found its completion with Claudia leaving the flat.

- (23) Claudia hat schnell die Wohnung verlassen.
'Claudia quickly left the flat.'

The structure in (23a) would have to be assumed to be the PFS of (23), using again, for sake of easier understanding, sorted variables as a means of representation.²⁶

- (23) a. PFS: $\exists c$ [AG(claudia, c) & $\exists b$ [FINIT(b, c) & LEAVE(b) & TH(flat, b)] & QUICK(c)]

It is part of this interpretation of (23) that, as a result of specifying its SF_I , the V'-expression *die Wohnung verlassen* ('leave the flat') denotes not a property of borders but – as noted in (24b) – one of changes.

- (24) a. SF_I : $\lambda x. Q_{ky} [R_k(y, x) C_k \text{LEAVE}(y) \& \text{TH}(\text{flat}, y)]$
b. PFS: $\lambda e. \exists b$ [FINIT(b, c) & LEAVE(b) & TH(flat, b)]

It is only under such a precondition that *schnell* ('quickly') in (24) can be reasonably used as an adverbial of manner.

A meaning transfer of the modified expression can be observed also in sentences where an instrumental PP as in (25) occurs as adverbial modifier.

²⁶ In order to be more precise, c, c' etc. will be used below as variables for changes (See Footnote 24.)

- (25) Stefan war mit dem Auto in der Stadt.
 ‘Stefan was in the town by car.’

In parallel with one of the interpretations of (6), here a statement is made about a change resulting in a state of being in the town. The conceptual content conveyed by (25) is formulated in (25a) where INSTR denotes the relation ‘instrument of’.

- (25) a. CC: $\exists c$ [AG (stefan, c) & $\exists s$ [RESULT(s, c) & +BE_IN_THE_CITY(s)
 & HD(stefan, s)] & INSTR(car, c)]

Thus, in order to characterize Stefan’s state indirectly in greater detail, namely that the vehicle used for its establishment is given, the copula-predicative construction *in der Stadt sein* (‘to be in the city’) has to be changed accordingly from a predicate of state to one of change. Then the statement that Stefan was the holder of the state induced by himself is, again, the result of an additional step of specification based on axiom (21c).

An other example is (26) where an originally change- or process-related PP is reinterpreted so that it can be combined with an expression denoting a set of states as an adverbial of manner.

- (26) Peter war mit Begeisterung Angler.
 ‘Peter was an angler with enthusiasm.’

Accordingly, Peter was in a habitual state of being an angler so that he performed the events or processes realizing the state with enthusiasm. Using *e/p* as provisional variable for events and processes, (26) then has the following conceptual content:

- (26) a. CC: $\exists s$ [HD(peter, s) & +BE_AN_ANGLER(s) & $\forall e/p$ [REAL(e/p, s)
 → WITH_ENTHUSIASM(e/p) & AG(peter, e/p)]]

Based on a respective fixation of the SF parameters occurring in (27a), the PP *mit Begeisterung* (‘with enthusiasm’) contributes the PFS given in (27b) to the operation of modification.

- (27) a. SF_i: $\lambda x. Q_{ky} [R_k(y, x) C_k \text{ WITH_ENTHUSIASM}(y)]$
 b. PFS: $\lambda s. \forall e/p [REAL(e/p, s) \rightarrow \text{WITH_ENTHUSIASM}(e/p)]$

That reinterpretations of the expressions used as modifiers, however, are not at all an exception will be shown later. Most of the examples discussed below are cases where the meaning of the modifying constituents is subjected to different kinds of transfer.

In Eckardt (1998) the indication can be found that sentences like (28) and (29) permit not only one interpretation specifying the described event by the adverbial of manner as unobtrusive and elegant, respectively.

- (28) Anna hat Max unauffällig frisiert.
 ‘Anna dressed Max’s hair unobtrusively.’

- (29) Maria hat Hans elegant gekleidet.
 ‘Maria clothed Hans elegantly.’

Such adverbials can as well specify a result achieved by the action concerned. It seems to be obvious to interpret them, in analogy with the temporal adverbial in (3), thus making a statement about states.²⁷ The second interpretation (28) would then imply that Anna dressed Max's hair and that the resulting state of Max was unobtrusive.

As also an analysis of sentences (30) and (31) makes it clear, this assumption, however, cannot be held up.

(30) Der Student hat den Brief korrekt übersetzt.
'The student translated the letter correctly.'

(31) Die Bibliothekarin hat die Bücher ordentlich gestapelt.
'The librarian piled up the books properly.'

Evidently, in the result-related interpretation, (30) does not imply that the letter was in a correct state as a result of its translation by the student concerned. It shall be expressed, rather, that the translation of the letter resulting from this event, i.e. an object produced in this way, was correct.²⁸ Supposing that OBJ_RESULT stands for the relation 'object result of' and o is a variable for objects, this interpretation therefore permits to assume the PFS given in (30a).

(30) a. PFS: $\exists c$ [AG(student, c) & TH(letter, c) & TRANSLATE(c)
& $\exists o$ [OBJ_RESULT(o, c) & CORRECT(o)]]

In quite a similar way a property of Max's hair-do, of Hans's clothing and of the pile of books is stated, accordingly, by the adverbials *unauffällig* ('unobtrusively'), *elegant* ('elegantly') and *ordentlich* ('properly') in (28), (29) and (31), respectively.²⁹ But for these object predicates as modifiers to have any site of application in the meaning structure of the sentences in question, they have to become predicates of changes at the level of PFS.

Suppose that, with (32a), the SF₁ of the adverb occurring in (28) is available, the predicate UNOBTRUSIVE being, in its applicability to objects or situations, unspecified at first.

(32) a. SF₁: $\lambda x. Q_{ky} [R_k(y, x) C_k \text{ UNOBTRUSIVE}(y)]$

Then, by specification, two PFSs can be obtained for *unauffällig*, on which the two possible interpretations of (28) can be based.

(32) b. PFS₁: $\lambda c. \exists c' [= (c', c) \& \text{ UNOBTRUSIVE}(c)]$

= $\lambda c. \text{ UNOBTRUSIVE}(c)$

c. PFS₂: $\lambda c. \exists o$ [OBJ_RESULT(o, c) & UNOBTRUSIVE(o)]

²⁷ The deliberations in Dölling (1998) are based on this view. A corresponding proposal for formalization is made as early as in Parsons (1990) for similar examples.

²⁸ For the possibility of assuming, beside its basic meaning as an event predicate, for a nominalization like *Übersetzung* ('translation') also a derived meaning in the sense of a predicate for objects being the result of a respective event, cf. Bierwisch (1988).

²⁹ Since adverbs do not have any special morphological marking in German it may be asked whether it is here really a matter of adverbial uses of the adjectives concerned. With reference to parallel English sentences this question can be answered in the affirmative. In Parsons (1990), however, the use of the ending *-ly* to be found there is assessed as „a mere case of compensating hypercorrectness“ and, therefore, as unjustified in the strict sense.

So, while in (32b) the contribution of the SF flexive to the interpretation finally is reduced to zero and, therefore, only the change described by (28) can be determined in greater detail by means of the adverb, (32c) permits to insert *unauffällig* to characterize the object resulting from the event.

Unlike the cases considered above, in sentences like (28) to (31), it is referred in terms of OBJ_RESULT to another ontological relation, by which also object-related predicates can be included as adverbial modifiers. We will see below that numerous other such possibilities of reinterpretation in modifications of verbal expressions have to be expected.

Detailed investigations in Maienborn (1996, 1998, 2000) prove that not all adverbial occurrences of locative PPs may be interpreted as localizing the situation, to which the respective sentence immediately refers. (33), for example, can be understood in two ways.

- (33) Die Bankräuber sind auf Fahrrädern geflüchtet.
 ‘The bank robbers fled on bicycles.’

On the one hand, this sentence can be understood as a description, in view of our standard knowledge, of a bizarre scenario where the bank robbers in question moved along on oversized bikes. Beside this situation-localizing interpretation of (33), there is another interpretation to be preferred under usual conditions specifying by the modifier the bank robbers’ location in their flight. These two interpretations accordingly imply the following PFSs:

- (33) a. $PFS_1: \exists p [AG(\text{robbers}, p) \ \& \ FLEE(p) \ \& \ \exists p' [= (p', p) \ \& \ LOC_{ON}(p', \text{bicycles})]]$
 = $\exists p [AG(\text{robbers}, p) \ \& \ FLEE(p) \ \& \ LOC_{ON}(p, \text{bicycles})]$
 b. $PFS_2: \exists p [AG(\text{robbers}, p) \ \& \ FLEE(p) \ \& \ \exists o [AG(o, p) \ \& \ LOC_{ON}(o, \text{bicycles})]]$

Since it can be ruled out, for any kinds of situations, that two different objects play the role of the same participant, the identity of the localized agents can be directly inferred from PFS_2 . As demonstrated in Maienborn (2000), the object-localizing interpretation moreover permits, due to additional axioms, an inference about the use of bikes as instruments of flight. Thus, the structure given in (33c) can be assumed to be the conceptual content CC_2 of (33).

- (33) c. $CC_2: \exists p [AG(\text{robbers}, p) \ \& \ FLEE(p) \ \& \ LOC_{ON}(\text{robbers}, \text{bicycles})$
 $\ \& \ INSTR(\text{bicycles}, p)]$

The second interpretation of sentence (33), however, is possible only by transferring, in connection with a suitable specification of its SF, especially by substituting AG for R_n , the PP *auf Fahrrädern* (‘on bicycles’) from a strictly object-related to a process-related predicate.³⁰

³⁰ Unlike my approach, Maienborn (1996, 1998, 2000) assumes a special mechanism for deriving the non-standard interpretation of locative PPs. The starting point of her deliberations is the observation that such an interpretation is permitted only if the respective expression is in a syntactic position near the verb. This connection is explained by the fact that different modification operations are used in dependence on whether the locative modifier is applied to a constituent of the V'- or of the V-category. While, in cases of the former kind, the modifying meaning combination follows the ‘usual’ pattern, for cases of V-modification a special operation is presupposed, producing according possibilities of specification. It is an asset of Maienborn’s conception that thus – unlike my procedure here – syntactic restrictions of reinterpreting adverbial modifiers are allowed for. But this proposal has not only the drawback that an extension to occurrences where the meaning of the modified expression is transferred appears hardly to be possible. As will be shown below, it is problematic also insofar as, along with it, other possibilities of meaning transfer in V'-modifiers are ruled out.

A sentence implying at least three different possibilities of reference of the locative PP used as modifier is represented by (34).³¹

- (34) Der Koch hat das Hähnchen in einer Marihuana-Tunke zubereitet.
 ‘The cook prepared the chicken in a Marihuana sauce.’

First, again an adverbial of localizing the event, to which (34) refers, can be seen in the PP. Then the PFS concerned permits, in dependence on the world knowledge involved, alternative inferences to whether only the chicken or – under quite adventurous circumstances – also the cook is localized at the given place as objects participating in the process. Second, the modifying expression *in einer Marihuana-Tunke* (‘in a Marihuana sauce’) can be considered as related exclusively to the chicken. Thus, the object of preparation but not the situation itself is arranged in space. Third, there is also the possibility to understand the PP in the sense of a specification of the place where the cook was during the procedure of preparation. It is crucial for the two object-localizing interpretations of the modifier that it is evidently a matter of meaning combination usually classified under the term of *secondary predication*.

Before turning my attention to this field of phenomena, sentences shall be briefly discussed, in which directional PPs occur as adverbial modifiers. Let me consider the following example:

- (35) Fred ist in das Haus geflüchtet.
 ‘Fred fled into the house.’

Sentence (35) refers to a process performed by Fred and resulting in his being in the house. By intuition, the expression *in das Haus* (‘into the house’) has the task to provide the process of fleeing with a resultative state and thus to ‘transfer’ it to a change.³² Accordingly, the PFS given in (36) can be assumed to be a representation of the literal meaning of the PP. While the second represents its locative part of meaning, i.e. ‘being in the house’, the first conjunct stands for its resultative part.³³

- (36) PFS: $\lambda c. \exists s [\text{RESULT}(s, c) \ \& \ \forall o [\text{HD}(o, s) \rightarrow \text{LOC}_{\text{IN}}(o, \text{house})]]$

As can be seen from (36), the modifying combination of the directional PP with *flüchten* (‘to flee’) requires that the verb – in parallel e.g. with *rennen* in sentence (7) – becomes an event predicate in the context of specification of its SF_I. Thus, its PFS can be identified with the structure given in (37).

- (37) PFS: $\lambda c. \exists p [p \text{ SUBST } c \ \& \ \text{FLEE}(p)]$

When additionally fixing θ by AG, the following PFS results for sentence (35):

³¹ This example as well has been drawn from Maienborn (1998). However, I deviate in a number of points from the understanding proposed there.

³² A basically similar understanding can be found in Pustejovsky (1991b) where, however, in my view a rather obscure procedure of reinterpretation was followed.

³³ The formulation of (36) can be reconstructed as follows: The part corresponding to the locative expression *in dem Haus* (‘in the house’) is first to be represented as $\lambda o. \text{LOC}_{\text{IN}}(o, \text{house})$ and thus as a predicate of objects. Its reinterpretation as predicate $\lambda s. \forall o [\text{HD}(o, s) \rightarrow \text{LOC}_{\text{IN}}(o, \text{house})]$ can be made, according to Dölling (1999), by suitably fixing the parameters occurring in the SF_I of *in dem Haus*. Then, by applying the modifier $\lambda P \lambda c. \exists s [\text{RESULT}(s, c) \ \& \ P(s)]$ to the state predicate, the resultative part of the PP is introduced. (See also Footnote 10.)

- (35) a. PFS: $\exists c$ [AG(fred, c) & $\exists p$ [p SUBST c & FLEE(p)] & $\exists s$ [RESULT(s, c)
& $\forall o$ [HD(o, s) \rightarrow LOC_{IN}(o, house)]]]

Further parts of the conceptual content of (35), among them particularly statements on that Fred is both agent of the flight process and holder of being in the house, can be inferred, accordingly, from the axioms for FLEE, SUBST and RESULT.

7. Secondary Predications as Adverbial Modifications

In current view, the semantic difference between a so-called secondary predicate and an adverbial is based on the condition that, in contrast to the latter, the former is related not directly to a verbal expression but to a DP in the sentence.³⁴ The following two subtypes of secondary predicates are distinguished: *Depictive predicates* stand for an additional property pertaining to one of the participants during the situation denoted by the verb; *resultative predicates*, however, for a state resulting from the event covered by the verb. Examples of sentences containing secondary predications are (38) to (40).

- (38) Der Koch hat das Hähnchen roh zubereitet.
'The cook prepared the chicken raw.'
- (39) Der Koch hat das Hähnchen missmutig zubereitet.
'The cook prepared the chicken ill-humored.'
- (40) Der Koch hat das Hähnchen knusprig zubereitet.
'The cook prepared the chicken crisp.'

While, under standard conditions, *roh* ('raw') in (38) is used as a depictive predicate related to the grammatical object and *missmutig* ('ill-humored') in (39) as one related to the grammatical subject, *knusprig* ('crisp') in (40) is used as a resultative predicate related to the grammatical object.

The remaining part of the paper is to outline how secondary predications can be treated within the model of multi-stage meaning representation. Starting with an analysis of depictives, let me first consider sentence (38) that can be paraphrased in approximation by (38').

- (38') Während der Koch das Hähnchen zubereitet hat, war es roh.
'While the cook prepared the chicken, it was raw.'

It is crucial for the understanding of (38) that the characterization of the chicken as being raw, a state is referred to that, the duration of which does not only contain the temporal interval required for preparing the chicken but which, more strictly, is to be considered an accompanying circumstance of this process. Using CIRC as a predicate denoting the relation 'accompanying circumstance of', the structure given in (38a) can be assumed to be the conceptual content of (38).

- (38) a. CC: $\exists c$ [AG(cook, c) & PREPARE(c) & TH(chicken, c) & $\exists s$ [CIRC(s, c)
& HD(chicken, s) & $\forall o$ [HD(o, s) \rightarrow RAW(o)]]]

³⁴ See, among others, the proposals in Steube (1994), Koch & Rosengren (1995), Maienborn (1996), Wunderlich (1997) and Kaufmann & Wunderlich (1998). That adjectives functioning as heads of secondary predicates are not used as adverbs can be directly proved by respective occurrences in English.

The axioms (41) and (42) hold, among others, for CIRC, v being a variable for any situations.

$$(41) \quad \Box \forall s \forall v [\text{CIRC}(s, v) \rightarrow \tau(s) \supseteq \tau(v)]$$

$$(42) \quad \Box \forall s \forall v \forall o [\text{CIRC}(s, v) \ \& \ (\text{AG}(o, v) \vee \text{TH}(o, v) \vee \text{HD}(o, v)) \rightarrow \text{HD}(o, s)]$$

Now, how can CC of (38) be derived?

In what follows, I assume that depictive predications can be considered adverbial modifications, in which the expression used as a modifier is regularly reinterpreted.³⁵ Concretely related to (38) this implies that the AP *roh* is combined with the verb *zubereiten* ('to prepare') in a modifying way and thus transferred, in the connection of parameter fixing for the SF of (38), from a predicate of objects to a predicate of changes. Supposing (43a) as PFS of the adjective in its literal meaning, in (43b) that structure can be seen which is available as PFS of *roh* as a result of meaning transfer.³⁶

$$(43) \quad \text{a. PFS: } \lambda o. \text{RAW}(o)$$

$$\text{b. PFS: } \lambda c. \exists s [\text{CIRC}(s, c) \ \& \ \forall o [\text{HD}(o, s) \rightarrow \text{RAW}(o)]]$$

It is evident that, as a basis of the transfer being more complex, an inflected SF obtained by means of the *met'*-operator used so far, would not suffice. Therefore, a revision of the assumptions made by (13) is inevitable.

In approximation to the general scheme of SF inflection developed in Dölling (2000), the complex character of which is accounted for by the occurrence of metonymy chains, the operator *met''* given in (44) shall therefore be used below.

$$(44) \quad \textit{met}'': \lambda P \lambda x. \exists y [R^2_n(y, x) \ \& \ Q_{nz} [R^1_n(z, y) \ C_n \ P(z)]]$$

While the application condition of the inflection operator agrees with that assumed in (14), the conditions of parameter fixing for *met''* in (15) have to be modified in a way that now in transition to PFS two parameters R^1_n and R^2_n can be fixed accordingly by = or by a predicate for relations between elements of two different ontological sorts. Such an use of the operator in the cases considered earlier does not lead to any problems since the contribution of the components newly introduced will prove empty at the PFS stage there.

As can be seen from (43c), the SF₁ of *roh* derived with *met''* contains all parameters required for the interpretation.

$$(43) \quad \text{c. SF}_1: \lambda x. \exists y [R^2_k(y, x) \ \& \ Q_{kz} [R^1_k(z, y) \ C_k \ \text{RAW}(z)]]$$

In analogy, this holds for the SF of the entire sentence (38) that – again highly simplified – can be given with (38b).

$$(38) \quad \text{b. SF: } \exists x [\theta(\text{cook}, x) \ \& \ \text{PREPARE}(x) \ \& \ \text{TH}(\text{chicken}, x) \ \& \ \exists y [R^2_k(y, x) \ \& \ Q_{kz} [R^1_k(z, y) \ C_k \ \text{RAW}(z)]]]$$

³⁵ Here, I follow the basic understanding of depictives as stated in Zimmermann (1992, Footnote 16) and Steube (1994). For the use of past-participle constructions as depictive predicates, not allowed for here, see Zimmermann (1999).

³⁶ It should be recalled that the second conjunct is to be understood as a representation of that part of meaning which can be abbreviated, in a simplifying way, also with ⁺RAW(s).

After fixing all SF parameters occurring, the following structure results:

- (38) c. PFS: $\exists c$ [AG(cook, c) & PREPARE(c) & TH(chicken, c) & $\exists s$ [CIRC(s, c) & $\forall o$ [HD(o, s) \rightarrow RAW(o)]]]

Finally, the conceptual content represented in (38a) is obtained by that, among other things, based on axiom (42), the respective chicken will be inferred as the holder of the state accompanying the preparation.

The type of depictive exemplified by (39) is different from the one considered above only by the fact that now the object denoted by the grammatical subject, but not by the grammatical object is the holder of the state in question. Thus, (39a) can be assumed to be the conceptual content of (39).

- (39) a. CC: $\exists c$ [AG(cook, c) & PREPARE(c) & TH(chicken, c) & $\exists s$ [CIRC(s, c) & HD(cook, s) & $\forall o$ [HD(o, s) \rightarrow ILL-HUMORED(o)]]]

It is a consequence of this difference limited to CC that a sentence like (45) has only one PFS, although it permits two interpretations of the depictive predicate *traurig* ('sad') – one interpretation related to the subject DP and one to the object DP.

- (45) Hans hat Maria traurig verlassen.
'Hans left Mary sad.'

- (45) a. PFS: $\exists b$ [AG(hans, b) & LEAVE(b) & TH(maria, b) & $\exists s$ [CIRC(s, b) & $\forall o$ [HD(o, s) \rightarrow SAD(o)]]]

Accordingly, the conceptual contents given in (45b) and (45c) can be derived by extension of (45a).

- (45) b. CC₁: $\exists b$ [AG(hans, b) & LEAVE(b) & TH(maria, b) & $\exists s$ [CIRC(s, b) & HD(hans, s) & $\forall o$ [HD(o, s) \rightarrow SAD(o)]]]
c. CC₂: $\exists b$ [AG(hans, b) & LEAVE(b) & TH(maria, b) & $\exists s$ [CIRC(s, b) & HD(maria, s) & $\forall o$ [HD(o, s) \rightarrow SAD(o)]]]

In analogy, this holds also for the second and third interpretation of sentence (34) discussed in Section 6. The locative PP *in einer Marihuana-Tunke* used here as a depictive predicate related in different ways, in both cases has the following PFS:

- (46) a. PFS: $\lambda c. \exists s$ [CIRC(s, c) & $\forall o$ [HD(o, s) \rightarrow LOC_{IN}(o, marihuana_sauce)]]]

As can be seen from (46a), the PP characterizes an accompanying state such that its holder is localized in a Marihuana sauce.³⁷ Then, the two possible CCs indicate that, in parallel with

³⁷ It may be assumed that, in contrast with, locative PPs are understood in the sense of a direct object localization only if, thus, a further specification is enabled as e.g. in the second interpretation of sentence (33). There, by inferring from the object-localizing interpretation of the PP *auf Fahrrädern* to the instrument of the situation described, an additional participant is identified (cf. (33c)).

(45b) and (45c), respectively, on the one hand the chicken and on the other the cook are the holders of the respective state.

- (46) b. $CC_1: \lambda c. \exists s [CIRC(s, c) \ \& \ HD(chicken, s)$
 $\ \& \ \forall o [HD(o, s) \ \rightarrow \ LOC_{IN}(o, marihuana_sauce)]]]$
 c. $CC_2: \lambda c. \exists s [CIRC(s, c) \ \& \ HD(cook, s) \ \& \ \forall o [HD(o, s) \ \rightarrow \ LOC_{IN}(o, marihuana_sauce)]]]$

Turning now my attention to resultatives I do not see any reason why to treat this type of secondary predication in a different way, principally. In such cases as well, it is evidently a matter of adverbial modifications which, however – as we will show – are not always connected with reinterpretations of that expression used as a resultative predicate. For example, sentence (40) is different from (38) and (39) only insofar as the AP *knusprig* does not specify a state accompanying but resulting from the preparation of the chicken.³⁸ The three stages of the meaning representation of (40) relevant to our purposes are given, accordingly, in (40a) to (40c).

- (40) a. SF: $\exists x [\theta(\text{cook}, x) \ \& \ PREPARE(x) \ \& \ TH(\text{chicken}, x)$
 $\ \& \ \exists y [R'_k(y, x) \ \& \ Q_{kz} [R'_k(z, y) \ C_k \ CRISP(z)]]]$
 b. PFS: $\exists c [AG(\text{cook}, c) \ \& \ PREPARE(c) \ \& \ TH(\text{chicken}, c)$
 $\ \& \ \exists s [RESULT(s, c) \ \& \ \forall o [HD(o, s) \ \rightarrow \ CRISP(o)]]]$
 c. CC: $\exists c [AG(\text{cook}, c) \ \& \ PREPARE(c) \ \& \ TH(\text{chicken}, c)$
 $\ \& \ \exists s [RESULT(s, c) \ \& \ HD(\text{chicken}, s) \ \& \ \forall o [HD(o, s) \ \rightarrow \ CRISP(o)]]]$

The statement contained in CC, with which the theme of change is determined also as holder of its resultative state, follows again from axiom (21c).

A case of resultative predication where not only the modifying AP but also the modified verb is reinterpreted can be found in (47).

- (47) Gerda hat den Tisch sauber gewischt.
 ‘Gerda wiped the table clean.’

Here, *sauber* (‘clean’) – in analogy with *knusprig* in (40) – is transformed into a predicate of changes by fixing the parameters occurring in its SF₁.

- (48) PFS: $\lambda c. \exists s [RESULT(s, c) \ \& \ \forall o [HD(o, s) \ \rightarrow \ CLEAN(o)]]]$

But since *wischen* (‘to wipe’) is one of those process verbs the connection of which with a quantized object DP does not necessarily result in an accomplishment,³⁹ the verb – in analogy with *flüchten* in (35) – has to be transferred in its meaning to a predicate of change. More specifically, by fixing the parameters in the SF₁ of *wischen* we get the following PFS:

³⁸ At this place, it should be referred to the difference from modifications by adverbials of manner as discussed by means of the sentences (28) to (31). There, properties of objects resulting from the events but not such of resultative states are specified.

³⁹ The characteristics of such verbs are, among others, explicated in Engelberg (1994, 1997, 1998). For the concept of quantized nominal predicates cf. Krifka (1989, 1992).

- (49) PFS: $\lambda c. \exists c' [= (c', c) \ \& \ \exists p [p \text{ SUBST } c' \ \& \ \text{WIPE}(p)]]$
 = $\lambda c. \exists p [p \text{ SUBST } c \ \& \ \text{WIPE}(p)]$

Finally, the structure fomulated in (47a) results as the conceptual content of (47).

- (47) a. CC: $\exists c [AG(\text{gerda}, c) \ \& \ TH(\text{table}, c) \ \& \ \exists p [p \text{ SUBST } c \ \& \ \text{WIPE}(p)$
 $\ \& \ AG(\text{gerda}, p) \ \& \ TH(\text{table}, p)] \ \& \ \exists s [RESULT(s, c)$
 $\ \& \ HD(\text{table}, s) \ \& \ \forall o [HD(o, s) \ \rightarrow \ \text{CLEAN}(o)]]]$

As can be seen from sentence (50), resultative constructions, however, have not always to be connected with a meaning transfer in the modifying expression.

- (50) Alice schrumpfte zu einer Zwergin.
 'Alice shrank to a dwarf.'

Suppose that the PFS in (51) represents the literal meaning of the resultative PP *zu einer Zwergin* ('to a dwarf') in one of its possible specializations. Then, in the modification in (50) only the literal meaning of the verb *schrumpfen* ('to shrink') is changed to the PFS given in (52).

- (51) PFS: $\lambda c. \exists s [RESULT(s, c) \ \& \ \forall o [HD(o, s) \ \rightarrow \ \text{DWARF}(o)]]$

- (52) PFS: $\lambda c. \exists p [p \text{ SUBST } c \ \& \ \text{SHRINK}(p)]$

For this reason, the relationships of resultatives with adverbial modifications by directional PPs as in (35) call for clarification.

The close relationship between the two kinds of secondary predication can be directly shown also by means of sentences, in which one and the same expression plays different roles of a modifier. For example, the PP *in Scheiben* ('into/in slices') is used in (53) as a resultative, in (54) as a depictive predicate.

- (53) Maria hat das Brot in Scheiben geschnitten.
 'Maria cut the bread into slices.'

- (54) Maria hat das Brot in Scheiben gegessen.
 'Maria ate the bread in slices.'

Using MOD_{IN} to characterize the modal understanding of the preposition *in*, the following conceptual contents can be assumed for (53) and (54):

- (53) a. CC: $\exists c [AG(\text{maria}, c) \ \& \ TH(\text{bread}, c) \ \& \ \text{CUT}(c) \ \& \ \exists s [RESULT(s, c)$
 $\ \& \ HD(\text{bread}, s) \ \& \ \forall o [HD(o, s) \ \rightarrow \ \text{MOD}_{IN}(o, \text{slices})]]]$

- (54) a. CC: $\exists c [AG(\text{maria}, c) \ \& \ TH(\text{bread}, c) \ \& \ \text{EAT}(c) \ \& \ \exists s [CIRC(s, c)$
 $\ \& \ HD(\text{bread}, s) \ \& \ \forall o [HD(o, s) \ \rightarrow \ \text{MOD}_{IN}(o, \text{slices})]]]$

To which transfer, here, the meaning of the PP is subjected in the connection of parameter fixing, again follows from the background of the standard knowledge about situations of the type of cutting bread and that of eating bread, respectively.

Finally, cases shall be briefly discussed which could appear to be problematic for the general approach proposed here. Unlike the ('weak') resultatives analyzed so far, so-called 'strong' resultatives give the impression that their understanding as adverbial modifications is ruled out.⁴⁰ This assumption is based on the circumstance that, in their cases, the resultative predicates – as exemplified in (55) – do not relate to a DP subcategorized by the verb.

(55) Der Gast hat das Glas leer getrunken.

'*The guest drank the glass empty.'

By intuition, the sentence implies that the guest concerned drank something, which was the content of the glass in question and that, as a result, this glass was empty. Therefore, the structure given in (55a) can be assumed to be the CC of (55), CONT standing for the relation 'content of'.

(55) a. CC: $\exists c$ [AG(guest, c) & $\exists o$ [CONT(o, glass) & TH(o, c)] & DRINK(c)
 & $\exists s$ [RESULT(s, c) & HD(glass, s)]
 & $\forall o$ [HD(o, s) \rightarrow EMPTY(o)]]

Although, when inferring the conceptual content, we have to return to more complex interconnections I suppose that also resultatives of this kind can be explained in the context proposed above. Justifying this assumption, however, has to be left to future inquiry.

8. Concluding remarks

The subject of my discussion were several forms of reinterpretation as can be observed in connection with adverbial modifications. Essentially, I did not only consider shiftings of meaning in modification by temporal and non-temporal adverbials. Instead, it was also demonstrated that by allowing reinterpretation so-called secondary predications can be understood as a special kind of adverbial modification. As a suitable means for analysis, a multi-stage model of meaning representation was presented, in which flexible interpretations proved to be a result of contextually controlled enrichments of an underspecified as well as a strictly compositionally structured semantic form. Here, the presupposition of obligatory inflection operations was crucial, by which the lexically given potential of meaning variation was systematically extended by introducing additional parameters. My paper concentrated particularly on the formal possibilities offered by such representation instruments for realizing according meaning transfers in adverbial modification. In contrast to, the syntactic conditions of compositional-semantic derivation, but especially also the concrete steps of interpretation in deriving the conceptual content were only be briefly touched. It remains the task of further investigations to formulate sufficient grammatical, pragmatic and conceptual restrictions of cases of meaning variation considered. Although, admittedly, the approach proposed has partly programmatic features, its fertility as a general device for explaining systematic reinterpretations in adverbial modification should have become clear.

⁴⁰ For the distinction of these two kinds of resultative predication see Kaufmann & Wunderlich (1998).

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The Dual Analysis of Adjuncts/Complements in Categorical Grammar

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Abstract

The distinction between COMPLEMENTS and ADJUNCTS has a long tradition in grammatical theory, and it is also included in some way or other in most current formal linguistic theories. But it is a highly vexed distinction, for several reasons, one of which is that no diagnostic criteria have emerged that will reliably distinguish adjuncts from complements in all cases — two many examples seem to “fall into the crack” between the two categories, no matter how theorists wrestle with them.

In this paper, I will argue that this empirical diagnostic “problem” is, in fact, precisely what we should expect to find in natural language, when a proper understanding of the adjunct/complement distinction is achieved: the key hypothesis is that a complete grammar should provide a DUAL ANALYSIS of every complement as an adjunct, and potentially, an analysis of any adjunct as a complement. What this means and why it is motivated by linguistic evidence will be discussed in detail.

1 The Starting Points: Initial Intuitions about the Phenomena, and a Theoretical Framework to work from.

1.1 The Pre-Theoretic Notion of ‘Adjunct’ vs. ‘Complement’

I will begin with some basic, intuitive, characteristics that have motivated linguists to draw the adjunct/complement distinction over the years, whatever their theory (if any) of these categories differ. That is, we start from common *pre-theoretic* notions of how adjuncts differ from complements, and proceed to build a formal account that, as first goal, satisfies these:

- **Syntax:** An adjunct is an “optional element”, while a complement is an “obligatory element”.
- **Semantics:** An adjunct “modifies” the meaning of its head, while a complement “completes” the meaning of its head.

To try to spell these out more concretely what these entail, I propose the following restatement of them; I have chosen this particular way of formulating them because it will help us to better see how the theory presented below does satisfy them, but I believe this formulation is still consistent with linguists’ *pre-theoretic* notions.

- **An adjunct is “optional” while a complement is “obligatory”:**

- A constituent Y in a phrase $[XY]$ (or in $[YX]$) is an ADJUNCT if and only if (i) phrase X by itself (without Y) is also a well-formed constituent, and (ii) X (without Y) is of the SAME syntactic category as phrase $[XY]$. (X is in this case the HEAD of the phrase $[XY]$.)
- Then, a constituent Y in $[XY]$ is a COMPLEMENT if and only if (i) X by itself (without Y) is not well-formed, or else (ii) if it is grammatical, then X standing alone not really have the same category in $[XY]$ (and does not have exactly the same meaning as it has in $[XY]$).

The caveat in (ii) is needed to allow for *elliptical complements*, which this criterion might otherwise class as adjuncts; see more just below.

- **An adjunct “modifies” the meaning of its head, while a complement “completes” its head’s meaning.**

- If Y is an adjunct, the meaning of $[XY]$ has the same kind of meaning (same logical type) as that of X , and Y merely restricts $[X Y]$ to a proper subset of the meaning/denotation of X alone.
- Where Y is a complement in $[XY]$, (i) the meaning of X by itself, without Y , is incomplete or incoherent. Else, (ii) X must be understood elliptically — the hearer must imagine/infer some context-dependent or anaphoric meaning of the general kind of Y to “fill in” the semantic slot that X requires semantically ¹. (For example both *eat lunch* and *eat* alone are grammatical VPs, but the latter must be understood as “eat something or other”, so *lunch* is a complement, not an adjunct.)
- Also, the same adjunct combined with different heads affects their meaning in the “same” way semantically (e.g. *walk slowly* vs. *write slowly*). But the same complement can have more radically different effects with different heads (e.g. *manage to leave* vs. *refuse to leave*).

There are, to be sure, a number of well-known problematic cases of adjuncts and complements that don’t quite fit these characterizations (for example, intensional adjuncts like *utter* in *utter fool*), but I still maintain that these general, pre-theoretic characteristics are the first and most basic properties that a linguistic accounts of adjuncts vs. complements should capture.

1.2 Categorical Grammar: some preliminaries

Although the hypothesis of the dual analysis of Complements as Adjuncts could possibly be formulated within several different current grammatical frameworks, it is the theory of Categorical

¹Admittedly, the difference between elliptical complements and adjuncts is hard to establish empirically for certain individual examples. However, we will see later on in this paper why the indeterminacy of some particular examples is in fact just what the dual analysis view predicts.

Grammar² (henceforth: CG) that offers a particularly direct and compelling way of implementing this hypothesis: because of the tight connection between syntactic analysis and compositional semantics in CG (which is stronger than in any other current theory), we can show within CG that many of the semantic properties of the adjunct/complement distinction follow directly from the syntactic CG characterization of adjunct/complement (and/or vice-versa).

For this reason, we need to explain some assumptions, familiar within CG for a long time now (cf. (Venneman & Harlow 1977)), as to how the basic distinction is characterized in that theory; these are stated further below in (2). But for this, in turn, we first need to review the way categories are named and are combined to form constituents in CG:

- (1) a. Standard definitions of syntactic categories: these include both PRIMITIVE CATEGORIES, denoted by simple symbols (usually only these three: S , N (common nouns), and NP), and COMPLEX CATEGORIES, formed (recursively) from a pair of more basic categories by “/” and “\”; e.g. S/NP , $NP\S$, S/S , $S/(NP\S)$, etc.)
 - b. How groups of syntactic categories are put together to form constituents: $A/B + B \Rightarrow A$. (“Where A and B stand for any categories, a category with a name of the form ‘A/B’ will combine with a category named ‘B’, to its right, to form a phrase ‘[A/B B]’ of category ‘A’”. Cf. a (nearly) equivalent phrase structure rule $A \rightarrow A/B B$ ”. (This rule-schema is called the *Functional Application Rule Schema*, also known as *Slash Elimination* and as “The L-rule for /”.)
- Note that where the slash direction is reversed, (A/B vs. $B\A$) the left-right order in which the two constituents are combined is to be reversed: $B + B\A \Rightarrow A$.
- c. Semantic interpretation via the CURRY-HOWARD ISOMORPHISM:³ compositional meaning is uniquely and rigidly determined by syntactic structure; the only two possibilities are (semantic) functional application (for Slash-Elimination) and functional abstraction (for Slash-introduction, or “The R-rule for /”). In other words, all other kinds of compositional semantic effects, within a construction, must be attributed to meanings of one or more lexical items in the construction, not to compositional semantic rules specific to the construction. (We can view this as the semantic counterpart of what has been called the “Radical Lexicalism” that CG demands).
 - d. Categorical Grammar derivations are traditionally conceived of as being built up from the bottom upward; one “combines” two constituents to “result” in a phrase (indicated by the mother node above them in a tree diagram), rather than generating a tree from

²Since the primary audience for this paper includes readers without familiarity with recent formulations of categorial grammar (or *type-logical grammar*, as these are called), my presentation of CG here will be deliberately informal and simplified. However, readers with more extensive knowledge of type-local grammar (as in Morrill (1994), Carpenter (1997)) should keep in mind that everything I say here can be (and is intended to be) formulated more precisely. To handle the problems in this short paper, the Associative Lambek Calculus (L) will suffice, and all theorems of L will hold. (For a language like English, I would ultimately choose a multi-modal system, to be able to treat both hierarchical and “flat” natural language constituents accurately, and to be able to include both wrapping (Dowty 1996) and occasional free word order). Syntactic features, mentioned below, are intended to be formalized by the (very conservative) method of introducing them only on the primitive types; the result is that the number of primitive types is large but still finite, and since no new provision is needed for features in the logical rules (Slash-Elimination and Introduction), the logic of L remains intact. Although I use quasi-phrase-structure trees here rather than the standard natural deduction or Gentzen derivation, informed and thoughtful readers should have no trouble seeing the implicit formal type-logical treatments behind everything said in this paper.

the top (or ‘root’) node downward as in PS grammars. Hence, the category that “dominates” two constituents is called the RESULT CATEGORY. This different viewpoint on derivations does not ultimately make any theoretical difference at all, but I will use this terminology throughout this paper.

1.3 Complement vs. Adjunct in Categorical Grammar

Now, we show how a formal but general definition of *complement* and *adjunct* can be made in CG, and in a way that generalizes across all kinds of syntactic categories. This distinction is NOT made in terms of phrase-structure configurations. Nor does it mention specific syntactic categories. Rather, the definitions of *head*, *complement* and *adjunct*, are in effect META-CATEGORIAL DEFINITIONS: they use A and B as variables over category names, and the characterization depends on the relationship between the relative form of two category names that enter into a combination. Since both grammatical function and semantic interpretation in CG are fully determined by the form of a category name and the category name it is combined with, it is perfectly natural that these meta-categories are specifiable this way in CG.

- (2) a. A **Head-Complement Structure** is defined in CG as any syntactic combination of two constituents having the form $[A/B B]$ (or else $[B B\backslash A]$), where A and B are any categories with the condition that A and B are not the same category: here, A/B is the *Head*⁴ and B is the *complement*.
- b. A **Head-Adjunct Structure** is defined in CG as any combination of two constituents having the form $[A A\backslash A]$ (or else $[A/A A]$), where A stands for any category; here, A is the head and $A\backslash A$ is the *Adjunct*.

³See (Carpenter 1997) for an exact account of the so-called Curry-Howard Isomorphism

⁴This characterization of *Head* has been criticized because it appears that certain heads would incorrectly be classed as adjuncts, even if morphological features are taken into account, for example, in:

1. John can *help* wash the car.

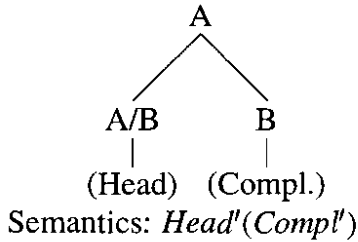
the verb *help* must agree with its head (*can*), i.e. must be in a certain morphological form (say, [BASE]). In turn, *help* governs a complement VP of morphological form [BASE], so its fully specified category is something like “ $VP_{[base]}/VP_{[base]}$ ”. (Other Germanic languages have many more instances of this situation than English does.)

The solution to the problem lies first in distinguishing agreement from government in CG. This can be done by (i) incorporating features into category names (though only on primitive categories, so the logic of L remains fully intact), and (ii) assigning category membership of many words to a category *schema* (not just a fully specified category). An item that should agree in all features with its VP head might be assigned to category $VP_{\alpha}\backslash VP_{\alpha}$, where α stands for a whole range of features (finiteness, number, inflectional form) with any feature values for these, as long as the corresponding feature values are the same in both occurrences of α . (By taking advantage of this kind of schematization, an account of morphological agreement can be built into the category assignment). A word that agrees with various features on its morphological head but *governs* a certain feature on its complement (such as *help*) would then belong to a category like $VP_{\alpha}/VP_{[BASE]}$, indicating that it governs the [BASE] form on its complement but agrees in all feature values on its own head. Specifically, then, we want the definition of “Head” to be sensitive to the *lexeme* the item belongs to (to use an old-fashioned term), not based on the particular *inflectional form* of that lexeme that happens to be needed in this sentence. HPSG, because of its strongly “lexicalist” approach to morphology, apparently cannot (or chooses not to) make reference in the syntax to the kind of morphological paradigm a word belongs to, but I see no reason why CG cannot take advantage of this possibility. Full details will be given in a later paper.

Dual Analysis of Adjuncts/Complements

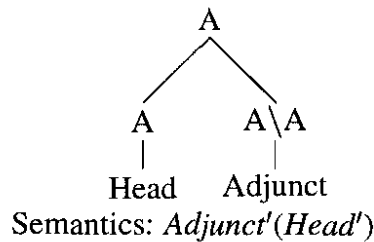
Head-Complement Structure:

A, B any categories, A ≠ B

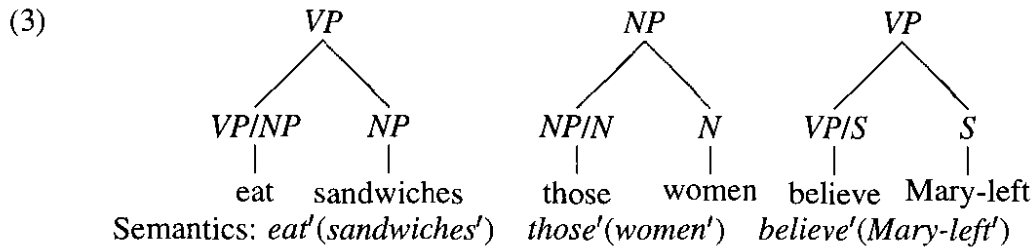


Head-Adjunct Structure:

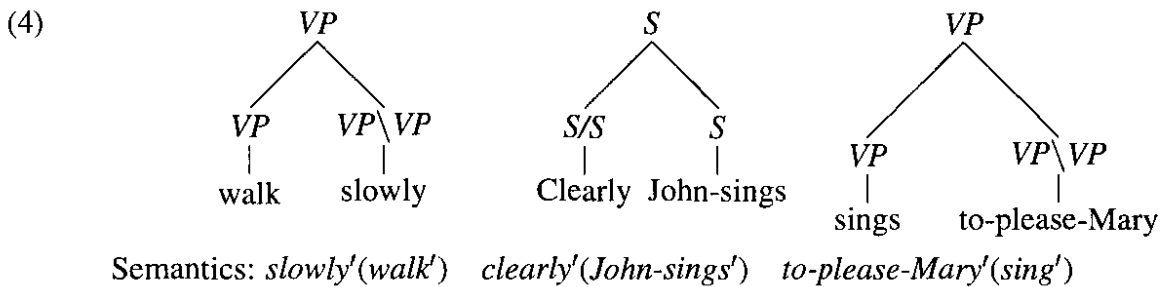
A any category



For example, all of the cases in (3) fit the characterization of Head-Complement structures: (here, *VP* is a notational abbreviation for *NP\S*),



and (4) shows examples of adjunct constructions:



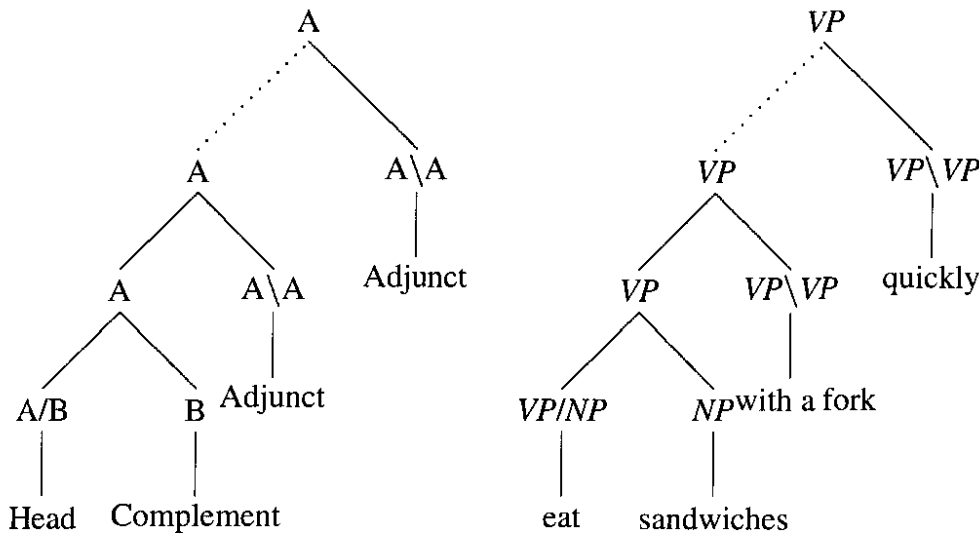
It is immediately clear why “obligatoriness” of complements is captured: since the category of the head by itself is not the same as the category of [head + complement], the head alone cannot fill the same grammatical slots as the [head + complement] phrase can fill; likewise semantically, the meaning of the head alone is not the same semantic type as that of the phrase, hence the meaning of the head alone is “incomplete” without the complement meaning and cannot yield a meaning of the required semantic type for the phrase as a whole. Conversely, it should be easy to see how it does follow from the characterization of Head-Adjunct structures that adjuncts are “optional” in both syntax and semantics.

1.4 When a Head has both Complement and Adjuncts

Two further predictions follow immediately from these characterizations which correspond to old observations about adjuncts vs. arguments: (i) multiple adjuncts (an unlimited number), can accompany the same head (indicated by the dotted line in the diagram), while only a fixed number of complement(s) can accompany a head (viz. just the one (or two, etc.) subcategorized by the particular head), and (ii) when both complement(s) and adjunct(s) accompany the same

head, the complement must generally be “closer” to the head, with the adjunct(s) “outside” the complement. The reasons for these predictions can be seen from this schematic derivation tree and example:

(5) **Both Complements and Adjuncts of the same Head:**



Because the addition of an adjunct to a head leaves the result category the same as the head’s category, one can continue to add on more and more adjuncts at will: this is because the highest phrasal category in the tree will always be the same category (here, *A*) as the one below it. But the combination of a complement (here *B*) with a head (*A/B*) produces a different result category from that of the head (result is *A*), hence a complement must be added exactly once, never more than once. Also, the adjunct(s) can be added on only *after* the complement, because the category with which the adjunct can combine is not present until the complement has been added, thus explaining why adjuncts (in this category configuration) occur “outside” complements—and of course the observation that complements typically occur closer to their head than adjuncts do. Similar predictions of course follow from *X-Bar Theory* in phrase-structure-based theories—but only as a result of stipulating a separate *X-Bar Theory*, distinct from phrase-structure proper. The important point here is that these predictions already follow simply from the basic CG theory, together with our definition of *adjunct* and *complement*: there is no need for a notion of “X-bars” at all in CG.

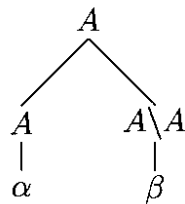
1.5 Subcategorized Adjuncts

Traditional grammar may have sometimes viewed *adjunct* and *complement* as fixed sets of syntactic categories – for example, Adjective and Adverb were considered adjunct categories, once and for all, and Noun (Phrases) were considered complement categories. But more recently it has been recognized that adjectives and even adverbs that are adjuncts in most occurrences do in certain other contexts appear to behave like complements. Some examples are in (6): the verb *tower* seems to take a locative PP as a complement, and verbs *treat* and *behave* take adverbs as complements:

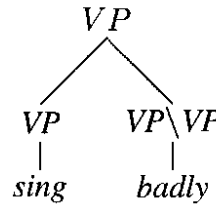
- (6) a. The campanile towers over the Berkeley campus
 #The campanile towers.
 b. He always treated me fairly.
 #He always treated me. (OK only with different meaning for treat).⁵
 c. Johnny behaved badly.
 #Johnny behaved. (OK only with different meaning for behave)

The term SUBCATEGORIZED ADJUNCT has been widely adopted for such cases. Notice that the CG account of adjuncts above, in not treating “adjunct” as a fixed set of categories list of categories, does already offer an interesting way of characterizing a subcategorized ‘adjunct’. In a head-complement configuration, $[A/BB]$, the complement B can be any category whatsoever, including one that is an adjunct category in other configuration: viz., where $B = C \setminus C$. Also, C can be equal to A here, so that $B = A \setminus A$. This possibility is illustrated in (7), where (7a) is the typical configuration in which $VP \setminus VP$ (the category of (verb-phrase) adverbs) occurs as an adjunct. But (7b) shows the case where an adverb occurs as a complement:

(7) a. **normal adjunct structure:**

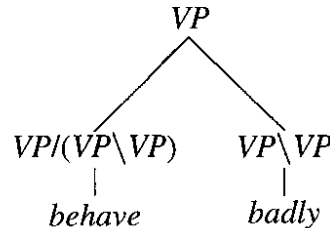
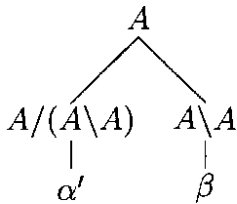


Example:



b. **Head-Complement structure with “subcategorized adjunct”:**

Example:



In fact, we now adopt the category configuration in (7b) as our definition of SUBCATEGORIZED ADJUNCT⁶(Note that in a head category name, of the form A/B , B is in effect the category of complement that the head is subcategorized for. So just as VP/NP is a verbal head

⁵To be sure, *He always treated me* can in fact be a grammatical string, but in the grammatical reading of it *treat* does not have the same meaning as it does in *treat me fairly*, and the same is true for *behave (badly)*.

⁶In most formal versions of categorial grammar, including the NON-ASSOCIATIVE LAMBEK CALCULUS (NL), the ASSOCIATIVE LAMBEK CALCULUS (L) (cf. Moortgat 1998), and Combinatory Categorial Grammar (Steedman 1996), a structure like (6b) is automatically available as an alternative syntactic structure for (6a) (and with the same meaning), due to the rule (or theorem) of *Type Raising*. We do not want such type raisings to count as subcategorized adjuncts, so we need to add a caveat to our definition: an expression α in category A/B is a *head* in the combination $[A/B B]$ only when α does not also occur in some simpler category (i.e. is not a result

subcategorized for a NP complement—i.e. it is a transitive verb—so $VP/(VP \setminus VP)$ is a verbal head subcategorized for an adverb complement.)

2 The Dual Analysis Hypothesis

2.1 A Case Study: Locative vs. Dative *To*

Perhaps the best way to begin to see motivation for the dual analysis is to examine a (very) familiar case where the same prepositional phrase has different meanings with different heads: English PPs headed by *to* which sometimes have directional, sometimes non-directional meaning. The directional readings, which are systematic and perfectly compositional are exemplified in (8a)–(8c):

- (8) a. Mary kicked the ball to the fence.
 b. John pushed the desk to the wall.
 c. Sue slid the paperweight to the edge of the table.

In these cases, the transitive verb always denotes an action performed on the direct-object's referent, and the *to*-PP always adds the information that the object of *to* denotes the new location at/near which the direct object referent ends up as a result of the action performed on it. Such examples can readily be constructed with hundreds of transitive verbs of motion.

But (9a)–(9c) are semantically different from the above:

- (9) a. Mary explained the memo to John.
 b. Mary rented the apartment to John.
 c. John offered a glass of tomato juice to Mary.

(9a) does not mean that the memo itself came to be at/near John, but only that the *information* contained in the memo came to be more fully understood by John, as a result of Mary's explanation. In (9b), however, neither the apartment nor its "semantic content" changes location: rather, because the verb is *rent*, we understand that a kind of temporary ownership of the apartment is acquired by John (subject to the conditions of the rent agreement). With *offer*, neither the glass of tomato juice nor its ownership changes location or possession — what happens is that Mary acquires the *option* to acquire possession of of the tomato juice, if she so chooses.

Examples of such "ambiguity" can be reproduced with many other prepositions (locative *remove it from the table* vs. non-locative *learn it from the doctor*), and in other languages. We want to reexamine it here in detail anyway, to delve into the reasoning behind the two best-known ways to try to solve it.

of type raising). More simply, we can call the lowest type to which α belongs the *lexical type* of α , specify that the definitions of *head*, *complement* and *adjunct* apply only to phrases occurring in their lexical types. type-raised phrases can also be distinguished from subcategorized adjuncts by the form of their semantic interpretation:

Type Raising of α : $\alpha' \Rightarrow \lambda f[f(\alpha')]$
 Adjunct reanalysis of α : $\alpha' \Rightarrow \alpha'', \quad \alpha'' \neq \lambda f[f(\alpha')]$

2.1.1 First Approach: "Abstract Thematic Roles"

Gruber (1965), Jackendoff (1972) (and later papers by Jackendoff), Fillmore (1968), and others urged us to analyze the preposition meanings in (8) as well as (9) so that all signify the same thematic role (or abstract deep case), called *GOAL*. The meaning of *GOAL* is broad enough to represent both literal change in physical location (directional) in (8), and abstract change in some property not involving literal motion, thus no ambiguity in *to* need be postulated at all. The same is done with *SOURCE* and *LOCATION*, so all non-locative "changes of state" marked by preposition are reduced to abstract versions of locative prepositions; this approach has been called the 'Localist Hypothesis' by Anderson (1971))

This idea gained widely support. But what Gruber and Jackendoff do not ever fully explain to us is how, exactly, the semantic component of the grammar determines which kind of meaning *GOAL* has in which example. After all, *kick the ball to the fence* cannot mean that the fence acquires possession of the ball, any more than (9a) can mean that the memo itself moved to John's location.

The situation is actually worse than this: the various abstract instances of *GOAL* differ semantically from each other in unpredictable ways. With *explain*, the *GOAL* apparently means "transfer of the information contained in something to NP, but in a more intelligible form.'. With *rent* does not mean "transfer the information in the apartment", nor conversely can *GOAL* with *explain* refer to a change in possession of (something). With *offer*, *GOAL* refers to a transition in an *option to acquire*, but neither a transfer in information content nor a change in possession. (There are even examples of *to* that don't refer to a transition into a state at all, but rather the avoidance of such a transition: *refuse a hearing to the prisoner, deny requests to all of them*.)

Thus (as has been recognized by the critics of Jackendoff and Gruber for some time), the abstract element *GOAL* is not really a semantic element that can play any consistent, useful part in the compositional semantics of all sentences involving *to*: *GOAL* is merely a label for a class of cases which may intuitively seem somehow related, but for which we still do not have a real semantic analysis.

2.1.2 Second Approach: Ambiguity between Adjunct and Syntactic Marker

Logicians, and many semantically conscious linguists, have long regarded the various non-locative occurrences of prepositions as purely grammatical markers, with the verb of the sentence being the sole semantic source of the multi-place relation being expressed: *Mary gives the book to John* is thus represented logically using a 3-place relation *give*:

give(m, the-book, j)

A currently popular syntactic implementation, then, is to postulate an ambiguity in every relevant preposition (*to, from, at; off of, on, onto, etc.*) between (i) a meaning-bearing literal locational preposition, and (ii) a syntactic artifact, a (semantically vacuous) idiosyncratic "case marker", "case marking preposition". This permits us to give a correct account of sentences with non-locative PPs, but it is ultimately satisfactory?

Note that this approach fails to make any connection in the grammar or semantics between locative *to* and abstract "dative" *to*, between locative *from* and abstract "Source"; it leaves it entirely as a grammatical accident that example after example of prepositions and morphological

cases, in language after language (though not in every language), shows this synchronicity.⁷

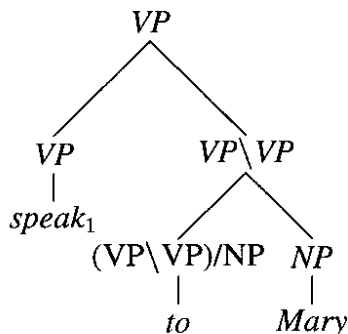
Ultimately, this connection must have its origin in the psychology of language acquisition or cognition itself: Clark & Carpenter (1989) show that many English-speaking children make several systematic “errors” in acquiring the ways that “Source” is expressed in English, which taken together, imply unmistakably that children are at some stages working with an underlying concept of “Source” of just the Gruber-Jackendoff kind.

2.1.3 The Dual Analysis: Case-Marking-*to* as a Reanalysis of directional Adjunct-*to*

Is there no way to better describe the case-localist connection in terms of grammar, or must grammar theorists sit back until some other field (psychology of language?) solves this difficult problem? In fact, I think we can improve on the formal theoretical side of the problem significantly, and the first important step is the DUAL ANALYSIS HYPOTHESIS.

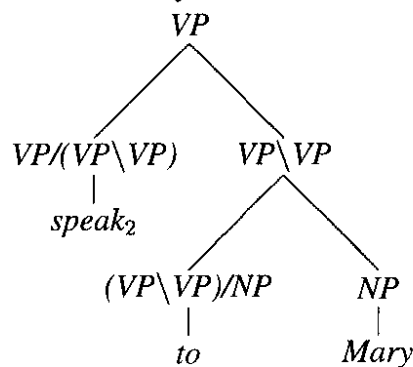
The idea behind the dual analysis view can be thought of (for now, anyway) as the claim that the locative adjunct analysis of *all* occurrences of *to*, *from* and other locative prepositions is a PRELIMINARY ANALYSIS which serve language-learners as a semantic “hint” or “crutch” to figuring out the idiosyncratic correct meaning of the complement analysis for the non-locative instances: a preliminary *adjunct* analysis of the *to*-PP (as locative) (10a) gives way to a *complement analysis* of *to*-PP structure as in (10b):

(10) a. **adjunct structure:**



Sem: $(to'(Mary))(speak'_1)$

b. **complement reanalysis:⁸**



Sem: $speak'_2(to'(Mary'))$

⁷Finnish, a non-European language, would at first seem devoid of this kind of connection, since it has three complete sets of four kinds of cases (which replace prepositions in that language): one set relating to enclosures (for “out of”, “in”, and “into”), a parallel set for surfaces (“off of”, “on”, “onto”), a third set relating to proximate location (“at/near to”, “away from”, etc.) and a fourth, (morphologically distinct) set for abstract, non-locative transitions (non-locative Source, State, and Goal). However, it turns out that this last set is historically derived from an older set of case markers which signified locative transitions, before the first three sets came into the language. So even Finnish, though its history, reveals the same deeper connection between Local and corresponding Non-Local case marking as seen elsewhere.

⁸Although this structure is actually perfectly adequate for both the semantics and syntax of complement reanalysis, there is no reason why it could not be further simplified, if desired, to replace the adjunct category $VP\backslash VP$ with a simple, non-adjunct category like PP —i.e. $speak_2$ would also belong to $VP/PP_{[TO]}$ here, and to to $PP_{[TO]}/NP$, with to translating as the identity function, insofar as its adjunct meaning is otiose.

The semantic interpretation of *John speaks to Mary*, under the adjunct analysis as in (a) is “John speaks, and the result of this action is that John ends up in a location next to Mary”—not the real intended meaning of the sentence of course, but a rough “hint” for the learner who has not grasped the “speak-to” construction. Note that in the complement interpretation of *speaks₂* (in (b)) cannot be the same as *speaks₁* in (a): rather, it takes the change-of-place *to*-“adjunct” as its semantic argument, and its meaning is something like “speak, with the intention that the verbal content of what one is saying will end up at a certain place (*to-Mary*) and will be understood there”); in other words, the proper way to interpret *to Mary* here is now built into the meaning of *speaks₂*.

2.2 The Cognitive ‘Trade-Off’ between Adjuncts and Complements

But why should languages really need an adjunct analysis as a “preliminary step” toward a complement analysis, anyway? If we step back and reflect on the communicative advantages of each, vs. the language-learning advantages of each, we can see that there is a trade-off between the two analyses.

- If we focus on the effort required from the learner of a language, then an adjunct analysis offers the advantage of yielding more ‘quasi-multi-place predications at a lesser load on lexical memory —because they are semantically compositional. Suppose the lexicon of a language has n different intransitive verbs (say, 100 verbs) and m different prepositions that can form adjuncts (say ten prepositions), then compositional syntactic and semantic rules automatically produce $(n \times m)$ different two-place predications (= 10,000 in this case), all of which have distinct meanings. By contrast, if the learner had to express all these two-place predications by learning individual transitive verbs, she would need to learn 10,000 different lexical items. But adjunct analyses achieve this advantage at the cost of a limitation on the range of meanings that can be expressed:
- If we focus on the semantic expressivity of the language, then lexical two-place predicates (verbs taking an object as well as subject) have an advantage over two-place predications derived by adding adjuncts: Though there may be 10,000 $(m \times n)$ of the adjunct-derived meanings, these meanings are all limited (in a way that the lexical meanings are not) to what is produced by a consistent compositional semantic rule that combines a verb meaning with a preposition meaning.⁹ Lexical two-place predicates are not limited to these, rather, one verb can express ANY imaginable (humanly ‘processable’) semantic two-place relations. Thus we achieve greater expressivity at the cost of a larger burden for the language learner.

This is just the trade-off we saw with *to*: we can compositionally generate lots and lots of adjunct-derived locative two-place semantic relations with little effort (*walk to, drive to, swim to, walk from, drive from, swim from, etc.* but none of these can correctly express the semantic relation lexicalized in *speaks to, rent to* and *offer to*, which instead must be learned as individual items. However, by allowing the language learner to access the adjunct analysis as a fruitful preliminary “clue”, one would soften the learning burden. If some multi-place relations like

⁹This claim about expressive advantages of complements actually only follows if we make some further (plausible) assumptions about how adjunct meanings work; see also §7 below, but see Dowty (2000) for details.

Speak to, *rent to* look superficially the same as adjunct structures, then the learner will be led through the preliminary step automatically.

This “trade-off” may not be a very earth-shaking idea for locative-*to* vs. “dative” *to*, but note that my claim here is that this same trade-off applies to ALL parallel cases of an adjunct vs. a superficially similar complement – for example, infinitive adjuncts of intransitives (e.g. *sing to please Mary*) vs. infinitive complements (*try to please Mary*), and the dozens of other cases in §5.

2.3 A Second Case Study: Agent Phrases in Passives

In the case of the dual analysis just discussed, individual verbs differ fairly sharply as to whether they ultimately take adjunct or complement *to*. In other cases to be discussed below, a single verb may still permit, in “adult” speech, both an adjunct reading and a complement reading equally, or else a whole construction may prefer the adjunct reading almost exclusively, or the complement reading almost exclusively—the last possibility being illustrated by agent phrases in passives. My proposal is that all these possibilities should be treated formally via dual analyses, with it being left to psycholinguistics to determine exactly how these cases differ in mental processing.

The agent phrase of a passive (*by Mary* in *John was visited by Mary*) has been frequently analyzed as an adjunct, but just as frequently analyzed as an instance of “prepositional case marking”, i.e. the *by*-phrase is a complement of the passive verb, but *by* has no independent meaning of its own, it is merely the marker that passive verbs subcategorize for. The dual analysis of *by*-phrases will provide a second useful case study, because it differs from the dative *to*-phrase in several ways; notably, it involves a syntactic/morphological construction, not just single verbs, and more importantly, it shows how the dual analysis is motivated by diachronic and typological facts, not just “thought experiments” in language acquisition.

One reason to suspect that passive agent phrases are possibly adjuncts is that the meaning borne by the *by*-phrase in a passive, as in (11) seems intuitively very similar to that of other *by*-phrases as in (12) that do not accompany a passive verb and hence must necessarily be analyzed as adjuncts:

(11) John was touched by Mary

(12) This book is by Frege.

A dress by Chanel.

She sent him a letter by courier.

He washed the dishes by hand.

She died by her own hand.

cf. Cheating by students is punishable with expulsion. (*Keenan (1985): NB cheating here is not from a passive verb.*)

Note the *by*-phrases in (12) all seem to entail a semantically-related sentence that is a true passive: for *This book is by Frege*, compare “This book was written by Frege”; for *She sent him a letter by courier* compare “A letter was delivered by courier”, and so on.

Nevertheless, it has been recognized in the semantics literature for some time that a semantically correct adjunct analysis of agent phrases in passives is either impossible or else very

difficult (and has not been achieved in any case; cf. Thomason (1974), Cresswell (1985), Dowty (1979). For one thing, pairs like (13) show that an adjunct analysis cannot be extensional but must be handled intensionally in some way, while a complement analysis never requires this complication:

- (13) This chair was sold to Mary by John.
 This chair was bought from John by Mary.

(See the above-cited references and Dowty (1989) for explanation.) It is now widely held that a “Neo-Davidsonian” analysis in terms of events can circumvent this problem (cf. Parsons (1990), but as argued in Dowty (1989) and Dowty (2000), this will not really work. This approach appeals to an abstract Thematic Role ‘AGENT’, but this fails for the same kind of reason that we saw with GOAL earlier: there is no possible semantic definition of AGENT that is independent of the particular verb that it occurs with. Notably, passives of stative verbs occur with agent phrases (in English and other languages), but these are not “Agents” in a semantic sense, rather they are “Experiencers”:

- (14) This rumor has now been heard by almost every voter, and it is believed by many of them.

The only correct way to identify what the *by*-phrase refers to here is to appeal to the meaning of the active verbs *hear* and *believe*, not via semantics, and this demands a complement analysis of the *by*-phrase.

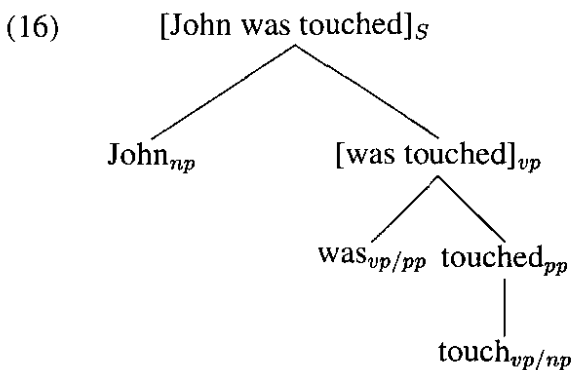
The account in terms of a dual analysis begins with the assumption (well-justified by cross-language typological studies) that the agentless passive is the most basic form of passives — they occur in more languages than agentive (or “full”) passives occur in, while there are no languages with only the agentive passives but no agentless passives. The agentless passive can be analyzed adequately and very simply as a detransitivizing, “relation-reducing” operation on transitive verbs:

- (15) *Passive as a detransitivizing operation:*

(Agentless) Passive:

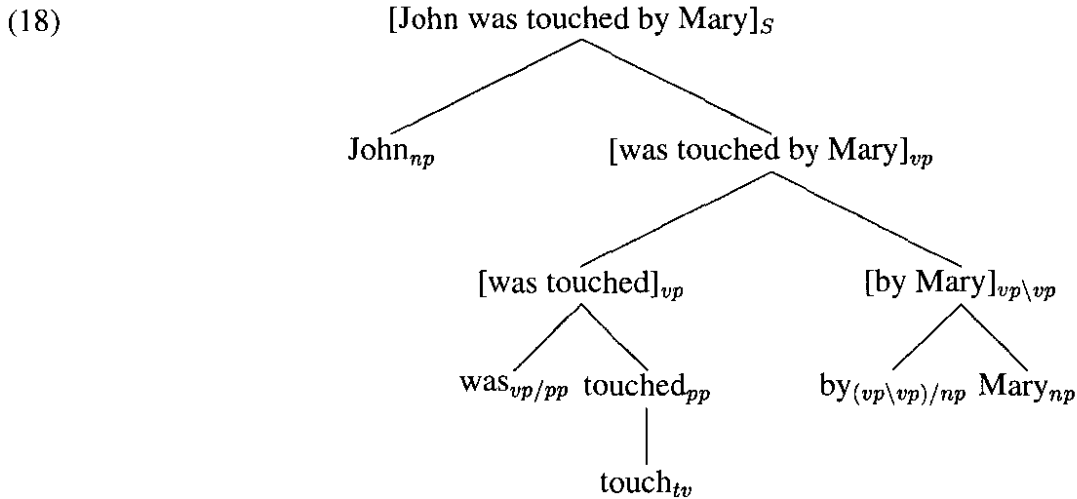
Lexical Rule: $\alpha \in vp/np \rightarrow \text{PST-PRT}(\alpha) \in vp_{[pp]}$

Semantic Interpretation: $\alpha' \rightarrow \lambda x \exists y [\alpha(x)(y)]$



(17) Translation of ((17)): $\exists x[\text{touch}'(\mathbf{John}')(x)]$

Assuming that *by*-phrase agents (as in (13) above) exist in the language already, then the meaning of a “full passive” can be approximated, without any addition to the syntax, by adding a *by*-phrase adjunct to an agent-less passive:



(19) Translation of (18):

$\mathbf{by}'(\mathbf{Mary}')(\lambda y[\exists x \text{touch}'(y)(x)])(\mathbf{John}')$

“John was touched, and Mary was a causal factor in this event”

As the paraphrase in (19) suggests, the meaning of **by'** here, which is the adjunct meaning, does not produce the correct meaning of the actual English passive sentence but only approximates it, and of course it also cannot possibly serve as the final analysis of full passive for the reasons cited above (and it is important to note in this regard (cf. below) that many languages exist in which agent phrases are not found with passives of stative verbs, only active verbs). And so, I argue, the adjunct analysis serves as a preliminary step through which the complement analysis is reached. That analysis is:

(20) **(Reanalyzed) Passive** (as yielding 2-place predicate):¹⁰

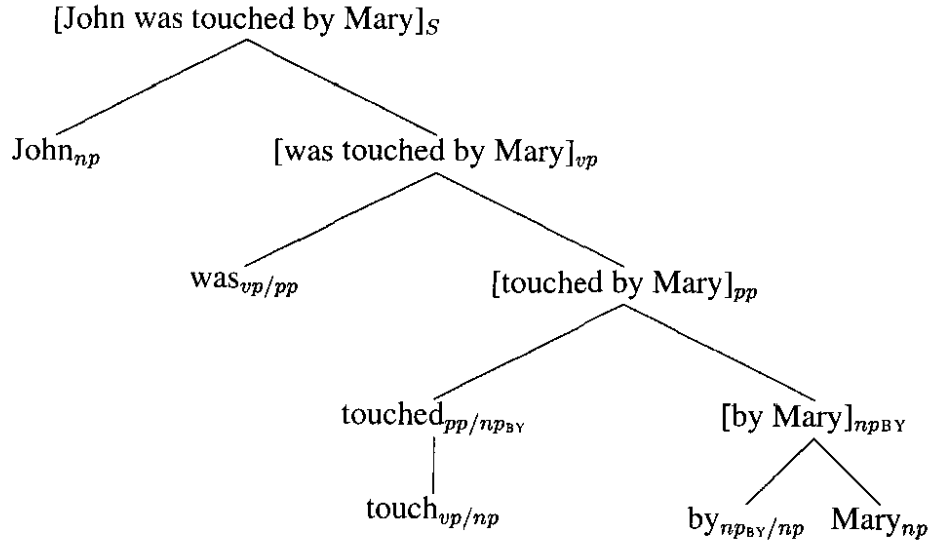
syntactic rule: $\alpha \in vp/np \rightarrow \text{PST-PRT}(\alpha) \in vp_{[PP]}/np_{[+BY]}$

semantic rule: $\alpha' \rightarrow \lambda y \lambda x [\alpha'(x)(y)]$

. In this rule, *PP* stands for the category of past participles (semantically the same type as the *VP* category), and I have incorporated the further simplification of the category of passive *touched* from *PP/(VPbackslashVP)* to *PP/NP_[by]* (see footnote 8).

¹⁰In this rule, and in the example tree below, I have already incorporated the secondary simplification mentioned in the previous footnote, i.e. from *PP/(VP \setminus VP)* to *PP/PP_[BY]*

(21)



(22) *Transl. of (21) is equivalent (by λ -conversion) to:* **touch'(John')(Mary')**

For passive agent phrases, typological data about the distribution, form, and semantic restriction on agent phrases cross-linguistically, imply that there are observable diachronic manifestations of the reanalysis hypothesis as just sketched above. The following typological generalizations about passive agent phrases were observed in (Keenan 1985:247)

- (23) a. Some languages exist in which **only** agentless passives occur, though no languages apparently exist in which agentive passives occur but no agentless passives.
- b. In many languages, passives of stative and other “not highly transitive” verbs are ungrammatical.
- c. Either instrumental case or a preposition with instrumental meaning is (almost) always used to mark the agent of a passive in natural languages, according to Keenan (1985:261). (Actually, it seems that prepositional phrases with “Source” meaning sometimes appear instead, e.g. English *from*, German *von*)

These typological generalizations are just what we would predict if the dual analysis/reanalysis of agent phrases is given the following diachronic interpretation, as seven (possibly hypothetical) stages in the development of passives in a language:

(24) *Hypothesized stages in the development of passives with agent-phrases:*

1. Passive is a “relation-reducing” (or “detransitivizing”) rule (Dowty 1982a). Only the ‘agentless forms’ of passive sentences appear in the language; what will become agent phrases (*by*-phrases, in English) only occur as instrumental adjuncts of non-passive VPs (*send the package by airmail* or the like).

2. Agent Phrases occur as adjuncts (with instrumental/source meaning) to passive verbs; as instrumental “agent phrases” would not make sense with stative and other non-volitional and non-causative passive verbs, agent phrases never occur with them.
3. Agent-phrases are reanalyzed as complements of passive verb phrases, thus leading to step 4:
4. The agent-phrase-marking preposition (*by* in English) or instrumental case marking is reanalyzed as a marker of grammatical function (without independent semantics), a so-called “case-marking” preposition or “empty case” and does not contribute any meaning per se to the compositional semantics of the sentence.
Passive is now an argument-permuting rule (“relation-changing” rule), i.e. one that yields the same 2-place lexical meaning as the active verb but with subject and non-subject arguments interchanged.
5. Passives of stative verbs, other non-causatives, etc. now occur.

3 Syntactic Consequences: Predictions about Word Order of Adjuncts vs. Complements

In English and typologically similar languages, adjuncts in general can often occur at various positions within the clause, while superficially similar complements have a more restricted position—specifically, complements in English always follow verbal heads. For example:

3.1 Infinitive Adjuncts vs. Infinitive Complements

- (25) a. John sang to please Mary (*to please Mary* is adjunct)
 To please Mary, John sang
 John, (in order) to please Mary, sang for hours.
- b. John tried to please Mary (*to please Mary* is complement)
 *To please Mary, John tried
 *John, (in order) to please Mary, tried for hours. (*acceptable only if tried is taken to have an elliptical complement*)

3.2 Subcategorized Adjuncts

Subcategorized adjuncts, such as adverbs, are distinguished from true adjunct adverbials in just this way:

- (26) a. They criticized him harshly (*adjunct*)
 They harshly criticized him
- b. They treated him harshly (*subcategorized adverb*)
 *They harshly treated him¹¹

Allowing multiple syntactic positions for adjuncts can be done in various ways in CG; one way is to give adjuncts multiple category membership (e.g. S/S vs. $S \setminus S$), another is to introduce them as “permutable” constituents within a multi-modal CG allowing adverbs to obey the logic of LP. But once we observe the (independently verifiable) typological demand in English that complements always follow their heads, then the implication for adjunct reanalysis is this:

- An adjunct can be reanalyzed as a complement (in English) only when it follows its head; the same adjunct in any other syntactic position cannot be reanalyzed.

3.3 Position of repetitive vs. restitutive again (*wieder*)

At this point it is interesting to look at the word order possibilities for the repetitive (external) reading of English *again* and German *wieder* vs. those for the restitutive (internal) *again* and *wieder* (Dowty 1979), (Fabricius-Hansen 1983). (This ambiguity is present in a sentence like *Mary shook John awake again*: the external (or REPETITIVE) reading entails that this was the second time that Mary had shaken John awake; the internal (or RESTITUTIVE) meaning only entails that John became awake for a second time as a result of Mary’s shaking him, not that she shook him for a second time, i.e. Mary has merely *restored* the state of John’s awokeness.) Dowty (1979:260-264) proposed that this meaning difference results from a complement vs. adjunct ambiguity (an ambiguity in the verb’s category), not an ambiguity in the adverb per se¹², so this predicts that the availability of both readings will depend on word order. Fabricius-Hansen (in the cited paper and elsewhere) and others have argued for a different analysis of this ambiguity, thus not immediately predicting any word order sensitivity.

In fact, the two readings are indeed limited by syntactic position, just like infinitives and subcategorized adverbs (*treat harshly*). When *again* occurs to the right of the verb, both readings for *again* are available; in any other position, only the external (repetitive) reading exists:

- (28) a. Mary shook John awake again (*Both readings*)
b. Again, Mary shook John awake (*Only repetitive reading*)
Mary again shook John awake. (*Only repetitive reading*)
c. When the power failed, the satellite entered the atmosphere again. (*Both readings*)

¹¹Mike Calcagno has observed the paradigm below, which shows in more detail that this restriction cannot be an artifact of the particular choice of adverb; rather *treat* (in this sense) requires an adverb complement on its right, and a pre-verbal adverb cannot satisfy this subcategorization requirement:

- (27) a. They treated him harshly.
They treated him cruelly
b. They harshly treated him cruelly
They cruelly treated him harshly
c. *They harshly treated him.
*They cruelly treated him.

¹²It should be noted that Dowty (1979) actually proposed TWO analyses of this adverb problem; in addition to the complement/adjunct analysis (pp. 260–264), another analysis was entertained (pp. 264–269) that attributes the ambiguity to the category of the adverb; subsequent examination showed that the complement/adjunct analysis is the more viable one.

- d. When the power failed, the satellite again entered the atmosphere. (*Only repetitive reading*)

Arnim von Stechow ((von Stechow 1996) and p.c.) has noted that the restitutive reading of *wieder* in German is only available when *wieder* appears in a syntactic position where a verbal complement can appear in in German, while the repetitive reading is available for *wieder* in any position German allows for an adverb. Thus for both English and German, the syntactic prediction of the reanalysis hypothesis are met for *again (wieder)*. See Dowty (1979, 1993, to-appear) for more data and details.

4 Independent Arguments for the Simultaneous Existence of Multiple Syntactic Analyses: The Perspective of Historical Linguistics

The postulation of simultaneous multiple analyses has often been regarded with suspicion within the methodology of modern linguistic theory — a sign of a “missing generalization” at least, and always deemed inferior to a proposed alternative that appeals only to a single analysis.

In spite of this, several papers over the years have argued explicitly for multiple syntactic analyses, even when there is little or no detectable accompanying semantic ambiguity. A few of these are:

- Hankamer (1977), “Multiple Analyses”
- Kroch (1989) “Reflexes of Grammar in Patterns of Language Change”
- Ladusaw & Dowty (1988), Bresnan (1982a): ‘Syntactic Control’ of complements vs. ‘Real-World Control’ of actions and objects: unexpected acceptability of *He was promised to be allowed to leave*

But many historical linguists have long accepted the idea that multiple analyses must be assumed to be available to a single generation of speakers in order to explain fully the facts of language change. One clear explicit statement of the reasoning behind this deserves quoting here, from A. Harris and L. Campbell, *Historical Syntax in Cross-Linguistics Perspective*, (Harris & Campbell 1995:81, ff):

4.4.3 Multiple analyses during actualization

During the period of actualization, a single input structure continues to have multiple analyses in the grammar of the individual speaker. For descriptive purposes it is convenient to recognize three stages to reanalyses:

Stage A, Input: The input structure has all of the superficial characteristics of the input analysis.

Stage B, Actualization: The structure is subject to multiple analysis: it gradually acquires the characteristics of an innovative analysis, distinct from that of Stage A.

Stage C, Completion: The innovative structure has all of the superficial characteristics of the innovative analysis

Reanalysis is the transition from Stage A to Stage B. Stage B is the period of actualization, and the speaker makes both (or many) analyses, which may be related to each other in different ways at different times. Stage B typically consists of multiple changes, reflecting the characteristics of the particular construction in the particular language. It may be noted that the gradualness of change is due in part to the duration of actualization in some changes. Some reanalyses may not reach Stage C; they are never completed, in the sense that all the characteristics of the innovative analysis may not be acquired.

It has often been assumed, especially in the description of change in individual languages, that in reanalysis the period of multiple analyses is only transient, and that the innovative analyses rapidly *replaces* the earlier analysis. There are at least three kinds of evidence that multiple analyses continue to be available in individual grammars for some time, though that time of course is different for different changes. Evidence comes from the possibility of multiple reflexes, from variation and conflicting data, and from the possibility of reversibility of change. . . .

5 Evidence for the Adjunct ‘Origin’ of Most Complements

Probably one of the most compelling arguments for dual analysis in English comes from the very large set of pairs of cases where (i) an adjunct construction is found that parallels a complement construction exactly, at least in “surface” syntax, (ii) the two parallel constructions can be shown to have the same kinds of semantic similarities and differences between adjunct and complement already discussed above, and (iii) the same syntactic differences also occur (i.e. word order possibilities).

Because of space limitations, all I can do here is enumerate a representative list of these pairs, with examples for each pair: this is in **Table 1** below.

It will have to be left as an exercise for the reader (i) to find more examples for each pair of constructions, (ii), to verify that the allowable word orders are usually broader for the adjunct than the complement case (iii) to figure out the (regular) adjunct meaning of each case, and (iv) to verify that the “specialized” meanings of the complement examples do in fact differ (sometimes subtly) from the corresponding regular adjunct meaning.

The case of the complement vs. adjunct genitives is worth special comment, all the more so in this context because of the interesting connections between it and Partee and Borschev’s paper on genitives in this volume. It has been widely recognized for years that possessives (and genitives) have a different semantic function when they combine with relational nouns (*friend, mother, top*, etc.) than with non-relational nouns (*team, dog, table*, etc.) This idea has been thoroughly investigated (independently) by Barker (1991), (1995) and by Partee (1997) (based on unpublished work by Partee from 1983 and developed in subsequent papers). The reading (normally) found with relational nouns (*Mary’s mother*) is called LEXICAL, INTRINSIC (Barker) or INHERENT (Partee), and that with non-relational nouns (*Mary’s book*) is called EXTRINSIC (Barker) or FREE (Partee), or MODIFIER. The meaning of the extrinsic possessive is quite broad but is also context dependent — for example, *John’s team* could mean, depending on the context in which it is uttered, either “the team that John plays on”, or “The team that John owns”, or “the team that John cheers for”, or “The team that John placed a bet on today”. The extrinsic/free

Table 1: Table of Examples of Corresponding Adjunct vs. Complement in English

ADJUNCT CONSTRUCTION:	CORRESPONDING COMPLEMENT CONSTRUCTION:
A1. Adjective Adjuncts to VPs John left work <i>exhausted</i> .	Adjective Complements to VPs John arrived <i>alone</i> .
A2. Adj. Adjuncts to Transitive Verbs ¹⁵ John ate the meat <i>raw</i>	Adj. Complements to Tr. Verbs ¹⁵ John's attitude made Mary <i>unhappy</i>
A3. “Repetitive Again (Adjunct Again, Mary shook John awake	“Restitutive” Again (Complement) Mary shook John awake <i>again</i>
B1. Directional PP adjuncts to intr. Vs Mary walked <i>to the park</i> .	Dative complements to intro. Vs John sang <i>to Mary</i>
B2. Directional PP adjuncts to tr. Vs ¹⁵ John threw a ball <i>to the fence</i> .	Dative complements to Tr. Vs John threw a ball <i>to Mary</i> . John threw Mary a ball.
C. Instrumental with-adjuncts John swept the floor <i>with a broom</i>	With-marked complements John loaded the truck <i>with hay</i> .
D. Other intr. and tr. PP adjuncts I took it <i>from</i> the box	Other intr. and tr. PP complements I learned it <i>from</i> a doctor
E. Agent phrases of passives (early stage) [= <i>by</i> -phrase as instrumental adjunct]	Agent phrases of passives (final) [= <i>by</i> -phrase as complement of passive verb]
F1. ‘Rationale’ purpose infinitives John sang (a song) (in order) <i>to impress Mary</i>	Infinitive complements of verbs John attempted <i>to impress Mary</i>
F2. Gapless Object-controlled infinitive adjuncts ¹⁵ John hired her <i>to fix the sink</i>	Infinitive complements of transitives ^{13 14} John persuaded her <i>to fix the sink</i>
G. Gapped non-subject-controlled infinitive adjuncts Mary bought it <i>to read</i> ___ <i>on the plane</i> .	(None?) —
H. Adjective-modifying gapped infinitive adjuncts It is available <i>to figure your tax with</i> ___ .	“Tough”-complements It is hard <i>to figure your tax with</i> ___ .
I. Possessive adjuncts of non-relational nouns <i>Mary's</i> team (etc.) A team (etc.) <i>of Mary's</i>	Possessive complements of relational nouns <i>Mary's</i> mother (etc.) the mother (etc.) <i>of Mary</i>

reading, it has been proposed, has a meaning such that *Poss Noun* is, uniformly “the unique *Noun* that stands in some contextually-determined but salient relation to *Poss*”; it is up to the hearer to figure out exactly what kind of relation is intended, though the relation of ‘ownership’ is probably the most common. If so, this extrinsic meaning can be semantically analyzed as an adjunct reading in my sense. The intrinsic/inherent possessive (*Mary’s mother*, *mother of Mary*) differs, in that the nature of the relation between Possessor and Noun is determined by the relational noun (so it is of course different for each relational noun). Thus in terms of this paper’s hypothesis, the inherent genitive must be a complement of the relational noun, not an adjunct.

The syntax of these two kinds of possessives and genitives is different from the other complement/adjunct cases above: the pre-nominal possessive is the one case I know of where a complement can precede its head (in English), e.g. *Mary’s mother*. But the two readings do differ syntactically in the post-nominal position, albeit in a subtle way: the so-called “double genitive”, as in *a book of Mary’s* is only found with extrinsic (adjunct) genitive meaning¹⁴: note that *#The mother of Mary’s* sounds quite odd, which is because *mother* is relational. Conversely, the post-nominal genitive with no possessive suffix occurs only with inherent/intrinsic (relational) readings (*The mother of Mary*) and not with non-relational heads (*#A book of Mary* sounds odd). (Cf. also Partee and Borschev’s paper in this volume.)

The significance of all the cases A–I in the table above can be summarized this way: If it is important to the grammatical structure of a language, (and important to the learners of the language) to distinguish adjuncts from complements, why should the grammar of English have dozens of cases where an adjunct construction and a complement construction look superficially exactly alike? This seems rather counter-productive.

But, if it somehow *helps* the language learner that each complement construction should look so similar to an adjunct construction as to be initially “mistaken” for one, then this is exactly the distribution of data that we should expect!

6 Dual Analysis is a more complex matter than just reanalysis in language acquisition

We can better understand that there are broader implications of the dual analysis hypothesis by digressing for a moment to examine the semantics of compounding and other word formation rules.

¹⁴Barker (1998) argues that the “double genitive” is actually a partitive reading (*a book of Mary’s* = “a book of Mary’s books”); if so, this is not an extrinsic reading but nonetheless still not an intrinsic reading either, but my general point still holds that genitive complements to relational nouns are syntactically distinct from other post-nominal genitives. See also (Partee & Borschev 1998).

¹⁵When examining all examples of adjuncts and complements to *transitive* verbs, it is important to keep in mind that I am assuming a WRAPPING analysis of direct objects (cf. Bach): thus what I call a complement (or adjunct) to a transitive will never appear immediately adjacent to the transitive, but rather after the direct object. Thus, the combination of *persuade* with its complement *to leave* form a DISCONTINUOUS CONSTITUENT in *persuade Mary to leave*

6.1 Compounds and derived words

In the history of the study of compounding in generative transformational grammar, linguistic theory has alternated repeatedly between deriving compounds by grammatical rule ((Lees 1960), (Levi 1975)) and arguing that derived compounds are not derived grammatically but are only listed individually “in the lexicon”; the latter position is supported by pointing to the idiosyncrasies of the meanings of individual examples that cannot possibly follow from any general rules ((Chomsky 1970), and in a different sense, also (Downing 1977)). The mistake that I think has usually been made in this debate is the assumption that if compounds (etc.) are listed individually in the lexicon (together with their meanings), then there cannot also be a rule that derives meanings of compounds by general rule.

Instead, I believe that a speaker’s knowledge of her/his language includes **both** ways of deriving meanings for most compounds. This is best shown with English Adjective–Noun compounds. I propose that all English speakers know that any compound of the form “*Adj-Noun*” has associated with it a ‘general’, rule-predictable meaning paraphrasable as “*Noun that is Adj*”. Thus a blackberry must be “a berry that is black”, a bluebonnet is “a bonnet that is blue”, and so on. But at the same time, speakers are perfectly aware that “berry that is black” (etc.) is not the **real** meaning of *blackberry*; that is rather “a certain species of bush that produces edible black, tiny berries in clusters.” Other examples:

(29)	<i>example:</i>	<i>predictable meaning:</i>	<i>real meaning:</i>
a.	big shot	“shot that is big”	important or influential person
b.	blackboard	“board that is black”	surface made for writing on with chalk, often black in color
c.	quicksand	“sand that is quick”	fine sand mixed with water that sucks down an object resting on its surface

To deny that speakers know there is some elementary sense in which *soft drink* means “drink that is soft” is to deny an obvious facet of speakers’ knowledge of their language, notwithstanding the fact that they also know a “real” or “correct” meaning for such compounds.

Why should languages have such double meanings for compounds? With only a moment of reflection, the answer is obvious, I believe: the “predictable” meaning of a compound:

- gives the hearer a “clue” or “hint” to the compound’s real meaning upon first encountering the compound
- serves as a mnemonic for more easily retrieving that real (and individually learned) meaning from memory when the compound is encountered again later

(Try as a mental exercise to imagine what English would be like if all compounds were replaced by mono-morphemic words that had to be learned individually, without any morphological clues: English would be *far* harder to learn!.)

On encountering the compound *software* for the first time, a speaker at least has a clue from its derivational meaning (“wares that are soft”) where to start guessing what the real meaning might be. That is, one does not necessarily assume for a initial period of time that it really literally means “ware that is soft” and then correct that assumption later: more likely, a person realizes *already at first hearing* that *software* must have a much more specific, probably technical meaning.

What exactly is the relationship between the two meanings of a pair in the speaker's mind? What should it be in a linguist's grammar? The first question is no doubt highly interesting for psycholinguistics and the psychology of memory, but I doubt that much can be specified about this relationship in linguistic theory — nor should we try to. What we can and should do is simply specify that there are two kinds of meanings for each: (i) a predictable but only approximate meaning (and the rule that gives it from the meanings of the parts), and (ii) an individually-learned meaning for it—just like the individually-learned meanings of all monomorphemic words.

Other kinds of derivational word formation also show the need for dual analysis: it is intuitively felt by all speakers of English that all derivations of VERB + *-able* have a uniform approximate meaning: “capable of being *verb+ed*” – so that *washable* means “capable of being washed”. At the same time, speakers know that many such forms have a more specific actual meaning: *readable* does superficially mean “capable of being read”, but its actual meaning is something more precise.¹⁵

My general point in making these observations about word formation is to argue that the two analyses in each word formation “dual” are almost certainly not simply a matter of the lexicalized analysis *replacing* the preliminary analysis, then disappearing forever; rather the preliminary, semantically compositional analysis is still employed, in some subtle psychological way, in on-line processing — though in a way that only connectionism or some other other future theories of the psychology of language can explain.

If this is plausible, then *simultaneous* on-line processing is just as plausible for the “dual” complements-adjunct analyses.

So what the dual analysis hypothesis accomplishes (for both domains) is to allow theorists to formalize—right now—the two “endpoints” of a complex psycholinguistic “continuum”. I have argued that being able to acknowledge and isolate these “endpoints”, within a formal linguistic theory, improves our understanding the phenomena of “adjunct” and “complement”.

7 Remaining Problems: Further Limiting the Semantics of Adjuncts

It can be shown that my proposal about the cognitive “trade-off” (discussed above) make some further formal limitation on adjunct meanings beyond that which is implicit in the standard semantic interpretation of the CG category $A \setminus A$, specifically in the case of $VP \setminus VP$. Logicians and some linguistic semanticists have traditionally treated most adjectives and adverbs as one-place predicates (a *Republican senator* is simply anyone who is both a Republican and also a senator), hence the compositional semantic rule for Adj-N or for VP-Adv must be “intersection of two predicates”. But Montague and others in the 1970's observed many examples of “intensional” modification (*former wife, alleged communist, putatively spies on us*),

¹⁵In their book *On the Definition of Word*, Di Sciullo and Williams (DiSciullo & Williams 1987) introduce the term *listeme* for linguistic units that are thought to be “listed individually”(as opposed to generated ‘on-line’): their listemes include all root morpheme, most derived words, certain syntactic phrases (idioms, and probably collocations) and a few sentences. Although this term does seem to draw the same distinction I am making here, Di Sciullo and William go on to deny that their ‘listemes’ have any relevance to linguistics at all, much less do they even raise the possibility of dual analyses for any one form, morphological or syntactic. Hence, I will not adopt their term ‘listeme’ here.

and observed that the type assigned by Montague to $VP \setminus VP$ (and other instances of $A \setminus A$), “functions from properties (of individual) to sets (of individuals)” was inherently rich enough to cover both intensional modification and ordinary intersective modification; following Parsons (1980), we can just translate any extensional modifier in category $A \setminus A$ with a lambda expression $\lambda P[\alpha'(x) \wedge P(x)]$, using an extensional predicate α' . Inasmuch as non-intersective (intension) modifiers are the exception and intersective modifiers are the rule, this strategy could be criticized as “generalizing to the worst class”, as some of his other analyses have been criticized, but it has nevertheless been judged adequate and accepted in CG up to the present, even though there is minor “inconvenience” in unifying the predicate with the attributive syntax of each extensional modifier (e.g. *The woman is clever* vs. *The clever woman*).

However, Kasper (1997) has discovered a more serious problem for this analysis of adjunct semantics, this time with the recursive use of intensional and extensional modifiers, that shows that Montague’s categorial solution must ultimately fail, for compositional semantic reasons¹⁶ The ultimate solution, I argue in the successor to this present paper (Dowty 2000), is to go beyond the Lambek Calculus (**L**) and its relatives by adding a new kind of type constructor for intersective, extensional modifiers in CG (type logical grammar). We still want to retain the type A/A for the non-intersective modifiers, as syntactic differences exist between between this and the intersective adjunct category (type).¹⁷

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¹⁶This may not be immediately obvious from Kasper’s paper itself, since it is couched entirely within HPSG syntactic terminology and HPSGs less rigid relationship between syntax and semantics, not the type-logical, syntax-driven semantics of CG.

¹⁷In Dowty (1997) (“Adjunct to Argument Reanalysis... the Problem of Prepositional Phrases” — Blaubeuren 1997 Workshop Paper), I argued more specifically that (i) my claim that prepositional phrase complements and most other *VP* complements are ‘expressively richer’ semantically than any possible *VP* adjuncts is really only valid if most such adjuncts are **extensional intersective modifiers**, and that specifically (ii) locative, directional, instrumental, etc. *VP* adjuncts are in fact intersective modifiers of *events* (contra Keenan & Faltz (1985)).

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Semantic Features and the Distribution of Adverbs

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Abstract

This paper proposes that we can predict which adverbs cannot adjoin to the right in head-initial languages by means of a particular semantic property, that of being a “subjective” adverb, one which maps an event or proposition onto a scale with the high degree of indeterminacy and context-dependence. Such adverbs, such as *probably* or *luckily*, cannot adjoin to the right with non-manner readings, while other adverbs (like *politically*, *often*, or *deliberately*) may. This supports the view that the distribution of adverbs depends heavily, and subtly, on their lexicosemantic properties.

1. Introduction

In this paper most of the discussion will be about lexical semantics, but still it is ultimately a syntax paper. My overall concern is to build a theory of adverb distribution that will tell us, for any given adverb in a language, where it can occur in a sentence, what possible meanings it can have in each position, and what other elements it can cooccur with. We want this theory not simply to make a list, but to make these predictions by means of general principles, and to do so in as restrictive a way as possible. And it is universally agreed that at least some aspects of the distribution of an adverb can be predicted by its lexical semantics. The goal of this paper is to identify a particular semantic property that correlates directly with one specific fact about adverbial distribution.

The major syntactic fact at issue is that some adverbs are able to adjoin to the right in VO languages while others cannot. (Throughout this paper I will ignore OV languages, where right-adjunction is often exceptional if possible at all, and in any case is of a completely different sort, in my view; see Ernst (to appear-b) for discussion). This difference is illustrated in (1-4):

- (1) a. Karen has recently been buying first-aid supplies.
b. Karen has been buying first-aid supplies recently.
- (2) a. Fred will often discuss this question.
b. Fred will discuss this question often.
- (3) a. Karen has luckily been buying first-aid supplies.
b. *Karen has been buying first-aid supplies luckily. (no comma intonation)
- (4) a. Fred will probably discuss this question.
b. *Fred will discuss this question probably. (no comma intonation)

(Some versions of current syntactic theory would deny that the postverbal adverbs are really right-adjoined.¹ This issue will not matter here, since all that is crucial is the descriptive

¹ See Alexiadou (1997) and Cinque (1999) for prominent examples.

difference.) In (1-2), the adverbs *recently* and *often* may occur either between the subject and the verb, as in the a. sentences, or in final position, as in the b. sentences. But in (3-4), *luckily* and *perhaps* may only occur in preverbal position.

The first stab at a solution to the distinction between (1-2) and (3-4) might be that the adverbs in the first two sentences are functional, or quantitative, while those in the second pair are lexical, or qualitative.² On this view, the time and frequency adverbs in (1-2) would line up with other functional adverbs in (5), while the more ‘lexical’ adverbs would be a subclass of predicationals, shown in (6). I put domain adverbs with predicationals for the moment, since they are similar in many ways, though they are not really of this class:

(5) Functional Adverbs (not a complete list)

- (a) Frequency (broadly defined): *often, occasionally, always, twice, again*
- (b) Location Time: *today, previously, now, then, once*
- (c) Duration: *briefly, momentarily*
- (d) Aspectual: *still, already, yet*
- (e) Focusing: *even, only, merely, just*

(6) Predicational Adverbs

- (a) Speaker-Oriented:
 - (i) Discourse-Oriented: *frankly, honestly*
 - (ii) Evaluative: *luckily, oddly, significantly, unbelievably*
 - (iii) Epistemic: Modal: *probably, perhaps, necessarily*
Evidential: *clearly, obviously, plainly*
- (b) Subject-Oriented:
 - (i) Agent-Oriented: *cleverly, tactfully, stupidly, wisely*
 - (ii) Mental-Attitude: *reluctantly, willingly, gladly, calmly*
- (c) Exocomparative: *similarly, likewise, accordingly*
- (d) Pure Manner: *loudly, woodenly, brightly*
- (e) Domain: *phonologically, chemically, politically* (Not predicational but similar)

Also, manner adverbs do right-adjoin, both pure manner adverbs as in (6d) and the manner versions of the other predicationals shown in (6). So the real issue concerns right-adjunction for adverbs with non-manner readings.

In this paper I will propose that the functional/predicational division is close to the mark, but that the right division is slightly different and a bit more fine-grained. One salient property of predicationals is that they all represent gradable predicates, and many nongradable adverbs indeed occur postverbally. Among other things, this means that domain adverbs, while they have sometimes been claimed to be predicational or at least ‘lexical’,³ are not best classified as such. As we will see, they are not gradable, and can occur to the right of the verb. Perhaps more interestingly, I will show that mental attitude adverbs are predicational, but lack one crucial semantic property which the other predicationals have, and that this frees them up to be able to adjoin to the right just like *recently*, *often*, and nongradable adverbs. In other words, I will show that there is a semantic property shared just by all the adverbs in (6) except domain and mental-attitude adverbs, which predicts the impossibility of right adjunction. The

² Ernst (1984) calls predicationals ‘Quality adverbs’, and Laenzlinger (1997) similarly distinguishes ‘qualitative’ from ‘quantitative’ adverbs in a way that corresponds roughly to the 5/6 distinction.

³ E.g. by Ernst (1984), chapter 2.

point of all this is to try to zero in on precisely those semantic properties which enable us to predict important differences in the syntactic distribution of various adverbs.

I will start by providing some background assumptions about the mapping between syntax and semantics. After that, I consider and reject the obvious first guesses about the distinction between these adverbs that may adjoin to the right and those that may not. Then I will make a proposal and show how it makes the correct cut, focusing on the adverbs which represent gradable predicates yet still may right-adjoin, including mental attitude adverbs and the time-related adverbs in (1-2). I conclude with a summary and brief discussion of this result.

2. Basic Assumptions

As noted above, everyone assumes that at least some aspects of adverb distribution can be predicted from their semantics. The big questions are how much can be predicted, and exactly how the mapping between syntax and semantics is to be done. My view is that a lot of it can be predicted, and that the mapping ought to be as direct as possible.

Consider first the difference between location-time expressions like *yesterday*, *now*, or *on Saturday*, and frequency adverbs such as *occasionally* or *frequently*. Cross-linguistically, in terms of possible syntactic positions, it is clear that frequency adverbs may occur lower in structure than location-time phrases (even if there is variation among individual items, so that not all frequency adverbs may occur in low positions). This is easiest to show in SOV languages, or those like Chinese whose adjuncts follow typical OV ordering even though it is head-initial in terms of complements. (7-8) illustrate the fact that manner expressions may follow the verb in Chinese, while time and all other ‘high’ adjuncts, such as the epistemic adverb *yiding* ‘definitely’, may not:

- (7) Heiban, xiaozhang mai de hen kuai.
blackboard principal buy DE very fast
‘Blackboards, the principal bought quickly.’
- (8) Xiaozhang mingtian yiding hui mai heiban (*mingtian) (*yiding).
principal tomorrow definitely will buy blackboard tomorrow definitely
‘The principal will definitely buy blackboards tomorrow.’

As I have argued elsewhere, postverbal position in Chinese indicates a low adjunction site, in VP. Now observe in (9) that frequency expressions like *liang ci* ‘twice’ also may occur in this position; essentially following the analysis of Soh (1998), they are in a low specifier position, over which the verb raises (details are irrelevant here):

- (9) Xiaozhang hui mai liang ci heiban.
principal will buy two time blackboard
‘The principal will buy blackboards twice.’

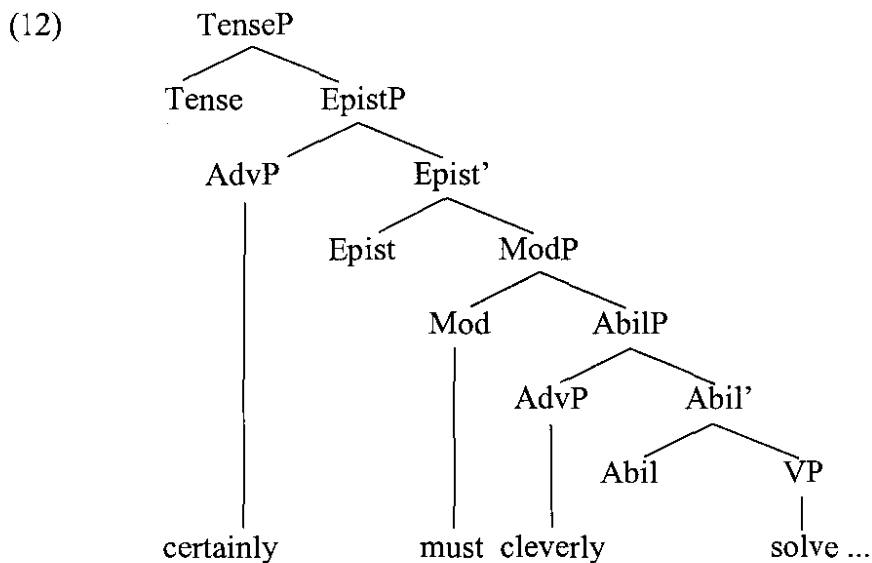
Similar evidence can be found for Japanese (see Fujita (1994)) and German (Frey & Pittner (1999)) among other languages, and in English as well, although the evidence is weaker for the latter. (This of course involves rejection of the Larsonian/Kaynean view that time adjuncts are licensed below complements in VP-shells. For discussions of this approach, see Stroik (1990), Stroik (1996), Laenzlinger (1997), Giorgi & Pianesi (1997), and Cinque

(1999).) The distinction can be made to follow if we consider frequency modifiers to be ‘event-internal’ in some way, perhaps taking them (as does Moltmann (1997)) as defining the interior mereology of events. By contrast, location-time modifiers take a complete event and locate it at an interval in time. If only event-internal modifiers can occur low in structure, then the positional differences can be derived. Though this idea has not been formalized, as far as I know, it seems to make the right distinction, and constitutes a clear instance where a specific semantic property correlates with syntactic distribution.

Now consider a second case, involving the relative order of adverbs and modals. Here I would like to contrast my view of a fairly direct mapping between syntax and semantics with that advocated by Cinque (1999) and others,⁴ where the mapping is less direct. As illustrated in (10), *certainly* can occur on either side of deontic *must*, while in (11) the agent-oriented adverb *cleverly* can only follow it:

- (10) a. The protagonist in your novel must certainly solve the mystery by herself.
 b. The protagonist in your novel certainly must solve the mystery by herself.
- (11) a. The protagonist in your novel must cleverly solve the mystery by herself.
 b. *The protagonist in your novel cleverly must solve the mystery by herself.

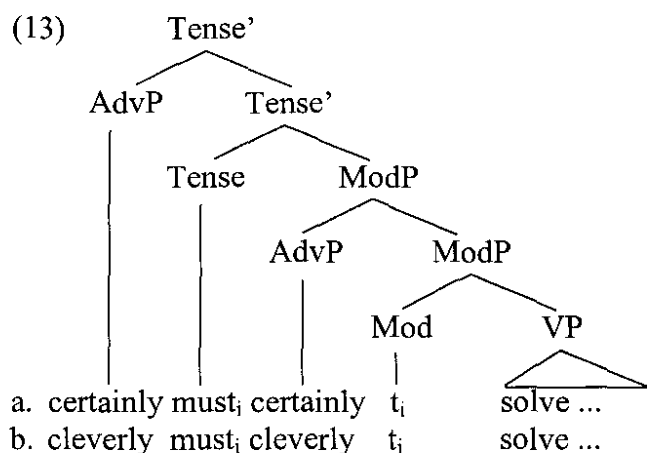
On Cinque’s approach, each adverb is licensed in a one-on-one relation with a specific functional head having a related meaning, and these heads are ordered by UG in a rigid clausal hierarchy. Thus for (10-11) the relevant portion of the clause would look something like (12) (the actual node labels are not important to the point):



(11b) is ruled out because *must* starts above *cleverly*, and the adverb can never raise over *must*. But both (10a) and (10b) are all right because *must* can optionally raise to Tense over *certainly*. There are other ways to account for this sort of data on this approach, but they share the assumption of rigid ordering of adverbs, with various movements of heads around them. The relationship between syntax and semantics is indirect, because the essential property of *cleverly* that makes it occur below *certainly* is encoded in the ordering of the functional heads that license the adverbs. Once this is in place everything else is syntax.

⁴ E.g. Alexiadou (1997) and Laenzlinger (1997).

By contrast, on a more direct approach one might explain (10-11) as follows. As far as syntax is concerned, adverbs are free to adjoin anywhere between the subject and verb, and *must* obligatorily moves to Tense, with possible adverb adjunction sites just above or below it, as shown in (13), where (a-b) show the two optional positions for each adverb:



Epistemic adverbs like *certainly* are essentially speaker's judgments about the degree of likelihood of some proposition, so they generally may take scope over modals. This accounts for its position before *must* in (13a). As for the order *must* - *certainly*, if we assume that the trace of a chain may mark narrow scope, then the adverb can still take wide scope over *must*, since it c-commands the modal's trace.⁵ As for *cleverly* in (13b), when it follows *must* it is within the modal's scope. But what about the case when it precedes, where it is ungrammatical? I take agent-oriented adverbs like *cleverly* as having two arguments, one being the agent which is usually the subject of the sentence, and the other being the event represented by the phrase in its immediate scope.⁶ Now, an important property of agent-oriented adverbs is that this event must be one that the agent can control, if only to be able to choose not to do it.⁷ But *must* indicates an obligation, which cannot be controlled by the obliged entity. So this eventuality is of the wrong semantic sort to be in the scope of the adverb, and (11b) is ungrammatical.

Although I advocate precisely this analysis, my point at the moment is merely to show that this is part of a system where sentences with combinations of adverbs, modals, aspectual operators, and the like are possible only if they fit together semantically, without violating any of their scope or other semantic requirements. There are purely syntactic effects, but they are minimal. I have argued for this approach in a number of places (see Ernst (1998), Ernst (to appear-b), for example), and I believe it has advantages over the theory based on one-to-one licensing by functional heads, in particular that it captures a number of generalizations more simply and elegantly. In this paper I do not aim to present evidence to distinguish the two approaches, but my main goal is to continue to identify the semantic properties which correlate with aspects of syntactic distribution, so that we eventually **can** see more clearly which theory does a better job in capturing these generalizations.

⁵ See Ernst (1991), Aoun & Li (1993), and Ernst (to appear-b) for discussion.

⁶ See Ernst (to appear-b) for discussion and justification.

⁷ I use the term *event* in the loose, syntactician's sense more often rendered as *eventuality* in the semantic literature, encompassing processes and states as well as actions. On the 'controllability' requirement, see the discussion in Ernst (1984), chapter 2.

3. Predicational vs. functional adverbs

3.1. Predicational adverbs

Predicational adverbs, listed in (6), are those which have the properties in (14):

- (14) Typical properties of English predicational adverbs:
- (a) come from open classes
 - (b) are composed of an adverb stem and *-ly*
 - (c) take a proposition, fact, or event as one of their arguments
 - (d) show the clausal/manner pattern of ‘homonymous’ readings in most cases

Clausal readings (often called “sentential”⁸) are shown in the a. sentences of (15-19):⁹

- (15) a. Frankly, they won’t speak to her.
b. They won’t speak to her frankly.
- (16) a. Clearly, they saw the sign.
b. They saw the sign clearly.
- (17) a. Strangely, Nikki was holding it.
b. Nikki was holding it strangely.
- (18) a. Intelligently, Carol explained it.
b. Carol explained it intelligently.
- (19) a. Accordingly, they adjusted the angle.
b. They adjusted the angle accordingly.

Not all types of predicationals show this split; modal and pure-manner adverbs are restricted to clausal and manner readings, respectively, as illustrated in (20-21):

- (20) a. They probably have been playing *Stairway to Heaven*.
b. *They have been playing *Stairway to Heaven* probably.
- (21) a. *They loudly have been playing *Stairway to Heaven*.
b. They have been playing *Stairway to Heaven* loudly.

But since this restriction can be explained independently (see Ernst (1987)), I take the existence of the dual-reading pattern as a defining feature of the predicational class.

⁸ See Ernst (to appear-a), Ernst (to appear-b) for further detail.

⁹ Clausal predicational adverbs, essentially divide into three types, according to scope. The first, ‘Discourse-Oriented’, is sometimes known as ‘Pragmatic’ or ‘Speech-Act’ adverbs (see Bellert (1977), Mittwoch (1976)). The second corresponds to the rest of the ‘Speaker-Oriented’ group in Jackendoff (1972), which includes the Discourse-Oriented subclass, and to ‘Ad-S’ for McConnell-Ginet (1982) (narrowly speaking, it is this group that is probably best termed ‘sentential’). The third, for which I follow Jackendoff’s ‘Subject-Oriented’, is ‘Ad-VP’ for McConnell-Ginet.

I assume that the manner adverbs in (15-19 b) are adjoined to the right in VP, so the discussion about how predicational and functional adverbs differ with respect to right-adjunction is really an issue of why most predicationals cannot adjoin **high** and to the right, attached to functional projections above the basic VP, with clausal readings. In addition to the examples in (1-4), we may add those in (22) for functionals, which do adjoin high and to the right, and (23-25) for predicationals, which do not (again, as always, we must exclude comma intonation):

- (22) a. She didn't fall asleep right then. (Location-Time)
 b. The visitors didn't understand us momentarily. (Duration)
 c. Paul was wearing the hat already. (Aspect)
 d. Christine will go swimming again. (Additive)
- (23) a. Frankly, Dan is way ahead of his classmates. (Discourse-Oriented)
 b. *Dan is way ahead of his classmates frankly.
- (24) a. The committee will wisely remain neutral on this issue. (Agent-Oriented)
 b. *The committee will remain neutral on this issue wisely.
- (25) a. Similarly, no theory exists in a vacuum. (Exocomparative)
 b. *No theory exists in a vacuum similarly.

While the (b)-sentences in (23-25) are marginally possible with manner readings, they are certainly out with the intended clausal readings. The (a)-versions are fine, with preverbal, non-manner readings.

There is good evidence in all these cases that these postverbal adverbs are adjoined high and to the right. Even in analyses following the antisymmetric (Kayne (1994)) approach like Cinque's, where right adjunction is banned in principle, various raising operations result in the effect of right-adjunction, so the evidence is still valid for the 'surface' structure (at Spell-Out) in such theories. We already saw above that there is good evidence for location time adjuncts, like *right then* in (22), being above the lexical VP. The fact that such adverbs can optionally take scope over negation confirms the possibility of high right adjunction, as in (26); imagine a case where last week, for the second week (time), a carousing man did not come home on two different nights:

- (26) He didn't come home twice again last week.

The same sort of test can be used for (22b); here *momentarily* takes scope over *didn't understand us*; as usual I assume that scope is mediated by c-command (except for cases of 'chain-scope' as discussed above for (13), which does not apply here since negation does not raise). This conclusion is strengthened by sentences like (27):

- (27) They didn't understand us out of fear momentarily, but even after they calmed down they were still somewhat thrown off by our accents.

Imagine that we are fearsome-looking tourists, and we startle some natives when we come around the corner. For a moment they are afraid and cannot process what we are saying, so that momentarily, out of fear, they don't understand us. Here the duration expression takes

scope over the causal phrase *out of fear*, which in turn takes scope over negation. Finally, proform substitution in (28), based on (27), confirms the relevant constituent structure:

- (28) They didn't understand us out of fear momentarily, and then did so because of our accents for another few minutes.

In (28) *do so* is interpreted as *didn't understand us*, so the causal phrase and the duration phrase c-command negation.

The same sorts of tests work for *already* and *again*. In (29), *already* takes scope over *obeying her out of love*, and on the usual assumption that a reason-phrase like *out of love* is relatively high in structure, then *already* should be even higher. This is confirmed by the constituency evidence from *do so* in the parenthesis:

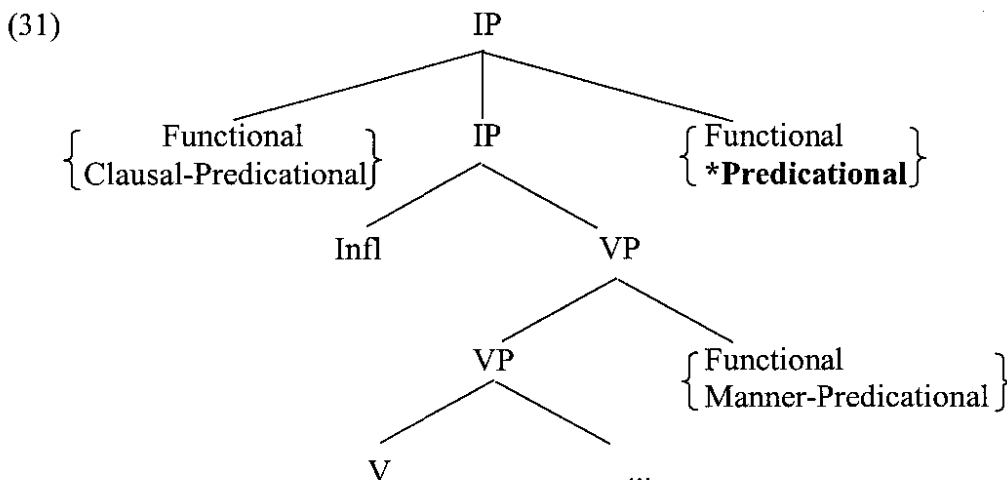
- (29) Fido was obeying her out of love already, instead of fear (but Rex was not doing so yet).

And in (30a-b), taking the phrases *on Saturday* and *because Jim asked her to* be outside the lexical VP, *again* should be higher (where it modifies *go swimming*, not *ask*):

- (30) a. Christine will go swimming on Saturday again.
 b. Christine will go swimming because Jim asked her to again.

It should be noted that these wide-scope readings for postverbal adjuncts are often disfavored, but this does not mean that they cannot occur. In fact, often all that is needed to make the wide-scope reading normal is to adjust the discourse structure so that the preceding material is old information. I will assume that the differences in position can be linked to information structure, but that this has no effect on the syntax and on the possibility for wide scope readings.

Given all these results, the pattern we must account for is shown schematically in (31) for different adverbial classes, where IP stands in for all functional projections above the minimal VP, including those headed by any elements of the 'split Infl', negation, auxiliary verbs, and the like:¹⁰



¹⁰ I assume that left-adjunction in VP in VO languages is excluded independently. I also assume that the lexical verb obligatorily moves into the head of the lowest functional projection, Pred. Neither assumption affects the arguments discussed here. See Ernst (to appear 1999), Ernst (to appear-b) for details.

3.2. What semantic property is relevant?

3.2.1. Open vs. closed classes?

There are a number of possible ways to distinguish predicational and functional adverbs that might distinguish correctly between those which can right-adjoin to functional projections and those which cannot. Consider first the open-class/closed-class distinction. Certainly, the temporal, aspectual, focusing, and quantificational adverbs listed in (5) come from limited, closed classes of adverbs, while predicational adverbs like *oddly*, *clearly*, *frankly*, or *softly* belong to open classes. But this runs into two problems. First, if we want a theory of adverb syntax to be embedded in a larger theory of adverbials, i.e. verbal and sentential modifiers, then we could not easily extend this explanation to the open class of temporal and frequency adjuncts like *a week ago*, *on the First Tuesday in April*, or *twenty-seven times*, which is quite productive. Second, and more importantly, some predicational adverbs have closed classes and some open-class adverbs may right-adjoin to functional projections. The first case, of a closed class of predicational adverbs, is represented by modal adverbs, whose members number only a handful, those in (32) and perhaps a few more:

(32) Modal adverbs:

maybe, probably, possibly, perhaps, necessarily, definitely, indubitably, ...

The second is domain adverbs, with a sample given in (33). Whether they should be classified as predicational or not, they clearly come from an open class, since new domains of endeavor can always be invented, and practically any technical distinction in any field of study may be used as a domain adverb; (34) provides an example of this from linguistics, where sloppy identity in ellipsis is being contrasted with strict identity:

(33) *logically, mathematically, choreographically, chemically, nautically, botanically, ...*

(34) “The ellipsis in (85) can be understood sloppily, ...” (Fiengo & May (1994), p. 125)

As (35a-b) demonstrate, domain adverbs may right-adjoin to functional projections, assuming again that postverbal adjuncts adjoin upward successively to the right, and that location-time adverbs are adjoined hierarchically above VP:

(35) a. They have worked hard since then politically.

b. The company’s productions have improved this year vocally, if not instrumentally.

Thus the difference we are looking for does not seem to be open versus closed classes.

Before going on to a second possible solution, I must mention focusing adverbs, some of which do not adjoin to the right. These are exemplified in (36); as always, I exclude comma intonation, or ‘afterthought’ intonation:

(36) a. The horses {just/merely} ran a mile.

b. *The horses ran a mile {just/merely}.

Some other members of this class do sometimes adjoin rightward, as in (37), though speakers vary in their acceptance of these sentences, and they are somewhat restricted prosodically. This indicates that as a class they may right-adjoin at least in principle:

- (37) a. The horses {even/only} ran a mile.
 b. The horses ran a mile {even/only}.

I have argued elsewhere (Ernst (to appear 1999), Ernst (to appear-b)) that these adverbs belong to a class of ‘Lite’ adverbs (morphologically ‘deficient’ in the terms of Cardinaletti & Starke (1996)). Such adverbs are usually barred from postverbal positions, and most of the time are also barred from sentence-initial position, as in (38):

- (38) *{Just/Merely/Even/Only} the horses ran a mile.

Although the string of words in (38) is in fact grammatical, this is true only if the adverbs are part of the subject. With the adverbs taking scope over the whole sentence, parallel to (35a), (36) is ungrammatical. Thus there is evidence for a PF-based, morphological explanation for the restriction on right-adjunction for these adverbs, which may be marked on individual adverbs, and we need not consider them in our semantic deliberations (see Ernst (to appear-b) for detailed discussion).

3.2.2. Quantitative vs. Qualitative?

Returning to the split between free and forbidden right-adjunction, one might try to take the idea of quantitative vs. qualitative adverb semantics seriously, treating functional adverbs as quantificational and predicational adverbs as qualitative. But again, time and domain adverbs do not fit: time adverbs are not necessarily quantificational, and domain adverbs are certainly not; both can right adjoin, as shown earlier.

3.2.3. Gradable vs. Nongradable?

Perhaps it is a matter of gradability - certainly location-time expressions like *yesterday* and *now* are not gradable; neither are domain adverbs. Observe (39-40):

- (39) a. Politically, they have worked hard since then.
 b. They have worked hard since then politically.
- (40) a. Very politically, they have worked hard since then.
 b. They have worked hard since then very politically.

Although *politically* appears to be able to take a degree modifier, when it does so as in (40) it is no longer a domain adverb; rather, it is agent-oriented, like *craftily* or *ambitiously*, making an evaluation of the agent on the basis of what he or she does. That is, the speaker is judging an agent as being very motivated by politics, rather than, in (39), saying that their working hard is evaluated in the political arena (as opposed to academics, or the theater, or weight-lifting).

So we might try to say that these non-gradable adverbs may right-adjoin, while the predicational adverbs, which are gradable, may not. But this, too, fails, because there are obviously functional adverbs which are gradable and also right-adjoin. These include some location-time adverbs like *recently*, some duration adverbs such as *briefly* and *momentarily*, and most frequency adverbs. Examples are shown in (41), the adverbs being both degree-modified and right-adjoined; their position to the right of purpose or causal expressions shows their high adjunction site:

- (41) a. Carol has robbed drugstores to get drugs more recently than Kim.
 b. Alice drank whiskey because Jim did only very briefly.
 c. Mark went to the gym to increase his strength quite often.

More seriously, there is another open-class group which has always been assumed to be predicational, yet also seems to adjoin high and to the right: mental attitude adverbs like *reluctantly*, *willingly*, and *anxiously*. Observe the sentences in (42-44):

- (42) a. Mark willingly rode a bicycle on the day of the transit strike.
 b. Mark rode a bicycle on the day of the transit strike willingly.
- (43) a. I will gladly pay you on Tuesday.
 b. I will pay you on Tuesday gladly.
- (44) a. Tori reluctantly had stopped dancing for a month.
 b. Tori had stopped dancing for a month reluctantly.

Since this group of adverbs will end up being rather important to my argument, it will be useful to spend a bit more time making sure that they really do adjoin to the right above the minimalVP. Recall that it is a general pattern for predicational adverbs that they have clausal readings above VP, but manner readings within VP. With mental attitude adverbs the clausal/manner distinction is not as clear as for, say, agent-oriented or evaluative adverbs (like *wisely* or *strangely*). But it comes out in (45):

- (45) a. She {reluctantly/willingly} had waited for him.
 b. She waited for him {reluctantly/willingly}.

(45a) seems better with an interpretation where her willingness or reluctance is about whether to wait or not to wait, while (45b) seems more felicitous when taken as indicating her mental attitude during the wait, but might also have the reading in (45a). This is as expected, since in (45b) the adverb could be right-adjoined to the minimal VP, giving the manner reading, or above VP, for the clausal reading; in (45a) only the clausal reading is possible, since the adverb is to the left of an auxiliary verb, and therefore outside the minimal VP.

I have tried to show that the gradable vs. nongradable distinction does not get the distinction we are looking for. Nevertheless, I think that gradability is useful as the first cut: we can say that if an adverb is **not** gradable, then it may adjoin high and to the right. This accounts for the domain adverbs and many of the functional adverbs, at least, as shown in the top part of the chart in (46):

(46)	<u>PREDICTIONS</u>	<u>EXCEPTIONS</u>
a.	<u>Nongradable Adverbs that Can High Right-Adjoin</u>	<u>Nongradable Adverbs that Cannot High Right-Adjoin</u>
	Domain	—
	Aspectual	
	Some frequency	
	(Most) duration	
	(Most) location-time	
	Focusing	

	<u>PREDICTIONS</u>	<u>EXCEPTIONS</u>
b.	<u>Gradable adverbs that</u> <u>Cannot High Right-Adjoin</u> Speaker-Oriented Agent-Oriented Exocomparative Manner	<u>Gradable adverbs that</u> <u>Can High Right-Adjoin</u> Many frequency Some duration Some location-time Mental Attitude

If this is on the right track, then we must concentrate on seeing what it is that the gradable adverbs in the lower left quadrant have in common that all the others do not. I turn to this in the next section.

4. A Proposal

4.1. “Subjective” Adverbs

I suggest that the restricted adverbs, the ones which may not right-adjoin to functional projections, are those gradable predicates which are “subjective”:

- (I) Adverbs may not right-adjoin to functional projections if they are “SUBJECTIVE”.
- (II) “Subjective” adverbs are (a) gradable adverbs, (b) on whose scale the members of its comparison class (event/proposition) may be (re)ranked according to the speaker’s judgment of the context.

Obviously, (II) will take some explaining. I use the term “subjective” impressionistically and tentatively. I intend it to reflect the speaker’s making a judgment about the event or proposition in context - for example, how likely it is, for a modal adverb like *probably*; how advantageous it is, for an evaluative adverb like *luckily*; or how well it supports calling an agent stupid or tactful, for the agent-oriented adverbs *stupidly* and *tactfully*. What is most subjective about this is that the context can easily change the way the judgment is applied, causing a rearrangement of items on the scale. This more or less subjective judgment contrasts with the functional adverbs, where the way in which one maps events or propositions onto a time, frequency, or duration scale is much less changeable with the context.

4.2. Scales, Norms, and Comparison Classes

I adopt a common view of gradable predicates (Bierwisch (1989), Kennedy (1999)), whereby gradable adverbs represent predicates of adjectival form, which are measure functions mapping the event or propositional argument onto the appropriate scale, such as probability, intelligence, similarity, closeness in time, frequency, and so on. As with any case of gradable semantics, the interpretation needs a comparison class determined by some combination of context and the nature of the objects being mapped onto the scale. In simple cases, like (47), the comparison class might be all women, so that she is clever for a woman; or it could be all people, so that she is clever for a person, and also happens to be a woman:¹¹

(47) She is a clever woman.

¹¹ Cf. the discussion of extensional and intensional ways of determining comparison classes in Bierwisch (1989), p. 119ff.

The comparison class plays the major role in determining the standard, or norm. Often the norm can be taken as an average for members of the comparison class.¹² This means that a shift in the comparison class may bring a shift in where the norm is on the scale. For (48), for example, if Karen is five years old, and she is judged as a member of the class of 5-year-olds, the norm N_C for *well* will be low on the scale; but if she is judged on the scale for all people, including adults, the norm will obviously be much higher:

(48) Karen dances well.

(49) ----- N_C ----->
 (bad dancing) (good dancing)

Finally, gradable predicates may be more or less **(in)determinate** (or ‘non-linear’; see the discussion in Kennedy (1999), p. 13), that is, they may be restricted to one or a very few dimensions, as in the case of a color term like *purple*, or be quite broad, such as *important*, *good*, or *big*. An object can be good or important in many different ways or for many different purposes, and in fact can be good in one dimension (say, for drinking) but bad in another (as for washing clothes). Likewise for *big*, where a film can be big at the box office but decidedly not big with the critics. Importantly, indeterminacy is what allows for reranking of objects in the comparison class. Take the class of writers, for a simple example, in (50-51):

(50) This writer is {economically/intellectually} important.

(51) a. Stephen King > Thomas Mann > Albert Einstein (economically)
 b. Albert Einstein > Thomas Mann > Stephen King (intellectually)

I suppose that the popular American writer Stephen King makes much more money than did Thomas Mann, who in turn made more money from his books than Albert Einstein (51a), but in terms of intellectual impact the ranking is presumably reversed (51b).

It is unclear to me whether one ought to treat every predicate as establishing a unique ordering of elements in the comparison class, in which case these examples would technically involve different, homophonous gradable predicates, each with a different, contextually determined ‘dimension’, or instead we should give up the idea that the ordering is determined solely by the comparison class, and say that a given class may have different rankings for different contexts. Since my main interest here is descriptive, I will take the latter tack, but nothing of importance here is lost with the first option.

4.3. Gradable “Subjective” Adverbs

Turning to an adverbial example in (52), imagine a very gregarious and uninhibited woman Lorraine, who normally would never leave a party before four in the morning:

(52) Surprisingly, Lorraine left the party early.

(53) a. Leave early > Sit quietly in the corner > Talk to many people > Dance on the table
 b. Dance on the table > Talk to many people > Sit quietly in the corner > Leave early

¹² Norms may also be established via prototypes; cf. Bierwisch (1989), p. 119.

Surprisingly is an evaluative adverb which (in effect) has a comparison class made up of states of affairs in a given context.¹³ In this case, (53a) might be the relevant ranking on the scale of ‘surprisingness’ of such states of affairs - loosely, things she might have done at the party - in which leaving early is the least likely, and thus the most surprising. But suppose the context changes, and Lorraine is ill, or she is trying to be more demure as an experiment. Now the same comparison class might be reversed, as in (53b), so that one would say not (52) but (54):

(54) Surprisingly, Lorraine danced on the table.

Consider a second example, with agent-oriented adverbs like *wisely*, *stupidly*, and *graciously*, with the example in (55):

(55) Intelligently, Bob went to Los Angeles.

I take adverbs of this sort to evaluate an event in terms of how one would judge the agent for doing it in context. Suppose that Bob is an stage actor in Boston, and wants to launch his film career. The ranking of events - things he might do - could reasonably be as in (56a), considering that New York is a better place than Boston for a film actor, but not as good as Los Angeles:

- (56) a. Go to Los Angeles > Go to New York > Stay in Boston
 b. Stay in Boston > Go to New York > Go to Los Angeles

On the other hand, if Bob will get a million-dollar inheritance if he takes his rich Bostonian aunt’s dogs out walking once a week, so that staying in Boston is his best option, then the ranking might be reversed as in (56b), with (55) becoming false or infelicitous.

Similar scenarios can easily be constructed for the other types of predicational adverbs, such as *probably*, *similarly*, or *obviously*. In all of these cases, when the context changes, the speaker is free to rerank the objects in the comparison class. Note especially that this is true even for modal adverbs, which have a scale that is fairly restricted dimensionally, i.e. a scale of probability that the proposition in question is true. What matters is that as the context changes, the ranking of the states of affairs (propositions) may change.

4.4. Gradable Functional Adverbs

The situation is different for the gradable functional adverbs we looked at briefly above, listed again here as the exceptions on the right side of (46b):

(46)	<u>PREDICTIONS</u>	<u>EXCEPTIONS</u>
b.	<u>Gradable adverbs that</u> <u>Cannot High Right-Adjoin</u> Speaker-Oriented Agent-Oriented Exocomparative Manner	<u>Gradable adverbs that</u> <u>Can High Right-Adjoin</u> Many frequency Some duration Some location-time Mental Attitude

¹³ Actually, I and others treat evaluative adverbs of this sort as taking facts (= true propositions) as their single argument. But the distinction between facts and states of affairs does not matter here; any state of affairs, speaking loosely, can be what a fact ‘is about’.

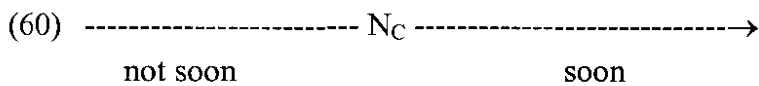
Examine the sample sentences in (57-59):

- (57) a. Megan goes dancing pretty often.
b. Terry drives to Philadelphia frequently.

(58) They left the ice cream out on the table briefly.

- (59) a. The comet will return soon.
b. Paul will be home from school soon.

All three of these types of adverbs map events onto a scale directly derived from time scale, with degrees representing time intervals. In the simplest case, *soon* in (59) involves the short length of time between speech time, presumably now, and a future event time. The higher an event is on a scale of 'soonness', the closer it is to speech time:



The standard or norm N_C is determined in part by the events in question, i.e. the comparison class. The actual time period for a comet's returning soon, by astronomical standards, might be stated in terms of decades, while the time period for a child returning from school soon would be in minutes. The scale stays the same, with only the time interval chosen as the norm changing. With the same sentence, slightly different comparison classes may be chosen; so, for example, if a comet returns in 20 years this might be considered soon for a comet, but if the comparison class is composed of observable celestial objects it would not, since the moon, satellites, and planets come and go much more often. So the norm for recurrence of all the things you can see in the night sky is much lower on the scale than it is for the recurrence of comets.

Now consider ways in which a different norm might be chosen in (59b), for exactly the same comparison class, that of a child coming home from school. If the school is three blocks away and the child walks home at 3 PM every day, it would be odd to say (59b) at noon on Thursday, since at noon, 3 PM is a fairly long time off in the context of a school day. But if the child is at a boarding school and regularly comes home on Fridays, the sentence becomes felicitous. Now imagine the boarding-school scenario, but where someone calls on the phone at noon on Thursday, wanting to talk to Paul, and asking if she should call back a bit later. Now Paul's parent might utter (61):

(61) No, Paul isn't going to be home soon -- he won't be home until tomorrow night.

In the context of calling back later, the norm for *soon* is lower on the scale than it is for a normal weekly return home from boarding school, even though the comparison class is the same: events of Paul returning home from boarding school.

Now note that, crucially, even though context plays a role in determining the norm on the scale, **there is no reranking of events** on this scale, because they are necessarily ranked according to a rigidly linear time-line. In (62), the times of various possible events of Paul returning home, regardless of where the norm is placed, will always have the same ranking:

(62) 1 PM Thursday > 3 PM Thursday > 10 AM Friday > 8 PM Friday

The same is true for the gradable frequency and duration adverbs in (57-58). Regardless of the precise analysis of frequency adverbs we pick (see the proposals and references in Vlach (1993), de Swart (1993), and Moltmann (1997)), frequency is agreed to involve some sort of ratio of numbers of events to intervals, and duration modifiers (Vlach (1993), Kamp & Reyle (1993)) provide the length of a time interval. So for the same reason, events in the comparison class of sentences like these cannot be reranked: any more frequent or longer-lasting event will always be higher on a scale than a less frequent or shorter one, regardless of the context or where the contextual norm is placed on the scale.

4.5. Mental Attitude Adverbs

To sum up what we have so far, most predicational adverbs are “subjective” as defined in (II) because the members of the comparison class may be reranked in different contexts, while for gradable functional adverbs there is no possibility of reranking. The last remaining exception to the generalization about high right adjunction is the mental attitude subclass of predicationals, including *willingly*, *calmly*, *eagerly*, *reluctantly*, and *gladly*.

The crucial difference between mental attitude adverbs and all the other predicationals is that they do not map their event argument onto a scale of willingness, calm, reluctance, and so on. In (63a), for example, the event of Tori flying to Paris is not willing; instead, Tori is willing, and in (63b) it is Bob who is reluctant, not the event of his playing a waltz:

- (63) a. Tori willingly flew to Paris.
b. Bob reluctantly played another waltz.

In other words, the comparison class is experiencers, mapped onto the scale of degrees of some mental state according to the norm for people (or for whatever entity has the mental state). Of course, the adverbs do take an event argument in the sense that the mental attitude is ‘with respect to’ or ‘about’ the event. But the comparison class, which determines the norm along with context, is experiencers of the mental attitude - unlike agent-oriented adverbs, for example, which map their event argument onto a scale according to how it reflects on an agent argument in terms of cleverness, wisdom, stupidity, or the like.

This can be seen more clearly in the overt comparative, which, following the majority view (see Bierwisch (1989), Kennedy (1999), and references therein), has the same basic semantics as the absolute (positive) constructions (which are essentially covert comparatives):

- (64) a. Tori flew to Paris more willingly than Christine.
b. Bob played another waltz more reluctantly than Barbara.

What is being compared in these two sentences is the experiencers’ degrees of willingness or reluctance, which does not necessarily have anything to do with the events themselves. It might be, for example, that Christine is depressive and is not willing to do anything at all. We must be careful not to be sidetracked by the fact that different contexts, including different events, may affect the actual degree of the mental attitude in question. Observe (65):

- (65) a. Calmly, Carol stood at the edge of the cliff with the rampaging herd behind her.
b. Calmly, Carol waited for the bus.

Here, presumably, Carol will be calmer waiting for the bus than when in danger of being pushed over a cliff. But still, it is Carol that is calm, not the event, and the norm for calmness is set by a comparison class of people, not of events.

5. Conclusion

5.1. Summary

I have suggested that the semantic property which determines whether an adverb is barred from adjoining to the right is that of being “subjective”, as defined in (II):

- (I) Adverbs may not right-adjoin to functional projections if they are “SUBJECTIVE”.
- (II) “Subjective” adverbs are (a) gradable adverbs, (b) on whose scale the members of its comparison class (event/proposition) may be (re)ranked according to the speaker’s judgment of the context.

Keeping in mind that some ‘Lite’ adverbs are independently forbidden from adjoining high and to the right, I predicts than any nongradable adverb is able to do so, those listed in the top half of (46), given again here:

(46)	<u>PREDICTIONS</u>	<u>EXCEPTIONS</u>
a.	<u>Nongradable Adverbs that Can High Right-Adjoin</u> Domain Aspectual Some frequency (Most) duration (Most) location-time Focusing	<u>Nongradable Adverbs that Cannot High Right-Adjoin</u> —
b.	<u>Gradable adverbs that Cannot High Right-Adjoin</u> Speaker-Oriented Agent-Oriented Exocomparative Manner	<u>Gradable adverbs that Can High Right-Adjoin</u> Many frequency Some duration Some location-time Mental Attitude

What we have seen is that among the gradable adverbs, those which can adjoin to the right in functional projections are of two types. Either their interpretation is crucially tied to a time line, whose intervals cannot be reordered (frequency, duration, and location time), or they do not use their event argument as the comparison class (mental attitude). Thus we have succeeded in linking a particular syntactic property to a lexical semantic property, in accordance with the general program of predicting as much as possible of adverb syntax from the independently needed semantics of the lexical items involved.

5.2. What is “Subjective”?

What is it about the “subjective” adverbs that allows the members of their comparison class to be reranked? It seems to be a matter of an extreme degree of **indeterminateness**: the predicate is relatively unspecified for some particular dimension, such as height, width, distance, color, heat, loudness, or duration of a time interval. Context does supply a ‘dimension’ when we use a predicational adverb, but there are no standard names for such dimensions, because they are in fact the extremely varied and contextually-dependent criteria

for strangeness, stupidity, similarity, intelligence, and so on - involving human behavior and expectations about the world. Consider (66):

- (66) a. Epistemic: Speaker judges likelihood that P is true based on how the real-world situation, or source of knowledge, affects the likelihood that the corresponding event occurred. (ex: *probably*)
- b. Evaluative: Speaker evaluates a fact according to its effect on the speaker or other beings. (ex: *oddly*)
- c. Agent-Oriented: Speaker judges the agent according to how the agent's decision to enter into the event or not, given the real-world context, reflects some personal quality. (ex: *rudely*)
- d. Exocomparative: Speaker judges how similar or different two propositions or events are. (ex: *similarly*)

Predicates from (66a-c) essentially require the speaker to rank propositions, facts, or events differently according to different criteria. Rudeness depends on very complex social rules; the oddness of an event depends on expectations of what is normal in a given context; judging probability likewise requires knowledge of normal and abnormal situations, cause and effect, and so on. Exocomparatives, in (d), involve judging degrees of similarity, but as anyone familiar with metaphor knows, similarity also can be evaluated according to complex and varied criteria. None of these predicates is tied down to a particular dimension in space or time observable in some direct way. Instead, they embody relatively abstract **evaluations**, only indirectly connected to observable dimensions.

5.3. Conclusion

Thus, to conclude, I have proposed that we can correlate one aspect of the distribution of adverbs with a particular semantic property. The property is that of being a “subjective” adverb, one which maps an event or proposition onto a scale with the high degree of indeterminacy and context-dependence just discussed. Such adverbs cannot adjoin to the right in functional projections, while other adverbs may. Regardless of how this correlation is to be expressed in syntactic theory, we have more evidence that aspects of adverb distribution can be directly predicted by specific semantic properties of the adverbs.

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Adverbials with Floating and Fixed Semantic Scope

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Abstract

The present study offers the analysis of the role of adverbials in the semantic structure of a sentence. To clarify this role new notions "Adverbials with floating and fixed semantic scope" are proposed. This classification also can clarify the role of adverbials from the point of view of the division into arguments vs. adjuncts.

1. Two independent foundations are mixed in the definition of adverbials: on the one hand, adverbials are a class of words, they are a lexical class; on the other hand, adverbials are modifiers. A modifier is a characteristic of a word when it is used in a sentence, it's a functional or semantic category, but not a lexical one (cf. Ramat & Ricca 1998).

2. The characteristic which an adverbial gives to a situation can be an inner one and an "outer" one. If an adverbial describes a characteristic of the situation as such, we call such adverbial a verb-adverbial or a predicate modifier (Thomason & Stalnaker 1973, Bartsch 1976), cf.

(1) *He answered wisely (carelessly, strangely)*

(2) *He refused loudly.*

And if an adverbial gives to a situation an "outer" characteristic - in this case the adverbial is a sentence-modifier, or a sentence-adverbial, for example:

(3) *He wisely (carelessly, strangely) kept silent.*

(4) *He carelessly rang at apartment 5 <and not apartment 6>.*

There is also the third main class of adverbials - so called grading adverbials (cf., for instance, Bartsch 1976), cf. the example of adverbials in a grading construction:

(5) *He left the room carelessly (strangely, wisely) early.*

But the division of adverbials into verb- and sentence-modifiers has weak points. The first problem is (and many authors note it, cf., for instance, Dik 1972) that, in fact, most of adverbial words function as sentence-adverbials and as verb-adverbials as well, cf. *wisely* in (3) and (1). It means that the division of adverbials into verb- and sentence-adverbials is not the division of words but the division of types of the usages of the adverbial in a sentence.

At the same time, many adverbials considered as manner adverbials (or as verb-modifiers) can not be used as sentence-modifiers (or as grading adverbials), cf. *loudly*, *low*,

drowsily, etc.: in sentence (2) the adverbial *loudly* has only manner-interpretation ("He refused in a loud voice", "The way he refused was loud"), and can not be interpreted as a sentence adverbial (*It was loud that he refused, *The event "he refused" was loud); cf. also implausible expressions **loudly early*, **drowsily good*. So, there is a difference between *wisely* in the (1) and *loudly* in the (2) though both of them are verb-modifiers, and the notion "verb-modifier" doesn't make this difference clear.

The second problem connected with the division of adverbials into verb- and sentence-modifiers is the occurrence of adverbials as arguments of a verb, like in the sentence (Bach 1980):

(6) *The first peace accord lasted for five years.*

The adverbial expression *for five years* here is an argument of a verb 'last'. But usually we don't consider arguments to be modifiers.

3. The difference of adverbials in (1), (3) and (5) can be explained by two ways:
- as the difference of lexical meanings of adverbials,
 - as the difference of adverbial scope.

If we accept the first explanation, we must treat the adverbials in the sentences (1), (3) and (5) as different lexemes. And this is the most popular decision. So, the sentence-adverbials in the sentence (3) get one meaning, and the adverbials in the sentence (1) get another meaning (they are manner adverbials here). According to this decision, the volume of adverbial scope is fixed in the meaning of the adverbial and we need to divide a particular adverbial word into as many lexemes as many volumes of the scope it has.

But I think that this decision can not satisfy us completely. First of all, because of the multiplication of adverbial lexemes. Many linguists note as an intuitively doubtless fact that in the sentences like (1), (3) and (5) an adverbial has only one, but not three meanings. Besides, it is well known that often the scope of a sentence-adverbial is not a situation as a whole, but only a communicatively important, rhematic fragment of a situation (Lang 1979, Koktova 1986). Let's compare the sentences (7) and (8):

(7) *He carelessly promised to arrive <instead of keeping silent>.*

(8) *He carelessly promised to arrive <instead of to phone>.*

In both sentences the adverbial *carelessly* plays the role of a sentence-modifier, so it must be the same lexeme. But in the sentence (7) the characteristic 'carelessly' is predicated to the fact of the promise; and in the sentence (8) *carelessly* characterises the choice of the content of the promise. So, the volumes of the adverbial scope in these sentences are different, and this difference is not explained with the lexical meaning of the sentence adverbial *carelessly*. Thus, the multiplication of lexical meanings is an instrument which is not good enough for captivating how to find the adverbial scope.

Thus, in classification of adverbials as verb and sentence modifiers the two foundations are mixed: the division of words according to their lexical meanings and the division of words according to the volume of their scope in a sentence.

4. I think that these two foundations should be treated separately. I propose to treat an adverbial word as a united lexeme, as a word with one meaning. (Indeed, the meaning of an adverbial word can become more concrete, so, it changes in some context types - but not due to changing of adverbial scope.) And as for the rules for finding the adverbial scope in a sentence - they must be investigated and formulated apart, the scope isn't fixed in the meaning of an adverbial. This approach let us to make the semantic links between an adverbial and its scope more clear, in particular, it let us to see that in reality different types of adverbial verb-modifiers modify a verb in different ways.

Adverbial words can be divided according to the rules for finding their semantic scope in a sentence. There are two main classes: adverbials with floating and fixed scope. This classification of adverbials demonstrates that the difference between adverbials like *wisely* and like *loudly* (both of them can be used as a traditional "manner" adverbial) is not accidental and has semantic foundation. In all their usages adverbials like *wisely* play the same role in the semantic structure of a sentence (namely, they have a operator-like nature), and the role of adverbials like *loudly* is quite different: adverbials like *loudly* should be considered as, in a sense, (optional) arguments, cf. such classification with about 1100 Russian "manner" adverbials in Filipenko 1994.

5. Adverbial words like *carelessly*, *wisely* are **adverbials with floating scope** because they can characterise semantically different components of the situation described by a sentence. Usually they characterise a communicatively important fragment of the situation or, to speak more precisely: they characterise a choice which is usually made by the controlling subject - the choice between ways of implementation of the situation. For instance, in sentence (8) a communicatively important fragment is "to arrive": the choice of the content of the promise is characterised as 'careless'. As for the sentence

(9) *He carelessly promised to arrive at 5 o'clock <instead 6>*,

it's the time of an arrival what is the scope of the adverbial *carelessly*.

Particles like *not*, *even*, *only*, and modal words like *of course*, *naturally*, and *may be* are also adverbials with floating scope. For instance, the particle *only* can characterise different components of the situation described by a sentence like an addressee:

(10) *I showed the letter **only** to Jim,*

or a subject:

(11) ***Only** Peter knew it,*

or an object :

(12) *I read **only** newspapers, etc.*

The linguistic behaviour of adverbials with floating scope concerns the topic/focus organisation of a sentence: these adverbials can characterise semantically different components of a sentence, and the choice of a relevant component usually depends on communicative organisation of an utterance. These adverbials can co-occur with semantically different verbs; in

other terms, their co-occurrence is very broad. We can say: *he carelessly came in / thought / overslept / counted on* and what's not.

We can not specify the grammatical features of components which form the scope of such adverbials because of the diversity of these components.

All these features of adverbials with floating scope are determined by the fact that these adverbials do not denote any "participants" of a situation described by a sentence, they describe an (evaluation) element which is "outside" of this situation, they have an operator-like nature.

6. The second class of adverbials are adverbials like *loudly*, **adverbials with fixed scope**. Adverbials with fixed scope play quite a different role in a sentence, they do not characterise one or another component of a situation (like adverbials with floating scope do). Adverbials like *loudly* describe such components themselves, they describe a "participant" (often "optional") of a situation described by a sentence, and this "participant" is strictly fixed for a particular adverbial. For instance, for *loudly*, *low* it is "the degree of loudness", for *drowsily* "the state of the subject's consciousness", etc. Information about such a "participant" is a part of the lexical meaning of the adverbial. A certain semantic type of verb has its own set of such "participants", and this set as a whole forms the "manner", the way of realisation of a situation described by a corresponding verb. If the semantic structure of the verb *V* has not got the corresponding "participant", the verb doesn't co-occur with the adverbial. For instance, we can not say **sleep loudly* or **hang loudly*, because there is not a parameter "the degree of loudness" in the situations described by the verbs 'sleep' or 'hang'. Thus, the co-occurrence of adverbials with fixed scope is not so broad and the information about topic/focus organisation is irrelevant for finding their scope.

Thus, the division "Adverbials with floating vs. fixed scope" is a division of words (and not usages of words in different syntactic constructions). And this division shows itself, for instance, in the character of semantic constraints on the use of the adverbial.

7. Semantic constraints which govern the use of adverbials with fixed scope concern the inner structure of the situation P as such: for instance, we can say that the movement situations 'run', 'go', 'swim' and so on have the parameter "speed", but the situations 'sleep', 'keep silent' do not have this parameter, this "participant" - and we can say it without paying attention to the context of the concrete implementations of these situations.

On the other hand, the scope of adverbials like *only*, *wisely* etc. is not the "parameter" components of the situation P as such, rather their scope is the particular values of the corresponding parameters. Then, semantic constraints which govern the use of adverbials with floating scope concern first of all not the semantic structure of the situation P but the context of the implementation of one or another element of the situation described by a sentence.

For instance, the particle *only* cannot modify all elements of a situation but only an element which is associated with a set of elements and can be opposed to them by a certain feature. For example, in the sentence

(13) *Among the pupils only Peter had heard about Wittgenstein*

we can use *only*, because this particle modifies the element ('Peter') which is associated with a set of elements ('the pupils') and opposed to them by the feature 'to have heard about

Wittgenstein'. If the context does not satisfy the conditions above, the use of *only* is impossible. So, we can not say

- (14) *There were an ink-pot, a blotter and sheets of letterhead paper on the table. ?? Only the sheets were put in a pile.*

The use of *only* is impossible in this context, because it's not clear to which elements the modified element 'the sheets' is opposed by the feature 'to be put in a pile'.

The independence of semantic constraints which govern the use of adverbials with floating scope from the semantics of the verb *V*, and their links with the "outside" context of the utterance are the most evident when the scope of such adverbials is constituted by antonymic elements. Thus, the sentences (15) and (16) are plausible to the same extent:

- (15) Jane was in a **carelessly** shot / long dress,

- (16) *John carelessly keep silent / carelessly interfered with the conversation.*

So, the semantic constraints which govern the use of adverbials with floating scope do not concern the situation P as such, but the "outside" context of the utterance.

The difference between the traditional and proposed classifications of adverbials is illustrated with the table.

Number of the exemple	adverbial/to which class the adverbial belongs	in the traditional classification	in the proposed classification
6 17 17 20	<i>for (five years)</i> <i>at (five)</i> <i>about (midday)</i> <i>over (the bridge)</i>	? (= argument, not modifier of a verb)	adverbial with fixed scope
18 a 18 b 19 2	<i>at (night)</i> <i>about (midday)</i> <i>for (five years)</i> <i>loudly</i>	verb-modifier	
1 1 1	<i>wisely</i> <i>carelessly</i> <i>strangely</i>		adverbial with floating scope
3 3,4,7 8,9,16 3	<i>wisely</i> <i>carelessly</i> <i>strangely</i>	sentence-modifier	
10,11,12	<i>only</i>		
15,5 5	<i>carelessly</i> <i>wisley, strangely</i>	grading adverbial	

8. Let's see now, what the role of adverbials with floating and fixed scope is in a sentence from the point of view of the division into arguments vs. adjuncts?

The term "adjunct" and its equivalents in French and Russian linguistics are different in some way. In the Russian tradition we don't speak about "adjuncts", but about "circumstances", in

the French tradition it's "circonstants". The English term "adjunct" stresses the syntactic role of the word: an adjunct - it's something adjunctive - adjunctive to a process, to an event, etc. And Russian and French terms have a semantic nature: "circumstances"/ "circonstants" are predicated to a situation described in a sentence. In fact, the Russian notion "circumstances" are not so broad as the English term "adjuncts". "Circumstances" are adverbial modifiers of time, of place, of manner, of instrument. So, first of all by "adjuncts of a situation", "circumstances" I mean a situation described by a verb. These adjuncts are close to arguments, so they are the most important among the adjuncts when we speak about the division into arguments vs. adjuncts. Now, let's see what is the role of adverbials with floating and fixed scope in a sentence from the point of view of the division into arguments vs. adjuncts.

8.1 As for adverbials with fixed scope, they may be arguments or adjuncts, and in both cases they play a similar role.

Adverbials with fixed scope may have either the status of an argument of the verb, as in (17), or the status of an adjunct, as in (18).

(17) *The crisis began **at night** / **about midday**,*

(18) a. *It rains **at night** / **about midday**,*

b. *We packed our luggage **at night** / **about midday**,*

In both cases the scope of adverbials is the corresponding "parameter" component, or "thematic role", of the situation-type denoted by a verb. For (17), and (18) it is the component 'time of the situation'. The status of this component in the semantic structure of a particular verb depends on the verb. For example, the time-parameter has the status of an "argument" with the verb 'begin' and the status of "adjunct" with the verbs 'rain' and 'pack'. But in either case, the adverbial with fixed scope describes a particular value of that parameter.

So, then a verb is combined with an adverbial with fixed scope, no matter whether the adverbial plays the role of the argument of the verb or of an adjunct, the semantic interpretation of the resulting combination is very similar in both cases. This similarity of the semantics of the combination is caused by the fact that adverbials with fixed scope, like typical arguments, are strictly connected with a specific component, or thematic role, in the semantic structure of the verb.

But in the usual treatment of adverbials, this resemblance is not taken into consideration. In the semantic representation of an utterance, an adverbial with fixed scope is normally treated either as subordinated to the verb or as subordinating the verb, depending on the particular verb. That is, an adverbial is treated sometimes as an adjunct which subordinates a certain semantic component of the verb, and sometimes as an argument, an expression filling in a certain semantic parameter, a variable of the verb. As for the notion "adjunct", usually it does not presuppose the idea of an inherent link of the adjunct with the semantics of the verb. This is absolutely correct for adverbials with floating scope but not so evident in a case of adverbials with fixed scope.

Adverbial with fixed scope in any of its uses can be treated as describing a semantic "participant" of the situation-type corresponding to the verb. If this "participant" is more important, more salient ("obligatory") in the situation-type V, the adverbial is treated as "an argument" of the verb; and if this "participant" is not so important ("optional") in the situation-type V (= if it has a low communicative "weight" in the semantic structure of the verb), the adverbial is treated as "an adjunct" of the verb.

Cf. McConnell-Ginet 1982 where adverbs are treated like variable-binding operators which introduce the "variable" which they "bind", an adverb gives to a verb a corresponding argument place. I think that it's relevant only for adverbs with fixed scope.

8.2 As for adverbials with floating scope, they don't describe any particular "participant", any parameter of the situation described in a sentence. They are an "outside" element in the relation of the situation P described in a sentence. Thus, the adverbials with floating scope - particles, adverbs like *wisely*, *strangely* - must not be treated, from a semantic point of view, as arguments or as adjuncts (= this is as expressions describing "participants" of the situation P). They have an operator-like nature. I note that such treatment of adverbials with floating scope continues Tesnière's tradition, cf. his analysis of French words like *ne ... pas* 'not': these words are not treated as "adjuncts", as "sirconstants" - in his analysis particles means something else, not "circumstances" (Tesnière 1959).

9. Finally, I should point out a very important aspect of the problem.. Above I proposed to treat adverbials with fixed scope (following McConnell-Ginet 1982) as describing a semantic "participant" of a situation described by a verb, when a verb has a special argument place for an adverbial. I have to say that in fact the picture is more complicated.

In a general case, the verb denotes a situation-type V, the adverbial describes a "participant" of a situation-type P, and often V and P are identical (cf. (2), (6), (17)-(19)). But in some sentences an adverbial describes a participant of another situation, not of the situation described by a verb (= the adverbial (expression) with fixed scope supposes the situation-type P). Then P and V are different situations.

For instance, which situation is modified by the adverbial expression *over the bridge* in (20)?

(20) *Sam lives (V) over the bridge (P).*

Over always supposes a type of movement with an initial and final positions. But the verb *live* doesn't mean a movement. 'Live' is a static situation. So, the adverbial expression *over the bridge* doesn't mean a participant of a situation described by a verb, it means a participant of another situation, a situation of movement which must be explicitly presented in the semantic representation of the sentence. This problem is discussed in detail in Filipenko 1997, Dölling 1999.

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Syntactic Requirements on Adjuncts*

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Abstract

The paper proposes structural constraints for different adjunct classes in German and English. Approaches in which syntax has only the task to provide adjunct positions and in which principles of scope are supposed to explain the distribution of adjuncts are rejected as incomplete. The syntactic requirements are not as rigid as other approaches require, such that there is just one possible position for a given adjunct. Rather the syntactic constraints may be fulfilled in different positions.

1. On base positions in German

It is well known that in the middle field of a German clause the constituents may appear in different order. Nevertheless most syntacticians working on German agree that verbal arguments have base positions. Other serializations are derived from the base serialization by scrambling. Some of the data which have been used to show that there are base positions of arguments are the following:

(I) Existentially interpreted wh-phrases

Existentially interpreted wh-phrases (nonspecific reading) resist scrambling. Therefore they constitute a good means to determine base positions:

- (1) a. weil jemand was lesen will
because someone something read want
'because someone wants to read something'
- b. *weil was jemand lesen will

(II) Focus projection

It is possible in German that a clause may have a wide focus reading if the constituent adjacent to the predicate receives nuclear stress. It has been shown that in order for this to happen the stressed constituent has to be verb adjacent in the base serialization (cf. Höhle (1982), Haider (1993)).

- (2) a. Gestern hat ein Kollege einer Dame ein GeMÄLde gezeigt (wide focus possible)
yesterday has a colleague a woman (Dat) a painting shown
'Yesterday a colleague showed a woman a painting'
- b. Gestern hat ein Kollege ein Gemälde₁ einer DAME t₁ gezeigt (only narrow focus)
- c. Gestern hat ein Kollege ein Gemälde₁ einer DAME t₁ geZEIGT (only narrow focus)

* I wish to thank Chris Wilder for very helpful discussions. This paper develops further joint work with Karin Pittner; cf. Frey & Pittner (1998, 1999).

- (5) weil (anscheinend) Hans (anscheinend) Maria (anscheinend) einladen wird
because (apparently) H. (apparently) M. (apparently) invite will

Data like this have led different authors to claim that SADJs can be base generated everywhere in the middle field (e.g. Hetland (1992), Laenzlinger (1998)).

A closer look however reveals that there are severe restrictions for the relative position between SADJs and other constituents:

- (6) a. *weil wer vermutlich das Buch entliehen hat
because someone probably the book borrowed has
 b. weil vermutlich wer das Buch entliehen hat
 c. *Hans ist wegen was leider böse
Hans is of something unfortunately angry
 d. Hans ist leider wegen was böse

In Frey (2000) it is argued that all phrases preceding SADJs in the middle field are topics in the aboutness-sense¹. The phrases are moved to these topic positions. Wh-indefinites can not be moved. Therefore the sentences (6a, c) are ungrammatical.

There is another restriction for the distribution of SADJs. It is possible to posit a complex verbal projection in the prefield of a German clause. Interestingly such a constituent can not contain a SADJ:

- (7) *glücklicherweise viel gelacht wird in diesem Land
luckily a lot laughed is in this country
 'Luckily people laugh a lot in this country'

This can be related to the following fact. A SADJ has necessarily scope over the temporal information of the clause:

- (8) *Gestern hat Otto bedauerlicherweise gewonnen, aber heute bin ich froh darüber
Yesterday has O. unfortunately won, but today am I glad about it

This sentence can not express that yesterday the speaker regretted that Otto has won, but today he is glad about it. (8) is contradictory because the regret is not temporally restricted.

¹ This holds with two exceptions, the first being irrelevant for the current discussion. First, all kind of elements which are pronounced with the special pronunciation called I-contour can be placed right after the C-projection and before the topics:

- (i) Da $\sqrt{\text{LEsen}}_1$ Otto leider dieses Buch \NICHT t_1 möchte
because read O. unfortunately this book not wants
 "because O. unfortunatly does not want to read this book"

Second, discourse-oriented adjuncts like 'offen gestanden' (*frankly*) or 'kurz gesagt' (*briefly*) precede SADJs:

- (ii) a. weil offen gestanden leider während deines Vortags jemand eingeschlafen ist
because frankly unfortunately during the talk someone fallen asleep is
 b. *weil leider offen gestanden während deines Vortags jemand eingeschlafen ist

The same is true for English:

- (iii) a. Paul frankly will unfortunately have to leave the company
 b. *Paul unfortunately will frankly have to leave the company

These adjuncts modify the implicit assertion operator of the sentence. Therefore they take the sentence's maximal proposition in their scope.

Scope relations in semantics correspond to c-command relations in syntax. The finite verb is the representative of the temporal information of the clause. The semantic relation between a SADJ and the temporal information therefore is reflected by the requirement that a SADJ has to c-command the finite verb. This explains the ungrammaticality of (7). The SADJ in (7) being part of a complex constituent in the prefield does not c-command the finite verb of the clause.

Our observations about SADJs in German can be captured by the following constraint:

- (9) SADJs
 The base position of a SADJ has to c-command
- (i) the base positions of all arguments and of all other adjuncts (except of discourse-oriented adjuncts) and
 - (ii) the base position of the finite verbal form.

It can easily be shown that in German the conditions in (9) hold for all the three subtypes of SADJs mentioned at the beginning of this section.

There are order restrictions between the subtypes of SADJs (cf. e.g. Cinque (1997), Ernst (to appear)). Now, these restrictions can be justified in purely semantic terms (cf. e.g. Ernst (to appear)). It is questionable whether these restrictions have any syntactic encoding. To my mind, they should accordingly be captured in the semantic component of the grammar and not in the syntactic part.²

We can check now whether a condition like (9) also holds for English. We find the following distribution of a SADJ:

- (10) a. (Unfortunately) She (unfortunately) will (unfortunately) be (*unfortunately) talking (*unfortunately) about this subject (*unfortunately)
- b. (Unfortunately) She (unfortunately) talked (*unfortunately) about this subject (*unfortunately)

Nowadays nearly every syntactician assumes that the subject of an English clause is moved to the surface position from its base position inside the verbal projection. Furthermore most syntacticians assume that a finite auxiliary in English is base generated in a V-position and moved to the I-position³. A finite main verb, however, is not moved to I.

- (11) a. [_{IP} She₁ will₂ [_{VP} t₂ [_{VP} be [_{VP} t₁ talking about this subject]]]]]
- b. [_{IP} She₁ [_{VP} t₁ talked about this subject]]]

Finally we adopt the prohibition against right adjunction (e.g. Larson (1988), Haider (1993), Kayne (1994)). We can indicate these three assumptions for (10) as follows:

- (10)' a. (Unfortunately) [_{IP} She₁ (unfortunately) will₂ (unfortunately) [_{VP} t₂ be (*unfortunately) [_{VP} t₁ talking (*unfortunately) about this subject (*unfortunately)]]]]]

² In section 3 it is, with regard to event-internal adjuncts, shown that the syntactic component does not differentiate between the subtypes of an adjunct class.

³ Ernst (1991) gives a scope argument for this assumption. In the following sentence *clearly* has scope over *can*. However *clearly* can not have scope over *already*.

(i) Gary already can₁ clearly t₁ lift 100 pounds

These facts find an explanation if the base position of *can* in (i) is to the right of *clearly*. *Clearly* c-commands the trace of the auxiliary. But it does not c-command *already*.

- b. (Unfortunately) [_{IP} She_i (unfortunately) [_{VP} t_i talked (*unfortunately) about this subject (*unfortunately)]]

The conditions in (9) explain the distribution of the SADJ in (10). All occurrences of the SADJ in front of the main verb fulfil condition (9i). In (10b) these occurrences also c-command the finite verb, i.e. they fulfil (9ii). However only the first three occurrences of 'unfortunately' in (10a) c-command the base position of the finite verb.⁴ The occurrence of the SADJ right after the main verb in (10a) and (b) neither fulfils condition (i) nor condition (ii). Due to the binary right-branching structure of the English clause (Haider (1992), Kayne (1994)) the SADJ does neither c-command the subject nor the finite verb. The sentence final occurrence of the SADJ will be discussed in section 8. Note that according to (9) all the grammatical positions of the SADJ in (10) are base positions of the adjunct.

According to (9i) a SADJ has not only to c-command the base positions of the arguments but also the base positions of other adjuncts. This requirement captures examples like the following:

- (12) a. John fortunately will therefore have read the book
 b. *John therefore will fortunately have read the book

In (12) the adjuncts are in base positions because there is no scrambling in English. The positions which the causal adjunct and the SADJ occupy in (12b) are in principle possible for these adjuncts. But if they occur together the SADJ has to precede.

Let us next have a quick look at frame adjuncts. Like SADJs they are related to propositions. Frame-setting adjuncts restrict the claim which the speaker makes by his assertion. One of the examples of Maienborn (1998) is the following:

- (13) In Deutschland bin ich weltberühmt (H. Juhnke)
In Germany am I world-famous

In this sentence the claim for the truth of the proposition "I am world-famous" is restricted to a certain spatial region.

Frame adjuncts are often considered as topics (e.g. Chafe (1976)). But it is clear that they have to be differentiated from aboutness-topics (cf. Jacobs (1999)). In fact if they can not be an aboutness-topic due to non-referentiality they have to follow SADJs, i.e. they can not be in the topic field of the German middle field (Frey (2000)):

- (14) a. *Otto ist in keinem Land erstaunlicherweise sehr berühmt
O. is in no country surprisingly very famous
 b. Otto ist erstaunlicherweise in keinem Land sehr berühmt

(14b) shows that the base position of a frame adjunct is below of an SADJ. If a frame adjunct is referential it may be positioned in the topic field above the SADJs and become an aboutness-topic thereby:

- (15) Otto ist in Deutschland erstaunlicherweise sehr berühmt
O. is in Germany surprisingly very famous

⁴ In *do*-insertion contexts the auxiliary is base generated in I. Thus in such a sentence a SADJ cannot occur after the auxiliary:

(i) *John did not probably miss the lecture

Above we observed that an SADJ is outside the scope of the temporal information of the clause. What about frame adjuncts in this respect? The following example shows that a frame adjunct can be in the scope of a (frame-setting) tense operator:

- (16) Im 16. Jahrhundert haben in Deutschland Mönche viel Bier getrunken
In 16th century have in Germany monks a lot of beer drunk

The sentence refers to the monks who lived in the region of Germany which it had in the 16th century. It does not refer to the monks who lived in the region of Germany which it has nowadays.

Because frame adjuncts do not have to have scope over tense they do not have to c-command the finite verb form. Therefore, in contrast to a SADJ (cf. (7)), a frame adjunct can appear inside a verbal projection in the prefield of a German clause:

- (17) in Deutschland viel Bier getrunken wurde bedauerlicherweise damals
in Germany a lot of beer drunk was unfortunately at that time
'In Germany people unfortunately drank a lot of beer at that time'

The following example shows that a frame adjunct is base generated higher than the arguments:

- (18) *daß wer in diesem Dorf weltberühmt ist
that someone in this village world-famous is

Similarly it can be shown that a frame adjunct is generated higher than the adjuncts discussed in the next section.

3. Event-related adjuncts and event-internal adjuncts

With regard to their syntactic behaviour many authors put temporal, causal, local, purpose and instrumental PP-adjuncts together into one class, e.g. Cinque (1997), Ernst (to appear), Haider (1999). According to Ernst (to appear) for example, they are not ordered with respect to each other because they are without scope requirements. According to Cinque (1997), they are unordered because they do not occupy the specifier position of distinct functional projections in contrast to AdvPs proper. Neeleman (1994) and Zwart (1993) state that temporal and locative adjuncts may adjoin to all maximal projections within the clause. Usually these adjuncts are considered to be of the same semantic type. It is assumed that they all are predicated on the event-variable which is part of the argument structure of the verb.

It is certainly true that these adjuncts can be ordered rather freely in certain environments:

- (19) a. Er wird am Freitag in Hamburg eine Rede halten
b. Er wird in Hamburg am Freitag eine Rede halten
c. He will give a talk on Friday in Hamburg
d. He will give a talk in Hamburg on Friday

However it seems to be wrong to conclude from this that these adjuncts are not ordered. The following German data show that e.g. temporal and local adjuncts behave differently with respect to the diagnostics for base positions:

- (20) a. daß wann wer das Zimmer aufräumen wird
that sometimes someone the room tidy up will
 b. *daß wer wann das Zimmer aufräumen wird
 c. weil wer wo das Buch verloren hat
because someone somewhere the book lost has
 d. *weil wo wer das Buch verloren hat

Test (I) of section 1 shows that a temporal adjunct is base generated higher than the base position of the subject of a transitive verb (cf. (20a, b)). In contrast (20c, d) show that a locative adjunct is base generated below the subject position.

That temporals and locatives have different base positions can also be shown by a direct comparison of the two adjuncts:

- (21) a. Hans sollte wann wo darüber vortragen
H. should sometimes somewhere about that talk
 ‘H. should talk about that somewhere sometimes’
 b. *Hans sollte wo wann darüber vortragen

These findings are confirmed by the application of test (III) of section 1:

- (22) a. WEIL mindestens einer an fast jedem Tag eine Wahlrede halten wird - ambiguous
because at least one on almost every day an election speech make will
 ‘because at least one person will make an election speech almost every day’
 b. WEIL mindestens einer an fast jedem Ort eine Wahlrede halten wird – only: $\exists\forall$
because at least one at almost every place an election speech make will

In (22a) the subject precedes the temporal adjunct. The sentence is ambiguous. According to the scope principle in (3) the reading with wide scope of the temporal adjunct is possible because the base position of the subject is in its c-command domain. In sentence (22b) the subject precedes a locative adjunct. This sentence has only the reading which corresponds to the surface order of the quantifiers. This means that the locative is base generated below the subject.

Because the opinion is widespread that temporals and locatives behave alike, I would like to give further evidence to the contrary. Let us look at bare plurals. It is well known that the interpretation of a bare plural depends on the position of the bare plural in the clause (cf. Diesing (1992)):

- (23) a. Heute hat eine Frau Kindern zwei Bonbons gegeben
Today has a woman children two sweets given
 ‘Today a woman gave sweets to some children’
 b. Heute hat Kindern eine Frau zwei Bonbons gegeben
 ‘Today children got two sweets from a woman’

The bare plural *Kindern* in (23a) can have an existential interpretation. (A generic interpretation is possible too. The translation given therefore corresponds only to one of the readings.) In contrast the bare plural in (23b) can only be interpreted generically.

In (23a) the bare plural object is in its base position, in (23b) it has been scrambled in front of the subject. The difference in interpretation between (23a) and (b) is captured by the following condition:

- (24) The domain of existential closure is restricted by the base position of the highest argument. Indefinite NPs outside this domain have to be interpreted as strong, e.g. as generic.⁵

The following examples differ in the position of the bare plural object relative to a locative and to a temporal adjunct respectively:

- (25) a. Die Polizei hat vor zwei Tagen im Universitätspark Linguisten befragt
The police has two days ago in the university park linguists questioned
 ‘Two days ago the police questioned some linguists in the university park’
 b. Die Polizei hat vor zwei Tagen Linguisten im Universitätspark befragt
 ‘Two days ago the police questioned some linguists in the university park’
 c. Die Polizei hat Linguisten vor zwei Tagen im Universitätspark befragt
 ‘Two days ago (quasi-)all linguists got questioned by the police in the university park’

A bare plural object which occurs after or in front of a locative adjunct can have an existential reading, cf. (25a, b). In contrast, a bare plural in front of a temporal adjunct is necessarily interpreted generically, cf. (25c).

These observations confirm that temporal adjuncts belong to a different class than local adjuncts. More precisely they confirm that the base position of a temporal adjunct is higher and that the base position of a locative is lower than the base position of the highest argument.

Having said that the base position of a locative is below the subject of a transitive verb we should determine its position relative to the object:

- (26) a. Peter hat heute im Hörsaal wen beleidigt
P. has today in the lecture hall someone offended
 "Peter offended someone in the lecture hall today"
 b. ??Peter hat heute wen im Hörsaal beleidigt
 c. Er HAT in fast jedem Park mindestens eine Dame geküßt (unambiguous)
He has in almost every park at least one woman kissed
 d. Er HAT fast jede Dame in mindestens einem Park geküßt (ambiguous)
He has almost every woman in at least one park kissed

These data show that locatives are generated above the base position of the object.

With the same test it can be shown that, with respect to the arguments, instrumentals are positioned like locatives:⁶

⁵ The constraint allows scrambling of an existential indefinite below the subject (contra de Hoop (1992)):

(i) Otto will heute abend Dias einer Freundin zeigen
O. wants tonight slides a friend show
 ‘Tonight O. want to show a friend some slides’

⁶ For the following examples the reader is asked to abstract from the independent tendency to let a heavier constituent (like the PP wh-indefinite) follow a lighter element (like the NP-indefinite) in the German middle field.

We can also apply test (II):

(i) Er hat mit dem Messer die Dose geöffnet (wide focus possible)
He has with the knife the tin opened.

The fact that the sentence allows the wide focus reading indicates that the object is base-generated next to the verb.

- (27) a. weil wer mit was den Tisch beschädigt hat
because someone with something the table damaged has
 ‘because someone damaged the table with something’
 b. *weil mit was wer den Tisch beschädigt hat
 c. da Otto mit was wen am Kopf getroffen hat
since O. with something someone on the head hit has
 d. ??da Otto wen mit was am Kopf getroffen hat

Let us now see how these adjuncts behave with respect to each other:

- (28) a. Er HAT mit mindestens einer Maschine in fast jedem Haus gearbeitet - only: $\exists\forall$
He has with at least one machine in almost every house worked
 b. Er HAT in mindestens einem Haus mit fast jeder Maschine gearbeitet - only: $\exists\forall$
- (29) a. Er hat gerade wo mit was viel Geld verdient
He (has) right now somewhere with something much money earned
 b. Er hat gerade mit was wo viel Geld verdient
He (has) right now with something somewhere much money earned

(28) shows that both orders of a quantified locative and a quantified instrumental adjunct are unambiguous. (29) shows that both orders of a locative wh-indefinite and of an instrumental wh-indefinite are grammatical. Thus the data show that instrumentals and locatives are unordered with respect to each other. Therefore in Frey & Pittner (1998) it is proposed that they belong to the same class of adjuncts. With the same tests it can be shown that further adjunct types belong to this class, e.g. benefactives. The members of the class are called event-internal adjuncts and they have to fulfil the following requirement:

- (30) Event-internal adjuncts, type I (e.g. locatives, instrumentals, benefactives)

The base position of an event-internal adjunct is minimally c-commanded by the base position of the highest argument, i.e. there is, modulo elements of the same class, no other element whose base position c-commands the event-internal adjunct.

(30) is the only requirement which is imposed on these adjuncts by syntax, i.e. the syntactic component does not differentiate between the members of the class.⁷

As we have seen temporal adjuncts belong to another class. The members of this class, to which, as can be shown, also e.g. causals belong, have to fulfil the following condition:

- (31) Event-related adjuncts (e.g. temporals, causals)

The base position of an event-related adjunct c-commands the base position of the highest argument and the base positions of event-internal adjuncts.

It could again be shown, in a way analogous to (28)/(29), that syntax does not order the subtypes of the class with respect to each other.

The conditions (30) and (31) do not only explain the contrasts observed in (20)-(22) and in (25) they also account for the following facts:

⁷ The condition refers to the highest argument. The reason is that in German for some verbs it is not the subject which is realized most prominently but another argument. (45) in section 4 gives an example for such a verb.

- (32) a. Im Garten einen Artikel lesen will Otto
In the garden an article read wants O.
 'Otto wants to read an article in the garden'
 b. ??Am Abend einen Artikel lesen will Otto
In the evening an article read wants O.

It is possible to move a complex verbal projection to the prefield of a German clause. In (32a) the locative adjunct is part of such a verbal projection. According to (30) this complex phrase does not have to contain the base position of the subject. The situation is different in (32b). According to (31) a temporal adjunct has to c-command the base position of the subject. Therefore the complex verbal projection in (32b) contains a trace of the subject. However the subject trace is unbound which results in the degraded status of grammaticality.

Another observation can also be explained by the conditions (30) and (31). The filling of the prefield with a temporal adjunct in German results in a unmarked structure. In contrast the filling with a locative yields a marked structure. The locative is highlighted with regard to information structure:

- (33) a. Vor einer Woche hat Hans das Problem gelöst (unmarked)
One week ago has H. the problem solved
 b. In einem Flugzeug hat Hans das Problem gelöst (marked)
In an airplane has H. the problem solved

According to (31) a temporal can be base generated in the prefield. According to (30) a locative has to be moved to this position. Movement to the prefield is not for checking of grammatical features however, rather it is for pragmatic needs.

Let us now look at some English data containing adjuncts of the two classes:

- (34) a. On Ben₁'s birthday he₁ took it easy
 b. For Mary₁'s valour she₁ was awarded a purple heart
 c. ?*In Ben₁'s office he₁ lay on his desk
 d. *With Mary₁'s computer she₁ began to write a book of poetry

Suppose the conditions (30) and (31) also hold for English. In (34a) and (b) we have a temporal and causal adjunct respectively. For these adjuncts condition (31) is relevant. This condition allows the base generation of the adjunct phrases in the sentence initial position. In (34c) and (d), however, a locative and an instrumental adjunct are sentence initial. These adjuncts are members of the class of event-internal adjuncts and they have to obey condition (30). Therefore the adjuncts in (34c) and (d) have arrived their surface position by movement. For (34c) for example we have a structure like the following:

- (34)' c. [In Ben₁'s office]₂ he₁ lay on his desk t₂

After reconstruction of the moved phrase we get a principle C violation. The same reasoning applies to (34d). Since there is no reconstruction in (34a, b), those sentences are grammatical.

There are further differences between the members of the different adjunct classes (30) and (31) in English:

- (35) a. John₁ ((?)by then) will (by then) have ((?)by then) t₁ read the book
 b. John₁ (*here) will (*here) be (*here) t₁ reading this book

In formal/written registers even some heavier adjuncts are possible in the AuxRange. Ernst (to appear) gives the following examples and judgements:

- (36) a. They₁ had two weeks earlier been t₁ fixing the bookshelf
 b. *They₁ had with a hammer been t₁ fixing the bookshelf
 c. *They₁ had for Lisa been t₁ fixing the bookshelf

Given the condition in (30) and (31), the data in (35) and (36) can be explained. The temporal adjunct in (36a) fulfils condition (31). It does c-command the base position of the subject. So the sentence is fine. The adjuncts in (36b, c) however would have to fulfil condition (30), i.e. they should be minimally c-commanded by the base position of the subject. Since this is not the case, the sentences are bad.

The same kind of reasoning explains the distributions of the adjuncts in (35). In all of the positions indicated, *by then* fulfils condition (31). In contrast in none of its positions does *here* fulfil condition (30).

In principle it is possible in English to have an adjunct between the verb and a prepositional object:

- (37) John has spoken carefully about the subject

We will discuss such examples not before section 6. But right now we have to rule out the following ungrammatical sentences⁸:

- (38) a. John₁ will have t₁ spoken (*by then) about the subject
 b. John₁ will t₁ speak (?? here) about the subject

Since Larson (1988) most syntacticians assume a binary right-branching structure for English. This leads to a so-called Larsonian shell structure. For a verb with two objects the shell structure has roughly the following form⁹:

- (39) [_{VP} NP V₁ [_{VP} XP [_{V'} t₁ XP]]]

The theta-licencing of the arguments is done successively by the verb. The subject then moves further to a functional projection to check grammatical features.

Due to binary branching, the vPs of the sentences in (38) are as follows¹⁰:

- (40) *[[_{VP} John speak₁ [_{VP} by then/here [_{V'} t₁ about the problem]]]]

Both kinds of adjuncts are not possible below the verb, but for different reasons. The temporal adjunct is not possible because it does not c-command the subject thereby violating condition (31). The locative is not possible because it is not minimally c-commanded by the subject.

⁸ If an event-internal or event-external adjunct occurs between the verb and an object, it can be shown that the object is extraposed:

- (i) a. John will speak here to his mother
 b. *Who₁ will John speak here to t₁

The freezing effect in (ib) is due to the fact that the prepositional object is not in its base position.

⁹ Chomsky (1995) introduced v to which the verb is adjoined. v is supposed to assign the agent theta role.

¹⁰ For the sake of concreteness the adjuncts are assigned to the spec position of VP. It is however irrelevant for our question whether the adjuncts are adjoined to VP or whether they are in its spec position.

The interference of the verb violates condition (30). Note that the higher position of the verb is a base position as well as the lower one. Both positions are involved in theta licencing.

In addition to (35b) we also have to rule out the following structure:

(41) *John₁ will be [_{VP} t₁ here reading this book]

Due to the binary branching requirement this structure simply can not arise. In order to theta-licence the subject, the verb has to move to the left of the adjunct yielding a structure like (38b).

4. Mental-attitude adjuncts

There is an interesting difference in the interpretation of the following English and German sentences:

- (42) a. that Peter deliberately was examined by the doctor
b. daß Peter bereitwillig von dem Arzt untersucht wurde

In sentence (42a) the mental-attitude adjunct 'deliberately' relates to 'Peter'. However in the German translation in (42b) the adjunct relates necessarily to 'the doctor'.

Furthermore, as is well known, if in English the adjunct is positioned after the main verb, the interpretation changes compared to (42a):

(43) that Peter was examined deliberately by the doctor

In (43) 'deliberately' relates to 'the doctor' as in the German example.

Let us first apply a test to determine the base position of the German mental-attitude adjuncts:

- (44) a. da wer bereitwillig den Auftrag übernahm
since someone deliberately the task took on
b. *da der Knabe was bereitwillig vorgesungen hat
since the boy something deliberately sung has
c. da der Knabe bereitwillig was vorgesungen hat

These data seem to show that German mental-attitude adjuncts are base generated below the subject and above the object. A closer look however reveals that they do not relate to the subject per se but to the highest ranked argument of the predicate. In German in most cases this is the subject but it need not be. It can be shown that, in the following sentence, the dative is base generated higher than the nominative:

- (45) weil einem Bekannten eine wichtige Vorstellung entgangen ist
because a friend (Dat) an important performance lost is
'because a friend missed an important performance'

It can be shown that in a construction like that a mental-attitude adjunct is base generated between the dative and the nominative:

- (46) weil wem versehentlich was entgangen ist
because someone (Dat) inadvertently something lost is

Therefore the condition for mental-attitude adjuncts seems to be that its base position is minimally c-commanded by the base position of the highest ranked argument.

The English example (42a) shows that this can not be quite right. In (42a) the mental-attitude adjunct relates to the subject of a passive. Thus the adjunct does not have to relate to a base position. Rather the condition for mental-attitude adjuncts is the following:

- (47) Event-internal adjuncts, type II (e.g. mental-attitude adjuncts)
The base position of a mental-attitude adjunct is c-commanded by a highest ranked argument inside the extended projection of the main predicate. Semantically a mental-attitude adjunct relates to the closest c-commanding highest ranked argument.

Let us now try to explain the contrast in interpretation between (42a) and (b). We expect that the difference is not due to a different behaviour of the adjuncts in the two languages but rather due to independently established structural differences.

Two differences are the following. Most prominently Haider (1993) argues that the two languages differ in the position of the subject. And furthermore, connected to the first point, he argues that in English an auxiliary heads its own projection whereas in German it constitutes a verbal complex with the main verb. One of the arguments for different subject positions is the fact that a German subject clause allows extraction of a constituent whereas an English one does not:

- (48) a. Mit wem₁ würde [t₁ Schach spielen zu dürfen] dich sehr freuen?
b. *Who₁ would [to play chess with t₁] have pleased you?

Haider (1993) concludes that in contrast to English the subject of a German clause remains in the licensing domain of the main predicate.

Among the arguments that an auxiliary and a main verb constitute a verbal complex in German are the observations that they may be moved together to the prefield (cf. (49a)) and that nothing may intervene between them (cf.(49b)):

- (49) a. [Gelesen haben] sollte jeder diesen Artikel
Read have should everyone this article
'Everyone should have read this article'
b. *da dieser Artikel von jedem gelesen bald wird
since this article by everyone read soon will-be

Applied to (42), these two differences between English and German imply that in (42a) the passive subject and the adjunct are part of the projection of the auxiliary whereas in (42b) both are part of the projection of the verbal complex.

Next we have to look at the argument structure of a passive predicate. The agent can be left unrealized or can be realized by a *by*-phrase. The *by*-phrase has properties of an adjunct. Corresponding to that it can be shown that the agent is present in the structure even if there is no *by*-phrase present. Therefore the agent of a passive is called an implicit argument.

- (50) a. The ship was sunk in order to get the insurance
b. Briefe wurden einander geschrieben
Letters were to each other written

In (50a) the implicit argument acts as an controller, in (50b) it is the binder of the reciprocal. Roberts (1987) takes the passive morphology on the verb as the syntactic representation of the implicit argument.

The implicit argument of a passive is accessible for an adjunct in the domain of the main predicate. First the agent is present in the syntactic structure. Second according to the definition of c-command in Chomsky (1981) a head c-commands all elements within its projection. Therefore the implicit argument, whose representative is the verb, c-commands all constituents within the verbal projection.

In German a mental-attitude adjunct is base generated higher than the subject of a passive:

- (51) a. weil absichtlich wer heruntergestoßen wurde
because deliberately someone pushed-down was
 b. *weil wer absichtlich heruntergestoßen wurde

In German there is no movement of the ‘deep object’ in passives. The subject of a passive has the same base position as the corresponding object of the active. The mental-attitude adjunct in (51a) is base generated above the passive subject as it would be base generated above the corresponding object of the active.

We can now explain the differences observed in (42). The subject of (42a) does not belong to the projection of the main verb, rather it is part of the projection of the auxiliary. The highest ranked argument inside this projection c-commanding the adjunct is the surface subject. Therefore the adjunct relates to this constituent, i.e. to *Peter*. The situation is different in (42b). The German auxiliary does not head its own projection rather it forms a verbal complex with the main verb. The whole middle field is dominated by a projection of the verbal complex. The adjunct is a constituent within this projection. The verbal complex c-commands the adjunct. Therefore the implicit argument, which is represented by the verbal form, c-commands the adjunct. The implicit argument is the highest ranked argument inside the verbal projection. That the subject of (42b) c-commands the adjunct on the surface, is only an effect of scrambling of the subject, as (51) shows. Therefore the adjunct relates to the implicit argument in the German example.

If in English the adjunct is positioned as in (43), we have the same situation as in the German example (42b). The adjunct is part of the projection of the main verb. It is c-commanded by the verb. The verb is the representative of the agent. Therefore the adjunct relates to the agent.

The example (42a) shows that a mental-attitude adjunct does not have to relate to a ‘deep subject’. Rather it relates to the nearest c-commanding highest ranked argument on the surface. The fact that mental adjuncts are not licenced by base configurations but by surface structures is also illustrated by the following data:

- (52) Terry (intentionally) has (intentionally) been (intentionally) reading Hamlet

(52) shows that mental-attitude adjuncts have a wide distribution in the Aux-Range of English. In all its position in (52) the mental adjunct fulfils requirement (47).

5. On the sentence initial occurrence of adjuncts

In this section it will be discussed whether sentence initial adjuncts are base generated in this position.

Let us start with subject-oriented adjuncts like *rudely* or *cleverly*. Like many other adjunct types, they do not only occur sentence internally but may also introduce an English clause:

- (53) a. John cleverly made no reply
b. Cleverly John made no reply

With these adjuncts the speaker evaluates a proposition with respect to the subject of the clause: *It was clever by John that he made no reply.*

Subject-oriented adjuncts differ from the mental-attitude adjuncts considered in the last section not only in their semantics but also in their syntactic behaviour. In German for example a mental-attitude adjunct may appear as part of a complex verbal projection in the prefield. In the same position a subject-oriented adjunct is less good:

- (54) a. absichtlich das Fenster zerstört hat Otto
deliberately the window destroyed has Otto
'O. deliberately destroyed the window'
b. ??netterweise das Fenster repariert hat Otto
nicely the window repaired has O.
'It was nice of O. to repair the window'

This difference follows if we realize that subject-oriented adjuncts share one important property with the class of SADJs. Like the SADJ characterized in (9) they always have scope over the temporal setting of the sentence, i.e. they have to c-command the base position of the finite verb. Mental-attitude adjuncts as characterized in (47) do not have to c-command the finite verb.

In fact, subject-oriented adjuncts are usually classified as SADJs in the literature. However, the fact that, by using a subject-oriented adjunct, the evaluation by the speaker is attributed on the subject constitutes an important semantic difference to other SADJs. Is the difference reflected in syntax? There is evidence for this. Compare the following sentences:

- (55) a. weil erfreulicherweise wer antwortete
because fortunately someone (or other) answered
b. *weil intelligenterweise wer antwortete
because wisely someone (or other) answered
c. *weil wer intelligenterweise antwortete
d. weil Hans intelligenterweise antwortete

In (55a) the SADJ behaves as characterized in section 2. However it can not be replaced by a subject-oriented adjunct, as (55b) shows. (55b) indicates that a subject-oriented adjunct can not be generated above the position of the subject. It has to be c-commanded by the subject at some level. Thereby it is structurally reflected that a subject-oriented adjunct is semantically attributed on the subject. (55c) shows that the base position of a subject-oriented adjunct can not be below the subject. (55d) is fine because the subject has been moved.

Let us now look at an interesting syntactic difference between subject-oriented adjuncts and other SADJs at the beginning of an English clause. Consider the following sentences:

- (56) a. *Who₁ do you think that t₁ made no reply
 b. Who₁ do you think that unfortunately/apparently t₁ made no reply
 c. *Who₁ do you think that stupidly t₁ made no reply

In (56) we have subject movement out of an embedded *that*-clause. (56a) shows the standard *that*-trace effect. Interestingly, an evaluative or an evidential cancels the *that*-trace effect, as (56b) shows. Subject movement is possible across such SADJs. But it is not possible across a subject-oriented adjunct, cf. (56c). A subject-oriented adjunct is not able to cancel the *that*-trace effect. These facts are puzzling because the different adjuncts have the same distribution in English. Both for example can appear at the beginning of the clause.

Browning (1996) and Rizzi (1997) investigate the canceling of the *that*-trace effect by adjuncts (Browning calls it 'the adverb effect'). However they reason as if all adjunct types would show the effect. They do not discuss that certain adjuncts do not mitigate the ungrammaticality.

Browning and Rizzi share two crucial assumptions to explain examples like (56b). The first is that the complementizer *that* can not be endowed with Agr features to licence the trace of the subject. An empty complementizer, however, is supposed to be consistent with Agr. The second assumption is that, by the presence of the sentence initial adjunct, an additional functional layer is generated such that an empty complementizer becomes adjacent to the trace of the subject. In Rizzi's (1997) framework, (56b) roughly would get a structure like the following:

(56b)' Who₁ do you think that [unfortunately [Fⁱ +Agr₁ [F^j]][t₁' Fⁱ +Agr₁ [t₁ made no reply]]]

The subject trace t₁ is licenced by the empty functional projection Fⁱ which is endowed with Agr features. These Agr features are licenced by the intermediate subject trace t₁' in the specifier position of Fⁱ. How is t₁' licenced? Rizzi (1997) assumes that in English the enriched functional head Fⁱ +Agr can move to the higher functional head F^j. From there it can licence t₁'.

As already mentioned, Rizzi (1997) and Browning (1996) do not consider adjuncts which do not show the adverb effect like the one in (56c). However Browning and Rizzi point out that preposed arguments do not mitigate the *that*-trace effect. Brownings approach to explain the difference between adjuncts showing the effect and preposed arguments depends on the assumption that the adjuncts are base generated in the sentence initial position whereas arguments are moved there.

The examples in (55) showed that in German the base position of a subject-oriented adjunct has to be c-commanded by the the subject at some level, whereas such a restriction does not hold for the other SADJs. If we assume the same difference for English we are able to explain the contrast between (56b) and (c). In (56b) *unfortunately* can be base generated in its surface position. In contrast, *stupidly* in (56c) has reached its position by movement because it has to be base generated below the subject. Therefore *stupidly* carries a movement index. We get the following structure, which is illformed:

(56c)' * ... [stupidly₂ [Fⁱ +Agr₁ [F^j₂]][t₁' Fⁱ +Agr₁ [t₁ t₂ made no reply]]]

By obligatory spec-head agreement, the index on *stupidly* is present on F^j. Therefore the head to head movement of Fⁱ +Agr to F^j, which would be necessary to licence t₁', results in contradicting indices on F^j.

Our observations about subject-oriented adjuncts in English and German can be captured by the following constraint. Since it can be shown that in English subject-oriented

adjuncts show the same sensitivity to surface structure like mental-attitude adjuncts, the condition (ii), which expresses the dependency on the highest argument, is the same as the condition in (47):

(57) Subject-oriented adjuncts

The base position of a subject-oriented adjunct

- (i) is subject to the condition for SADJ in (9) and
- (ii) is c-commanded by a highest ranked argument inside the extended projection of the main predicate. Semantically, a subject-oriented adjunct relates to the closest c-commanding highest ranked argument.

The approach to explain the difference in grammaticality between (56b) and (c) with the difference of base generation of the adjunct versus movement seems to be on the right track. This is supported by the following data:

- (58) a. Who₁ do you think that on Ben's birthday t₁ took it easy
 b. Who₁ do you think that for this reason t₁ was awarded a prize
 c. *Who₁ do you think that in Ben's office t₁ lay on his desk
 d. *Who₁ do you think that with Mary's computer t₁ began to write a book of poetry
 e. *Who₁ do you think that for Mary's brother t₁ was given some old clothes

The adjuncts of (58a, b) are event-external adjuncts and have to obey condition (31). The adjuncts in (58c-e) are event-internal adjuncts and have to obey (30). The former adjuncts can be base generated in sentence initial position, the latter ones are moved there. Thus we have the same situation as above. Base generated adjuncts mitigate the *that*-trace effect, moved adjuncts do not. The explanation for the differences in grammaticality in (58) is the same as for (56b) and (c).

The examples (33) in section 3 already illustrated the difference between sentence initial locative and temporal adjuncts in German, the former being marked and the latter unmarked. As it is now expected, we find the same difference between a subject-oriented adjunct and the other SADJs, the contrast being even sharper:

- (59) a. ?Intelligenterweise hat Hans das Buch gelesen
wisely has H. the book read
 b. Glücklicherweise hat Hans das Buch gelesen
fortunately has H. the book read

The adjunct in (59a) is not perfect in clause-initial position. According to (57) it is moved to this position. In contrast the sentence initial base generation of the SADJ in (59b) results in a fully grammatical structure.

The same kind of reasoning can explain the following data:

- (60) a. Leider hat Peter oft gefehlt
Unfortunately has Peter often be-absent
 'Unfortunately Peter was often absent'
 b. ?Oft hat Peter leider gefehlt
 c. Oft hat Peter gefehlt
 d. Sehr oft hat Peter leider gefehlt

The SAdj in (60a) is base generated in its base position. The frequency adjunct in (60b) is moved to the prefield because its base position has to be c-commanded by the SAdj (cf. section 8). As discussed in section 8 a frequency adjunct can be an event external adjunct. Therefore in (60c) the frequency adjunct can be base generated in its surface position. (60d) is better than (b) as F. Moltmann observed, referred to by Cinque (1997). The reason is that in this case the informational prerequisite for movement to the prefield is fulfilled. The frequency adjunct, not being able to be a topic due to its nonreferentiality, is in focus in this example.

A SAdj in the prefield may not be associated with an embedded clause (Doherty (1985)):

- (61) **Leider*₁ sagte Maria daß *t*₁ Otto das Spiel verloren hat
Unfortunately said M. that O. the game lost has

A SAdj is neutral with respect to information structure. It can not be a topic. Rather it constitutes the borderline between the topics and the comment (cf. Frey (2000)). Furthermore it can not be focused. Therefore informational requirements on movement to the prefield can not be met by a SAdj.

6. Manner Adjuncts

Many authors assume that manner adjuncts are positioned higher than the arguments or at least higher than the internal arguments (e.g. Ernst (to appear) for English and French, Cinque (1997) for Italian, Eckardt (1996) for German). Our tests for German however do not confirm this assumption:

- (62) a. Peter will jetzt was konzentriert lesen
Peter will now something carefully read
 b. Peter hat den Artikel sorgFÄLTIG geLEsen (wide focus possible)

(62a, b) show that the manner adjunct is c-commanded by the base position of the object. The wh-indefinite object in (62a) can not be scrambled. As for (62b), compare this sentence with a sentence in which a locative adjunct is adjacent to the main verb:

- (63) Peter hat den Artikel₁ im GARTen *t*₁ geLEsen (no wide focus possible)
Peter has the article in the garden read

As we have seen in section 3 the base position of the object is below a locative adjunct. Therefore there is a trace of the scrambled object between the locative and the main verb in (63). It is this trace that disallows a wide focus reading of (63). The fact that (62b) has a wide focus reading shows that there is no movement trace of the object between the manner adjunct and the verb.

Scope facts also show that manner adjuncts are generated below the object:

- (64) a. Er HAT mindestens eine Kollegin auf jede Art und Weise umworben (only: $\exists\forall$)
He has at least one colleague in every way courted
 b. Er HAT auf mindestens eine Art und Weise fast jede Kollegin umworben ($\exists\forall$ or $\forall\exists$)
He has in at least one way nearly every colleague courted

Thus our tests indicate that manner adjuncts should be generated next to the base position of the main predicate.

However proponents of the view that manner adjuncts are generated at least higher than the objects could point to examples like the following:

- (65) a. Otto hat heute heftig einen Kollegen beschimpft
O. has today strongly a colleague insulted
 b. Sie hat heute wunderbar Sonaten gespielt
She has today wonderfully sonatas played

In (65) the manner adjuncts occur naturally in front of the objects. Furthermore it is unlikely that the adjuncts are scrambled to this position because manner adjuncts of this form do not like to be scrambled¹¹.

So it seems that examples like (62) on the one hand and (65) on the other constitute contradictory evidence. However in Frey & Pittner (1998) we argue that the examples in (65) do not illustrate the general case but are due to a special phenomenon. Consider the following sentences:

- (66) a. ??Otto hat heute heftig viele Kollegen beschimpft
O. has today strongly many colleagues insulted
 b. *Da Otto grenzenlos eine Kollegin bewundert
because O. without limits a colleague admires

In (66a) the object of (65a) is replaced by a quantified NP. In (66b) the object is not a patient as in the examples in (65) but a stimulus.

Analyzing phenomena unrelated to adjuncts, Jacobs (1993) comes to the conclusion that in German it is possible to integrate an object into a complex predicate under certain circumstances. Among the prerequisites for integration, according to Jacobs, are that the object has the thematic role of a patient and that it is not quantified. The examples in (66) do not fulfil these prerequisites. These objects therefore can not be integrated.

Based on this observation Frey & Pittner (1998) argue that cases like (65) are compatible with the claim that manner adjuncts are generated next to the predicate. The objects of these examples are part of the predicate due to integration. That objects occurring after a manner adjunct have a special status is indicated by another fact. According to Haiden (1996) they are not fully referentially transparent. This can be illustrated as follows:

- (67) a. ??Hans hat heute heftig Kollegen beschimpft; ich wüßte aber gerne welche
H. has today strongly colleagues insulted; I'd like to know which ones
 b. Hans hat heute Kollegen heftig beschimpft; ich wüßte aber gerne welche

Only the bare plural in front of the manner adjunct is accessible in a sluicing construction.

So there is evidence that the order shown in (62) is the basic serialization pattern of an object and a manner adjunct. Why then is it so often assumed that manner adjuncts are gene-

¹¹ Compare:

(i) ??Otto hat heftig heute einen Kollegen beschimpft
O. has strongly today a colleague insulted

Note however that PP manner adjuncts may be scrambled:

(ii) Otto hat auf seine heftige Art heute einen Kollegen beschimpft
O. has in his vehement way today a colleague insulted

rated above the arguments? One reason might be the alleged integrity of the theta domain. Many syntacticians assume that there is a certain domain of pure theta assignment in which no adjunct can appear. However we can also find in English examples for which it is hard to maintain that manner adjuncts are generated outside of the theta domain:

(68) John has spoken (nicely) to his mother (nicely) about her letter

It is possible to have a manner adjunct between the verb and a prepositional object. The crucial observation of Costa (1998) is that these PPs are not extraposed:

(69) What_i has John spoken to his mother nicely about t_i

The fact that a prepositional object following a manner adjunct does not show freezing effects for movement is a strong argument that it is in its base position. Note the contrast to the following example, which shows that the PP is extraposed (cf. section 3):

(70) *What_i has John spoken to his mother yesterday about t_i

Examples like (68) suggest that in English the same constraint for manner adjuncts might be operative as in German. In section 3 we already exploited the binary right branching structure of English. This property will also explain the distribution of the adjuncts in (68). In the following structure, the traces left by verb movement inside vP are indicated¹²:

(68)' a. John₂ has [_{VP} t₂ spoken₁ [_{VP} to his mother [_{V'} t₁' [_{VP} nicely [_{V'} t₁ about her letter]]]]]]
 b. John₂ has [_{VP} t₂ spoken₁ [_{VP} nicely [_{V'} t₁' [_{VP} to his mother [_{V'} t₁ about her letter]]]]]]

In both structures the manner adjunct immediately c-commands a trace of the predicate. Note that all the verb positions in (68)' are involved in the licensing of arguments. Therefore they may all count as 'base positions' of the verb.

Given structures like (68)' we expect that manner adjuncts which are PPs should be possible in these positions. This expectation is confirmed:

(71) What has John spoken (with great care) to his mother (with great care) about

We can now formulate the constraint for manner adjuncts, which is supposed to apply in English and in German:

(72) Process-related adjuncts (e.g. manner adjuncts)

The base position of a process-related adjunct minimally c-commands a base of the main predicate.

(72) allows to explain the following contrast between English and German:

(73) a. Today John worried greatly about every girlfriend
 b. ??Hans hat sich heute maßlos über jede Freundin geärgert
H. has refl. today extremely about every girlfriend get-annoyed
 c. Hans hat sich heute über jede Freundin maßlos geärgert

¹² With regard to the spec position of the adjuncts, the remark formulated in footnote 10 applies here too.

The manner adjunct in (73a) is licenced because it minimally c-commands the trace of the verb. In (73b) however the adjunct does not minimally c-command the predicate. The manner adjunct has been moved and therefore the sentence is not fully grammatical.

Let us now look at another possible position for a manner adjunct in English. It is at the end of the clause. Because of the binary right branching structure of the English clause it is sister to a trace of the verb (cf. Larson (1988)):

- (74) a. John has talked to his mother nicely
b. John has [talked_i to his mother [t_i nicely]]

The adjunct satisfies condition (72). In contrast the following occurrences of a manner adjunct do not fulfil (72)¹³:

- (75) (*Nicely) John (*nicely) will (*nicely) have spoken to his mother about her letter

The reason is that the adjuncts in (75) do not minimally c-command the main predicate.

There is one occurrence left of items which are usually classified as manner adjuncts. This is the position directly in front of the main predicate:

- (76) John will carefully study her letter

However it is important to note that *carefully* in this example is not a pure manner adjunct. As Cinque (1997) notes, a sentence like the following does not contain any contradiction:

- (77) John has been cleverly talking about the problem stupidly

This is interesting because *cleverly* in (77) is not understood as a sentence adjunct, i.e. the situation is not evaluated by the speaker. In German it can be even seen morphologically that the corresponding element is not a SADJ:

- (78) Hans hat geschickt die Fragen dumm beantwortet
H. has skillfully the questions stupidly answered

The SADJ would have the ending *-weise* (cf. *geschickterweise*).

Not all adjuncts which can appear as manner adjuncts postverbally may occur preverbally:

- (79) a. John handled the situation terribly
b. *John terribly handled the situation
c. He played the sonata beautifully
d. *He beautifully played the sonata
e. He has danced with Mary marvellously
f. *He has marvellously danced with Mary

As Blight (1997) notes, these adjuncts can, however, occur in front of a main verb in the passive voice:

¹³ The star on the occurrence at the sentence initial position is meant to refer to a base generated and unmarked occurrence. It is possible to move a manner adjunct to this position.

- (80) a. The sonata was beautifully played
 b. The situation was terribly handled by John

Blight argues that only active verbs move to *v*, passive verbs stay in VP. Therefore the structural position of the preverbal adjuncts in (79) is different from the position of the adjuncts in (80). Thus we have to understand what makes it possible for some of the manner adjuncts to appear in a position which is not a position for manner adjuncts in general.

Bartsch (1972) makes a distinction between manner adjuncts which might be of importance here. She notes that only some allow a paraphrase in which they are not directly predicated of the process but only via a predication on the subject. Consider the following sentences:

- (81) a. He will work on the project carefully
 b. He will work on the project and in doing that he will be careful
 c. He will play the sonata beautifully
 d. He will play the sonata and in doing that he will be beautiful

(81a) with *carefully* might be paraphrased as (81b). In contrast *beautifully* does not allow such a paraphrase. (81c) and (d) do not have the same meaning. If we check the adjuncts in (79) we see that they all do not allow such a paraphrase. However the manner adjuncts which are possible in front of an active verb do allow Bartsch's paraphrase.

In (81b) *careful* does not characterize the process. Rather it is used to characterize the subject in relation to the whole action described by the sentence. Seen in this perspective, it makes sense that only manner adjuncts which allow Bartsch's paraphrase may appear preverbally. In this position they are c-commanding *vP*. Furthermore they are c-commanded by a position of the subject. The structural condition the elements fulfil in this position, is the same as the one for mental-attitude adjuncts.

It is clear that manner adjuncts which do not allow Bartsch's paraphrase, i.e. adjuncts which allow only the strict manner reading, can not appear preverbally. The condition in (72) can not be fulfilled in this position because the trace of the subject intervenes between the adjunct and the predicate.

Let us finally ask the question whether there are adjuncts in addition to manner adjuncts which are subject to condition (72)? Domain adjuncts like *politically* or *linguistically* are sometimes grouped with manner adjuncts, e.g. by Ernst (to appear). Cinque (1997) however classifies them as SADJ. The following data confirm Ernst's classification. They show that domain adjuncts obey condition (72). In German they are base generated below the subject and below the object:

- (82) Heute hat hier wer wen finanziell ruiniert
Today has here someone someone financially ruined

In English we find the following data:

- (83) Paul (*politically) will (??politically) have (??politically) been (politically) ruined (politically)

(83) is a passive construction. The domain adjunct has the same distribution as a manner adjunct. With an active verb and an agentive subject a domain adjunct is not possible preverbally:

(84) Paul (*politically) won (politically)

In this construction the verb moves to *v*, so this is what we expect if (72) holds for domain adjuncts.

For another adjunct type which fulfils condition (72) the reader is referred to Maienborn (2000). Maienborn develops an analysis of what she calls ‘internal locative modifiers’ illustrated by the following example:

(85) Der Koch hat das Hähnchen in einer Marihuana-Tunke zubereitet
The cook has the chicken in a Marihuana sauce prepared

Maienborn does not only give a semantic analysis of this kind of modifiers but she also gives evidence that they fulfil a condition like (72).

7. Frequency adjuncts

The last type of adjuncts I would like to consider are frequency adjuncts. Frequency adjuncts however do not constitute a further adjunct class with its own distributional requirements. Rather frequency adjuncts belong to different adjunct classes already discussed.

In the following German examples the frequency adjuncts occur in three different positions. All examples are unambiguous:

- (86) a. DASS Max fast alle Anwesenden oft beleidigte - unambiguous
that Max nearly all persons present often offended
b. DASS Max oft fast alle Anwesenden beleidigte - unambiguous
c. DASS oft an mindestens einem Tag der Strom ausfällt - unambiguous
that often on at least one day the current fails

This shows that in these examples the frequency adjuncts and the quantified phrases are base generated in their surface positions. Thus a frequency adjunct may be base generated next to the predicate, between subject and object or higher than the arguments.

It makes perfect sense to have several frequency adjuncts in one clause:

(87) weil häufig wer mehrmals Schrauben zu oft anzog
because often someone several times screws too often tightened

The sentence is understood in such a way that the frequency adjuncts quantify over different semantic objects: over the event, over a partial event and over the process described by the predicate. Data like (86) and (87) therefore suggest that frequency adjuncts may belong to the class of event-related adjuncts, to the class of event-internal adjuncts (type I) and to the class of process-related adjuncts.

The findings in German are confirmed by English data. Here too frequency adjuncts have the broadest distribution of all adjuncts types considered in this paper:

(88) (Frequently) she (frequently) has (frequently) been (frequently) talking (frequently) to Mary (frequently)

This suggests that also in English frequency adjuncts belong to different adjunct classes.

Let us finally consider the following examples discussed by Cinque (1997):

- (89) a. John intentionally knocked on the door twice
 b. John twice knocked on the door intentionally

Cinque (1997) notes that (89a) is ambiguous: *intentionally* can have scope over *twice* or *twice* can have scope over *intentionally*. In contrast (89b) has only one reading: *twice* has scope over *intentionally*.

With our conditions for the different adjunct classes we can explain the observed distribution of readings. Adjuncts occurring at the right periphery of an English clause may be process related, event-internal or event-external, cf. the next section. A frequency adjunct like *twice* belongs to these different adjunct classes. If in (89a) *twice* is analysed as a process-related adjunct it is in the scope of the event-internal adjunct *intentionally*, because event-internal adjuncts c-command process-related adjuncts. If it is analysed as event-external, it has scope over *intentionally* because event-external adjuncts c-command event-internal ones. In (89b) however *twice* can only be an event-external adjunct. Therefore this sentence has only the reading with *twice* having scope over *intentionally*.

8. Adjuncts at the right end of the sentence

The ordering of adjuncts at the right periphery of an English clause mirrors the ordering of adjuncts in the middle field of a German clause or to the left of the predicate in English. The following sentence shows the unmarked order of an instrumental, a locative and a temporal adjunct, the position of the manner adjunct being expected (cf. section 6):

- (90) He worked carefully with his sheares in the garden the whole morning

Furthermore, if the adjuncts at the right end are scope sensitive, it can be shown that an adjunct more to the right has scope over an adjunct to its left. The ordering preferences and the scope relations would find an easy explanation if the adjuncts at the right periphery (except manner) would be right adjoined to the different projections. However, as is well known, binding facts give evidence that the adjuncts at the right are c-commanded by the arguments (cf. e.g. Rosengren (2000)). This makes an analysis using right adjunction highly unpalatable.

As Pittner (1999) observes, we find the same mirror image of the order with extraposed sentential adjuncts in German. The judgements are even sharper:

- (91) a. Er hat sich ein Lager gebaut wo er gerade war als es dunkel wurde
He has himself a camp built where he just was when it dark grew
 b. ?Er hat sich ein Lager gebaut als es dunkel wurde wo er gerade war

As for English it can be shown that extraposed adjuncts are in the c-command domain of the arguments in the middle field:

- (92) Sie hat jeden₁ beschenkt als er₁ Abschied feierte
She has everyone given-a-present when he farewell-party had
 'She has given a present to everyone when he had his farewell party'

There is a remark about how to analyse the phrases at the right end of the clause in chapt. 4 of Chomsky (1995): "if a shell structure is relevant at all, the additional phrases might be supported by empty heads below the main verb ...". This proposal is taken up by Haider (1999): "The empty head in the extraposition subtree is just a structural licencer. In other

words, it guarantees endocentricity plus binary branching, and must be structurally licensed by a lexical head itself." Rosengren (2000) pursues a similar line of reasoning.

All sentence final adjuncts except process-related ones belong to the extraposition field with its empty heads in English. Sentence final process-related adjuncts are part of the core sentence structure. In Frey & Pittner (1999) we added the following proposal to the idea of the extraposition field. The extraposition field constitutes a pure structural environment. In order to become interpretable the phrases appearing in this field have to be connected to abstract markers in the interpreted domain of the sentence. The abstract marker corresponding to a given adjunct has to fulfil the c-command conditions which hold for the class the adjunct belongs to. Let us assume that in the unmarked case the paths connecting the phrases in the extraposition field with the associated markers in the interpretation domain do not cross. Then the order of the sentence final elements will mirror the order of the elements occurring in the core sentence structure.

SADJ can not appear sentence finally in English (without comma intonation). All 'lower' adjuncts, i.e. all adjuncts which have to be c-commanded by a SADJ according to our conditions, may occur at the end of the sentence. Compare for example a mental-attitude adjunct with a SADJ:

- (93) a. Mark rode a bicycle on the day of the transit strike willingly
b. *Mark was riding a bicycle on the day of the transit strike luckily

Note that even frame adjuncts can appear in this position:

- (94) People eat in fast food restaurants in America

I can not offer an explanation for the restriction for SADJs. SADJs are the only adjuncts which, according to our constraints, have to c-command the finite verb. Therefore I stipulate that this restriction can not be fulfilled by elements in the extraposition field. This means that the corresponding abstract markers are not able to enter a structural relation with finiteness. The reason for this might be that elements in the extraposition field, which is licensed by a lexical head and does not contain any functional structure, can only interact with lexical material. They can not interact with the encoding of functional information like finiteness.

The abstract markers of the other adjuncts interact with lexical material. Note that the requirement on event-internal adjuncts, type I, can now be fulfilled by the associated abstract marker. With regard to (40)/(41) of section 3, it was observed that e.g. a locative adjunct itself can not fulfil the requirements put on it inside the verbal projection, the reason being that the verb moves to a position in which it is next to the base position of the subject. An abstract marker between the subject's base and the verb however does not impair their structural closeness. Therefore the base position for a locative adjunct in English is at the right periphery. The only other position in which it may occur in an English clause is sentence initially. This is a position which it has reached by movement.

9. A note on the 'scopal' approach

The proposal presented here is between an approach like Cinque (1997) with only one possible position for a given adjunct and an approach like Ernst (to appear) or Haider (1999) according to which syntax proper does not constrain the distribution of adjuncts except to exclude certain positions for adjuncts in general. Instead semantics is supposed to regulate the distribution of adjuncts. Because critical discussions of Cinque's approach can be found in the

literature (e.g. Ernst (to appear), Haider (1999)) I only want to make some remarks about the second approach.

According to Haider or Ernst, syntax does not state special conditions for the different adjunct classes. The reason why there are certain serialization patterns lies in the mapping procedure to semantics. Preverbal adjuncts which relate to a more specified semantic domain have to c-command preverbal adjuncts which relate to a less specified domain. Haider (1999) differentiates only three semantic domains:

- (95) proposition \subset event \subset process/state

Haider (1999) and Ernst (to appear) relate for example all the adjuncts we categorized either as event-related adjuncts or event-internal adjuncts in section 3 to the event variable introduced into the structure. However if the members of these two classes are treated alike by the syntactic component, all the differences discussed in section 3 can not be explained. To take just three arbitrary examples: Why should there be any difference between sentences like (20a) and (d), between (34a, b) and (c, d) or between the examples in (36)? These data are all the more problematic for the 'scopal' approach as only one of the adjuncts under consideration occurs per clause. Haider (1999) expects only certain scopal restrictions between adjuncts. That the base positions of adjuncts should be sensitive to the position of arguments is not expected.

It might seem that an approach which wants to explain the distribution of adjuncts solely by their semantic type needs much more fine grained semantic distinctions than the ones in (95). However the introduction of a finer semantic ontology can not solve the problem. In this case according to the 'scopal' approach it should not be possible that members of the different adjunct classes could easily permute. But this is just what we have seen in the examples in (19).

There are more data which remain hard to explain also after the introduction of finer semantic distinctions. Let's take for example the different behaviour of mental-attitude adjuncts in English and German discussed in section 4. Our explanation crucially relies on a structural condition holding for the adjunct with respect to the most prominent argument and on the different sentence structures in the two languages. Another example is subject-oriented adjuncts. Although they belong to the SADJs, they have to obey the extra structural condition that their base is c-commanded by a derived position of the subject. This extra structural condition was crucial for the explanation of the difference between (56b) and (c).

The approaches of Haider and Ernst necessarily have the consequence that adjuncts do not scramble. All positions in which a given adjunct can appear in the German middle field are base generated positions. However this consequence does not seem to be right:

- (96) a. da Otto auf mindestens eine Weise an nahezu jedem Tag Maria umworben hat
because O. in at least one way on nearly every day M. courted has $(\exists\forall \text{ or } \forall\exists)$
 b. da Otto an mindestens einem Tag auf fast jede Weise Maria umworben hat
because O. on at least one day in nearly every way M. courted has (only: $\forall\exists$)
 c. Klara hat mit mindestens einem Computer an fast jedem Abend gearbeitet
K. has with at least one computer on nearly every evening worked $(\exists\forall \text{ or } \forall\exists)$
 d. Klara hat an mindestens einem Abend mit fast jedem Computer gearbeitet (only: $\exists\forall$)
K. has on at least one evening with nearly every computer worked

If the adjuncts in (96) are all base generated there should be no differences in scope possibilities. If however adjuncts have certain base positions and if they can be scrambled we expect differences like the ones observed in (96). Note that our conditions for the possible base posi-

tions of the different adjunct classes together with the scope principle in (3) predict the interpretations of the sentences in (96) correctly.

10. Summary

I have argued that the syntactic component of the grammar regulates the distribution of adjuncts. The ordering constraints can not be reduced to semantic scope conditions. Syntax, however, does not prescribe exactly one base position for a given adjunct. Rather an adjunct can be base generated in different positions as long as the c-command requirements are met which the adjunct has to fulfil with regard to the arguments and to other adjuncts occurring in the clause. We have distinguished five major classes:

- (97) (i) SADJs (e.g. *fortunately, probably*): The base position of a SAdj c-commands the finite verbal form, the base positions of the arguments and the base positions of the elements of the classes (ii)-(v).
- (ii) Frame adjuncts (e.g. *in the Middle Ages*):
The base position of a frame adjunct c-commands the base positions of the arguments and the base positions of the elements of the classes (iii)-(v).
- (iii) Event-related adjuncts (e.g. temporal, causal): The base position of an event-related adjunct c-commands the base positions of the arguments and the base positions of the elements of the classes (iv)-(v).
- (iv) Event-internal adjuncts
Type I: (e.g. locatives, instrumentals): Their base positions are minimally c-commanded by the base position of the highest argument.
Type II: (e.g. mental attitude adjuncts): Their base positions are c-commanded by a highest ranked argument in the extended projection of the lexical verb.
- (v) Process-related adjuncts (e.g. manner): The base position of a process-related adjunct minimally c-commands a base of the lexical verb.

The syntactic component does not regulate the distribution of members of the same adjunct class with respect to each other. If there are ordering constraints between members of the same class they are not syntactically encoded but are of a pure semantic nature.

In addition to the base serialization generated by (97) there are other orders possible between members of the different classes. These orders are derived by movement.

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A Semantic Account of the Stative Adverb Gap

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Abstract

It is argued that there is a surprising gap in the distribution of adverbial modifiers, namely that there are (practically) no adverbs that modify exclusively stative verbs. Given the general range of selectional restrictions associated with adverb/verb modification, this comes as a surprise. It is argued that this gap cannot be the result of standard selectional restrictions. An independently motivated account of the state-event verb contrast, in which state verbs are proposed to lack Davidsonian arguments is presented and argued to account for this stative adverb gap. Some apparent and real problems with the analysis are discussed.

1. Introduction

In early work on adverbial modification (Jackendoff 1972, Thomason and Stalnaker 1973), a fundamental distinction was drawn between S-adverbs and VP-adverbs. S-Adverbs such as *probably* and *luckily* appear relatively 'high' in the sentence and are ruled out sentence finally, while VP adverbs such as *quickly* and *merrily* appear 'lower' and are permitted sentence finally. Thomason and Stalnaker argued that S-adverbs and VP-adverbs are to be semantically distinguished. They claimed that S-adverbs are propositional modifiers, while VP-adverbials are predicate modifiers; that is, the distinction between them is articulated in terms of the semantic objects that they modify. This semantic distinction was taken to account for some of the contrast between them, for example the fact that the S-adverb *probably* is acceptable in (1a) while the VP adverb *quickly* is ruled out in (1b).

- (1) a. It was probably true that Bill kissed Jill.
b. *It was quickly true that Bill kissed Jill

One of the additional features that distinguishes S-adverbs from VP-adverbs is their selectivity. Generally speaking, S-adverbs are unrestricted with respect to the sentences they appear in. VP adverbs, on the other hand, are sensitive to the type of verb they modify. For example, although *probably* can appear in both (2a) and (2b), *quickly* can only appear in (3a).

- (2) a. John probably loved Mary.
b. John probably kissed Mary.
- (3) a. *John loved Mary quickly.
b. John kissed Mary quickly.

Thomason and Stalnaker noted that the type of verb-adverb selection illustrated in (3) could not be accounted for directly on their theory. Since *love Mary* is every much a predicate as *kiss Mary* is, there is no type-theoretic reason that (3a) should not be acceptable. Noting that

such adverbs as *quickly* cannot modify stative verbs, they suggested that predicates be marked stative or eventive, and that VP adverb modification be made sensitive to this marking. What Thomason and Stalnaker failed to note, however, was that adverbs select only against stative verbs and for eventive verbs. We don't, it seems, find adverbs that appear with stative verbs and but not with eventive verbs. That is, we don't find an adverb that fits the schema in (4).

- (4) a. John loved Mary ADVERB.
b. *John kissed Mary ADVERB.

Adverbs are sensitive to the state/event contrast, but only in one way. If an adverb can felicitously modify a state verb, then it can also felicitously modify some event verb as well. This lexical gap, which we will call the stative adverb gap (SAG), is striking and should be accounted for by any theory of adverbial modification.¹

In this paper, I discuss why the SAG is particularly problematic for the popular neo-Davidsonian theories of sentence interpretation, of the type proposed by Bach (1986), Parsons (1990), Wyner (1994) and others. Then I present an alternative theory, which I call the classical Davidsonian theory, from which the SAG follows as a natural consequence.

2. Neo-Davidsonian theory

Neo-Davidsonian approaches to sentence semantics have grown in popularity since the early work of Bach (1981) and Parsons (1985). To review briefly, the fundamental neo-Davidsonian assumption is the following:

- Verbs denote predicates of eventualities (states or events)

This fundamental assumption about verbal meanings makes available a simple analysis of adverbial modification, which can be given in slogan form as follows (see Parsons (1990), Kamp and Reyle (1993), and Wyner (1994) for details):

- VP adverbs denote predicates of eventualities
- VP adverbial modification is (essentially) simple conjunction

Additionally many neo-Davidsonians adopt the view that verbs are related to their nominal arguments via Thematic roles relations. The example derivation in (5) illustrates the main features of the approach.

- (5) a. John leave ; λe [leaving(e) & Agent(e) = John]
b. slowly ; $\lambda P \lambda e$ [P(e) & slow(e)]
c. John left slowly ; $\exists e$ [leaving(e) & Agent(e) = John & slow(e) & e < now]

An untensed clause is (like a bare verb) interpreted as a predicate of events. Nominal arguments simply introduce further (conjunctive) information about participants in the event. VP-

¹ I have been made aware of two apparent counterexamples to this claim: *still* and *no longer*. These will be discussed towards the end of the paper.

adverbs, while technically of a higher type, also introduce into the LFs underlying first order predication over events. This conjunctive modification accounts for the most obvious entailment facts about adverbial modification, namely that a modified sentence such as *John left slowly* entails the unmodified *John left*. (In many neo-Davidsonian accounts, tenses are also taken to add conjunctive information, locating the time at which the eventuality occurs with respect to the speech time, as we have indicated.)

Note that on the neo-Davidsonian account the contrast between S adverbs and VP adverbs then is not that between propositional modifiers and predicate modifiers, but rather between propositional modifiers and event predicates.

Besides the entailment facts just mentioned, the neo-Davidsonian approach articulates nicely the close relation many adverbs hold to their cognate adjectives. Given a semantics for nominals like *John's leaving* in which such expressions denote events (see Zucchi (1993)), the near-synonymy between (5c) and (6) is formally reconstructed.

(6) John's leaving was slow

Modulo definiteness (6) and (5c) have the same meaning, and on the neo-Davidsonian view they are given the same semantic analysis. The underlying predicate **slow** is taken to be the common semantic element, which is predicated of the underlying event introduced by *leave*.²

A further appealing innovation of the neo-Davidsonian approach, one that is central to our concerns here, is the treatment of Vendler/Dowty-type aspectual classes (Vendler 1967; Dowty 1979). Since (all) verbs are interpreted as predicates of eventualities, the distinctions among the aspectual classes can be characterized in terms of properties of these eventuality predicates. The most straightforward characterization is the following (taken from Bach (1986)):

- State verbs are those verbs that denote predicates of states.
- Activity verbs are those verbs that denote predicates of homogeneous events.
- Accomplishment verbs are those verbs that denote predicates of non-homogeneous events.
- Achievement verbs are those verbs that denote predicates of momentary events.

Given that adverbs, like verbs, are predicates of events, we might also classify adverbs in terms of the character of the underlying eventuality predicate which they denote. Much as we characterize the verbs *run* and *walk* as activity verbs because they are homogenous predicates of events, we might characterize *continually* as an activity adverb, because it too is a homogeneous predicate of events.

On the neo-Davidsonian theory, then, a stative adverb would simply be an adverb that applies only to states. While it is certainly not a prediction of the neo-Davidsonian perspective that such adverbs should exist, the theory also doesn't rule them out. For the neo-Davidsonian the SAG is merely an accidental lexical gap, and a somewhat surprising one, considering the central role that the state-event contrast plays in the verbal domain (see Dowty 1979 or Hinrichs 1985 Ch. 1, Katz 1995).

² In other work (Katz 1999), I have suggested that accounting for this fundamental parallelism in a compositional way in a neo-Davidsonian framework is not at all straightforward, if it is even possible.

3. Verb-Adverb Selection and the Stative Adverb Gap

Verb-adverb selection is a complex phenomenon (Jackendoff 1972, Rochette 1990). It is clear that certain adverbs appear with some types of verbs but not with other types of verbs. This is illustrated by the pairs in (7) - (9).

- (7) a. Austin tripped accidentally.
b. ??Austin wrote his book accidentally.
- (8) a. Melanie talked endlessly.
b. ??Melanie finished her book endlessly.
- (9) a. Steve finished his book quickly.
b. ??Steve slept quickly.

Intuitively, the infelicity of (7b), (8b) and (9b) seems somehow to be tied to an incompatibility between the verbal and adverbial meanings. In (7b), for example, the fact that for an event to be **accidental** it must be done without intent seems to conflict with fundamental intentionality of an event of book-writing. You just can't write a book accidentally.

The neo-Davidsonian approach, of course, gives us a way of making this intuition precise. On this approach one can simply say that verb-adverb selection is a reflection of the compatibility or incompatibility of the event predicates. Infelicity results from attempting to apply two incompatible predicates to the same event. In other words, verb-adverb selection is essentially the same phenomenon as classical "selectional restrictions" of the type illustrated in (10) (Chomsky 1965; Katz and Fodor 1964).

- (10) a. ??My shirt wants to go home.
b. ??My thoughts were very tall.

Just as there is an incompatibility being a shirt and being an object with desires (at least given our normal everyday world), and between being tall and being a thought, there is an incompatibility between being an event of book-writing and it being an accidental event. In both the classical cases and the verb-adverb cases it is incompatible co-predication that is the fundamental source of the infelicity.

We might, in fact, derive the infelicity from Grice's (Grice 1975) Maxim of Informativeness. We would say that a predicate Q violates the selectional restrictions of a predicate P iff it is not possible that any individual to satisfy both P and Q. If it is not possible for an individual to be both P and Q, it is uninformative to claim that there is an x such that P(x) and Q(x), since such a claim would necessarily be false. This uninformative is what gives rise to the infelicity we feel in the case of selectional restrictions. (Naturally, I am ignoring the fact that in typical cases it is the presuppositions associated with one or the other of the predicates that is incompatible with the other predicate, but that need not concern us.) A sentence such as (11), then, gives rise to a selectional-restriction violation because the predicate *bachelor*, meaning unmarried man, is not compatible with the property of having a wife (which is the presupposition associated with the use of the possessive in (11)).

- (11) ??The bachelor's wife was charming.

Note that when selectional restrictions are violated, speakers often attempt to reinterpret the sentence so as to “save” the utterance. In the case of (11) a hearer might reinterpret the phrase *the bachelor* as making reference to a man who, while married, has many other features of bachelorhood. This process of reinterpretation is also evident in such sentences as (7b), (8b) and (9b). In attempting to “save” (7b), for example, we might reinterpret *accidentally* to mean something like *effortlessly and quickly*, which would then be compatible with book writing. Or we might interpret *finish* in (8b) to mean *work on finishing*. That this kind of reinterpretation is evident in the both the case of verb-adverb selection and of subject-predicate selection is one indication that they are one and the same phenomenon.

At first glance, of course, it seems that an account of the SAG that appeals to this kind of verb-adverb selection would be the most straightforward and obvious account there could be: Adverbs that don’t appear with state verbs are simply adverbs that happen to select for dynamic or agentive properties of an eventuality. The fact that (12) is infelicitous, then, is not a grammatical fact, but simply another example of the kind of verb-adverb selection we saw at work in (7) - (9).

(12) ??Peter knew Mary gently.

The reason (12) is odd is simply that *gently*, being a manner of action adverb, is a predicate that holds of an eventuality if and only if the manner in which the eventuality was acted out was **gentle**. *Know*, on the other hand, is a predicate of states. States, being static do not have manners of being acted out, and so it is not possible for *gently* and *know* to apply to the same eventuality.

This much is fine. The problem is that this kind of account only explains why certain adverbs do not combine with state verbs. It doesn’t account for the stative adverb gap, that is we don’t have an explanation for why there are no adverbs that combine with state verbs but not event verbs. In fact, we are stuck thinking there should be some adverbs out there that are formally like *gently*, in that they are predicates of eventualities, except that they select for non-dynamic, non-agentive eventualities. This kind of gap is, in fact, not at all characteristic of selectional restrictions as we know them from the classical subject-predicate case.

Typically, selectional restrictions are symmetrical. That is, if P and Q are incompatible predicates, we can usually find a P’ and a Q’ such that P and Q’ are compatible, P’ and Q are compatible, and P’ and Q’ are incompatible. Consider the case in (13):

(13) ??My thoughts are tall.

Here P is *being a thought* and Q is *being tall*. These predicates are incompatible. But of course we can find both a P’ and a Q’ that result in acceptable variants, namely *being a mountain* and *being confused*.

(14) a. The mountain is tall.
b. My thoughts are confused.

The point is this: We don’t have just predicates that select for mental objects to the exclusion of, say, physical objects, we also have predicates that select for physical objects to the exclusion of mental objects. It might seem that we are simply commenting on the accidental properties of the lexicon. I think, however, that there is good reason to expect selectional restrictions exhibit this kind of symmetry.

Selectional restrictions reflect the semantic compatibility between predicates of different syntactic category. In the classical case, this is compatibility between nouns and verbs or adjectives. Since the kind of compatibility we are concerned with here is purely “real world” compatibility, and there is no *a priori* association of classes of meanings (beyond semantic type) to syntactic categories, we expect that the classes of compatible (and incompatible) predicates should be distributed evenly among the syntactic categories. If two syntactic categories are of the same semantic type, then for any lexical elements from one category, there should be an element from the second that denotes a compatible predicate and one that denotes an incompatible predicate. If there are syntactic contexts in which the semantic combination rule for these categories is conjunctive, then selection restriction violations will exhibit paradigmatic symmetry. We might, then, take symmetry, alongside reinterpretation, to be a test for whether a particular infelicity is due to selectional restriction violations or something else.

Paradigmatic symmetry, of course, is exactly what is missing in the case of adverbial selection of stative verbs. We only have adverbs that select for event verbs to the exclusion of state verbs and not adverbs that select for state verbs to the exclusion of event verbs. Interestingly, if we leave stative verbs aside, we see that other types of verb-adverb selection do exhibit symmetry. That is, we find such paradigms as (15).

- (15) a. ??John slept quickly.
 b. John ran quickly.
 c. John slept deeply
 d. ??John ran deeply.

The fact that in the case of adverbial modification of stative verbs there is no paradigmatic symmetry, suggests to me that the SAG has a grammatical basis. In the following section I will propose that there is a grammatical distinction between event verbs and state verbs from which the SAG follows as a natural consequence.

4. Accounting for the Stative Adverb Gap

An often-expressed intuition is that the crucial distinction between states and events is that states simply don't have many properties. Events are much more interesting, and therefore there is much more to be said about them. Because of this, they are compatible with a larger class of predicates, and thus event verbs combine felicitously with more adverbs than state verbs do. To analogize, if events are like paintings, states are like blank canvases. Both have dimensions, but for a canvas, that is about all there is to it, whereas for a painting we can talk about the theme of the painting, the shading, the use of light and so on. In the case of states and events, while we can talk about the dimensions of both (i.e. their spatio-temporal properties), for events there is simply so much more; we can also talk about their manner, their speed and their causes and effects and their purposes.

I find this intuition compelling, and take it to show us is that events and states are not two classes of the same type of object, as the neo-Davidsonian would have it, but rather that events are highly articulated things of which states are the most simple form. In the next section, I give this intuition formal expression and show how this formal mechanism accounts for the stative adverb gap. The lack of stative adverbs, then, is not an accidental property of the lexicon, but in fact follows from the character of the state/event distinction.

4.1. The State/Event Distinction

In Davidson's (1967) paper he suggests that "fact" verbs be distinguished from event verbs in that they lack an extra event argument. Davidson's tentative suggestion has been adopted by a number of researchers and pushed into service to account for some of the more well-known state/event contrasts (see Galton (1984), Löbner (1988), Sandström (1993), and Katz (1995)). The basic idea is that state verbs are distinguished from event verbs by the absence of a Davidsonian argument. The event sentence (16a) and the state sentence (16b), then, have different logical representation, as shown in (17).

- (16) a. Sandy kissed Kim.
b. Sandy liked Kim.

- (17) a. $\exists e$ [kiss(e,Sandy,Kim)]
b. like(Sandy,Kim)

On this approach, as we see, state verbs are of a different logical type than are event verbs with the same number of NP arguments. There are two things to note: First, the fact that there are no underlying states in the logical form for (16b) requires us to adopt an "ordered argument" account of the verb-argument relations (Dowty 1991), at least for stative sentences. For uniformity, it seems sensible to adopt such an account generally. Secondly, once existential closure has applied to the event sentence, state sentences and event sentences are of the same logical type. It is in this sense that event sentences are also like state sentences but are simply more articulated.

General discussion of the empirical advantages of this approach to the state/event contrast, which I will call the "classical" Davidsonian approach, would take us too far afield here (but see, Katz (1997); Katz (2000)). Let us just take a single example. Consider the fact, illustrated in (18), that state verbs cannot appear as bare infinitive complements of perception verbs.

- (18) a. Peter saw Sue leave.
b. *Peter saw Sue wear a coat.

It is standardly assumed that these complements are interpreted as indefinite descriptions of the eventuality introduced by the complement verb (Higginbotham 1983). State verbs such as *wear* in *wear a coat*, which clearly would refer to perceivable states, are for some reason prohibited in this context. This prohibition follows naturally if these verbs simply lack an eventuality argument.³ The grammatical mechanism which turns bare infinitivals into eventuality descriptions is simply unable to apply to them. A number of event/state contrasts in the domain of nominalization, sentential anaphora, and tense interpretation are likewise amenable to classical Davidsonian analyses. And, of course, my claim is that the stative adverb gap is as well.

In the next section I present the outlines of my particular classical Davidsonian account of sentence interpretation. I present several details which are not, in fact, relevant to the treatment of adverbials, but which I think, aid in the understanding of the mechanism.

³ Higginbotham himself makes a similar proposal. Unfortunately he confuses the state/event contrast with the stage-level/individual-level contrast (Carlson 1977). That such stage-level statives as *wear a coat* are prohibited is something his proposal does not explain.

4.2. Classical Davidsonianism

Since both state sentences and event sentences have temporal components to their semantics, I will assume that both saturated state verbs and saturated event verbs are predicates of times. Tenses will apply to these time predicates to yield propositional meanings. The “upper” part of the system, then, is fairly standard:

- Sentence meanings are propositions
- Fully saturated verbs are properties of times
- Tenses are functions from predicates of times to propositions

We will distinguish fully saturated verbs from “nominally” saturated verbs. Nominally saturated verbs are those that have all their nominal arguments, but may be missing an underlying implicit argument. The basic assumption of the classical Davidsonian approach is that eventive verbs can be nominally saturated without being fully saturated. The basic difference between state verbs and event verbs then is that:

- Nominally saturated state verbs are properties of times.
- Nominally saturated event verbs are properties of events.

The difference between state sentences and non-state sentences, then, appears “below” the tenses and “above” the VP. Following Klein (1994), Kratzer (1998), and others I assume the existence of two aspectual operators that turn predicates of events (nominally saturated event verbs) into predicates of times. These are the operators PERFECTIVE and PROGRESSIVE. If we make the further natural assumption that these operators are syntactic heads, this semantic contrast between state sentences and event sentences receives expression in the syntax, as illustrated in (19):

- (19) a. $[_{TP} \text{ Sandy}_i [_T \text{ PAST } [_{AspP} \text{ PERFECTIVE } [_{VP} t_i \text{ kiss Kim }]]]]$
 b. $[_{TP} \text{ Sandy}_i [_T \text{ PAST } [_{VP} t_i \text{ like Kim }]]]]$

Note that there is a mismatch between syntactic category and semantic type in the **lexical** vocabulary, since stative VPs and non-stative VPs are of different type. Stative VPs and eventive AspPs however share a semantic type: they are properties of times.

Our logical forms will be interpreted with respect to a structure $\langle D, E, T, <, \text{time-of} \rangle$, where D is the domain of individuals, among which E is the subset of events, T is the set of time intervals with ordering relation $<$. The function **time-of** takes an event and returns its run-time (this is Krifka's (1989) τ function).

The difference between the eventive *kiss* and the stative *like* is reflected by a difference in their lexical entries. Let us take a concrete example. Assuming that semantic combination is simply functional application we can, using the lexicon given below derive logical analyses of (19a) and (19b). Note that the first order variable t ranges over times, the variable e over events and the others over normal individuals.

$\text{kiss} ; \lambda y \lambda x \lambda e [\text{kiss}(e,x,y)]$
 $\text{like} ; \lambda y \lambda x \lambda t [\text{like}(t,x,y)]$
 $\text{PAST} ; \lambda P \exists t [t < \text{now} \ \& \ P(t)]$
 $\text{PERFECTIVE} ; \lambda t \exists e [P(e) \ \& \ \text{time-of}(e) \subset t]$

The derivations, then, are as follows:

- (20) a. Sandy kissed Kim.
 b. $[_{TP} \text{ Sandy}_1 [_T \text{ PAST } [_{AspP} \text{ PERFECTIVE } [_{VP} t_1 \text{ kiss Kim }]]]]$
 c. $\exists t \exists e [\text{kiss}(e, \text{Sandy}, \text{Kim}) \ \& \ \text{time-of}(e) \subset t \ \& \ t < \text{now}]$
- (21) a. Sandy liked Kim.
 b. $[_{TP} \text{ Sandy}_1 [_T \text{ PAST } [_{VP} t_1 \text{ like Kim }]]]]$
 c. $\exists t [\text{like}(t, \text{Sandy}, \text{Kim}) \ \& \ t < \text{now}]$

We have, of course, simplified many of the less relevant issues, such as the treatment of tense. Nevertheless we get what we want: the claim on the one hand that there is a past time at which a kissing of Kim by Sandy occurred, and on the other the claim that there was a past time at which Kim liked Sandy.

There are a number of features of the tense-aspect system of English that fall out of the classical Davidsonian approach. Consider, for example the English progressive. If we make the natural assumption that it is taken to be the morphological expression of the operator PROGRESSIVE defined below, which is the natural dual of the PERFECTIVE operator, we can explain some of the most obvious properties that the English progressive exhibits:⁴

PROGRESSIVE ; $\lambda t \exists e [P(e) \ \& \ t \subset \text{time-of}(e)]$

The progressive, then, is a function from event predicates to time predicates, intuitively the time at which that event was going on. Since the progressive is, effectively, a type shifter, it should not be able to apply either to state verbs, which are of the wrong type to act as ‘input’, or apply to its own output. This, of course, is exactly what we find to be the case:

- (22) a. *John is owning a car.
 b. *John is being kissing Mary.

Furthermore, the well-known “stativizing” effect of the progressive (Vlach 1981) also gets a fairly straightforward account in this framework, since formally the function PROGRESSIVE is a stativizing operator, in that it turns predicates of events into predicates of times.

4.3. A Classical Davidsonian Account of Adverbial Modification

Let us now look at how adverbs are treated. Like Thomason and Stalnaker's (1973) we distinguish adverbs that apply to the propositional content—*probably*, *frankly* from others. Furthermore, we distinguish temporal adverbials—*yesterday*, *for an hour*, *on Sunday*—from event adverbs—*slowly*, *gently* and the like. As would seem natural, temporal adverbs are taken to be predicates of times and event adverbs are predicates of events. For concreteness, here are some examples:

slowly ; $\lambda P \lambda e [P(e) \ \& \ \text{slow}(e)]$
yesterday ; $\lambda P \lambda t [P(t) \ \& \ \text{yesterday}(t)]$
probably ; $\lambda P [PROB P]$

⁴ This semantics should, of course, be modalized. See Zucchi (1999) for a recent summing up of these issues.

The intended interpretation of these underlying predicates is the following. When *slowly* applies to an event predicate it returns a predicate of slow events of the same kind, when *yesterday* applies to a temporal predicate, it returns a predicate of times that were yesterday, and when *probably* applies to a proposition P it returns a proposition that is true if it is probable that P.

The mechanism of adverbial modification adopted here is fairly simple. In contrast to syntactic theories such as that of Cinque (1999), I follow Wyner (1998) in assuming that the relative order of adverbials follows from principles of semantic composition. In short, adverbials adjoin freely to elements of the extended verbal projection, subject only to semantic compatibility. There are two kinds of semantic compatibility to be considered. Certain restrictions are type-driven: For example, S-adverbials apply to propositional meanings (and therefore adjoin quite high, say to the TP projection), while temporal adverbs are properties of times, and so adjoin either to AspectP or to stative VPs. Event adverbs only apply to eventive VPs. These adverbs are subject to the kind of selectional restrictions discussed in Section 3 (as, in fact, are the others, as we shall make clear subsequently).

Given a sentence such as (23a) in which there is a temporal adverb and an event adverb, the semantic combination is fairly straightforward. When everything functions as it should the event adverb combines with a compatible event predicate. An aspectual operator applies. And then a temporal adverb combines with the resulting time predicate. (It should be clear that type-theoretical restrictions rule out any other order of application of these two adverbs.) Finally a tense operator applies. The LF for (23a) is given in (23b) and the logical analysis in (23c).

- (23) a. John left slowly yesterday.
 b. $[_{TP} \text{John}_1 [_T \text{PAST} [_{AspP} \text{PERFECTIVE} [_{VP} t_1 \text{left slowly}] \text{yesterday}]]]$
 c. $\exists t [t < \text{now} \ \& \ \text{yesterday}(t) \ \& \ \exists [\text{time-of}(e) \subset t \ \& \ \text{leave}(e, \text{John}) \ \& \ \text{slow}(e)]]]$

This system would have to be modified, of course, to be compatible with a syntactic approach to adverb placement: While the VP domain is taken to be the domain of event adverbs, TP domain the domain of S-adverbs, the domain of temporal adverbs is disjunctively described as either (eventive) AspP or (stative) VP. This problem is not evident if the composition system is entirely semantically driven.

4.4. The SAG explained

Like the restriction on stative progressives, the stative adverb gap is a direct consequence of the structure of the theory. Since adverbs such as *slowly* are, underlyingly, properties of events, it is clear that they cannot apply to stative VPs, which are properties of times. This is not fundamentally different from the claim that *slowly*, being a predicate of events, cannot apply to states. What makes the analysis interesting is that it rules out adverbs that apply exclusively to stative verbs.

Consider a potential adverb, *state-adverb*. To apply to stative VPs it must be of the same type as *yesterday*, that is, it must apply to properties of times. But if it is of this type then it could also apply to eventive AspectPs, which are also interpreted as properties of times. If the semantic account of adverbial distribution is correct, there should be no adverb that can apply to a stative VP without also being able to apply to an eventive AspectP.

From a semantic perspective an eventive predicate with an existentially closed event argument is of the same type as a stative predicate. Note that this is the fundamental claim of the classical Davidsonian account. And this is a claim which is independent of the particular

implementation. Here we have assumed that stative predicates are simply predicates of times. There is very little evidence that they should be treated otherwise. But even if one were to adopt the view that stative predicates were predicates of underlying states, one could still maintain the classical Davidsonian perspective that existentially closed eventive predicates are of the same semantic type as nominally saturated state verbs. This would amount to claiming that the aspectual operators are functions from event predicates to state predicates. This alteration would not fundamentally undermine the results. As long as the fundamental insight that existentially closed event predicates are of the same type as state predicates, is maintained, it will be impossible for an adverb to exist that can combine with state predicates but is not of the right type to combine with existentially closed event predicates.

It should be noted that this does not quite mean that there cannot be adverbs that only appear in stative sentences. In fact, there are two adverbs that do: *still* and *no longer*. The existence of these two adverbs might at first seem to call into question not only the theory just proposed, but also the claim that there is a stative adverb gap to start with. As we will see in the next section, it is not as bad as all that.

4.5. *Still* and *no longer*

It is quite clear that *still* and *no longer* appear only in state sentences. The contrast between the eventives in (24) and the stative sentence in (25) makes this clear.

- (24) a. *John kissed Mary no longer.
b. *John still wrote a book.
- (25) a. John no longer owned a car.
b. John was still sick.
c. John was still kissing Mary.
d. John no longer worked in Stuttgart.

Note that these adverbs combine not only with lexical stative verbs such as *own* but also with derived statives such as the progressive in (25c) and the generic in (25d). Semantically these adverbs are most naturally treated as temporal adverbials, since they seem intuitively to add information about the time for which the claim is taken to hold. If they **are** temporal adverbials it is not particularly surprising that they appear with state verbs. The question, then, would be why they don't seem to combine with event predicates, or, to be more precise, with eventive AspPs. I think there is very good reason for this, however. The reason being that it would violate the selectional restrictions of these adverbials.

Note that selectional restrictions of the standard kind are expected to apply just as much to predicates of times as they are to predicates of events. That is we expect there to be predicates of times that are simply incompatible with one another. In fact, this is a well known phenomenon: The classic cases of *in an hour* and *for an hour*, which select for different classes of temporal predicates, can be seen in this light.

- (26) a. Peter ran the race in an hour.
b. *Peter owned a vacation house in the Alps in an hour.
- (27) a. ??Peter ran the race for an hour.
b. Peter owned a vacation house in the Alps for an hour.

Although both adverbials are predicates of times, because of the lexical semantics of temporal *in* and *for* the former is compatible with certain types of event verbs, while the latter is compatible with state verbs. The literature on this topic is extensive and varied (Dowty 1979, Hinrichs 1985, Krifka 1989, Moltmann 1991, Zucchi and White 1996). There is general agreement, however, that the contrast is due to purely temporal properties of the modifiers.

There is, then, normal selectional restriction, in the domain of temporal predicates. And as we have already discussed one of the features of selectional restrictions is that they are symmetric. So we expect there to be temporal modifiers that select for the temporal properties of event verbs to the exclusion of state verbs and temporal modifiers that select for the temporal properties of state verbs to the exclusion of event verbs. I would suggest, then, that *in an hour* is an example of the former, while *still* and *no longer* are examples of the latter. They are, then, temporal modifiers which happen to be compatible with the temporal properties of stative verbs but not with the temporal properties of eventive verbs.

In fact, when we consider what the semantics of *still* should look like, it is no longer surprising that it should select for state verbs. Intuitively *still P* means that *P* is true at some time *t*, that it was true at some time *t'* previous to that, and that it has been true at all the times in between *t* and *t'*. This is formalized in (28).

(28) *still* ; $\lambda P [P(t) \ \& \ \exists t' [t' < t \ \& \ P(t') \ \& \ \forall t'' [t' < t'' < t \rightarrow P(t'')]]]$

This analysis makes it quite clear why *still* selects for state verbs: it requires that the temporal predicate it applies to have the subinterval property. It is well known that this is one of temporal properties that state verbs have but event verbs lack. Similar comments hold in the case of *no longer*.

These are, so to speak, counterexamples that indeed prove the rule. Both event sentences and state sentences have components whose denotations are predicates of times. Given what we have said about selectional restrictions, it would be a surprise if the selectional restrictions that applied at this level were insensitive to the state/event contrast. In a sense, it is a prediction of the theory that there be temporal adverbials that are acceptable only in stative sentences as well as temporal adverbials that are acceptable only in event sentences. The existence of the adverbs *still* and *no longer*, then, is no problem at all. There is, however, one real difficulty to be addressed. I do so in the next section.

5. A Problem with the Account: Stative ‘Manner’ Adverbs

Given the above account, we would expect that stative verbs should only be modified by temporal and propositional adverbs. This, however, is clearly not the case. There are a number of adverbs that combine felicitously with state verbs, but which would not normally be classified as temporal or propositional. Some examples are given in (29).

- (29) a. Peter knew Maria *well*.
 b. Lisa *firmly* believed that he was innocent.
 c. Mary loves Max *passionately*.

I would hasten to add that these adverbs aren't exceptions to the SAG, as they all combine event verbs as well:

- (30) a. Peter played the song well.
b. Lisa held the door firmly.
c. Mary kissed Max passionately.

The adverbs in (29) do, however, behave very much like manner modifiers of event verbs, and that is what makes them troublesome. For example, as we mentioned above, one of the properties of manner adverbs is that they are closely related semantically to their adjectival cognates. This seems to be the case for the adverbs in (29) as well. Also in the case of state verbs can we derive a synonymous expression by nominalizing the verb and applying the cognate adjective to it. So (29c) seems synonymous with (31a) in much the way that (30c) is with (31b).

- (31) a. Mary's love for Max is passionate.
b. Mary's kissing of Max was passionate.

One of the advantages of the neo-Davidsonian approach was that it made sense of this synonymy in a straightforward way. In both (30c) and (31b) the underlying predicate **passionate** applies to a kissing event. And on the neo-Davidsonian analysis of (29c) and (31a) the underlying predicate **passionate** is predicated of an underlying state, as in (32).

- (32) $\exists s$ [love(s,Mary,Max) & passionate(s)]

This treatment, of course, is inconsistent with the classical Davidsonian analysis, since the central assumption of that analysis is that state verbs do not have underlying eventuality arguments. The question, then, is whether the kind of modification illustrated in (29) – ‘manner’ modification of state verbs – is enough like event modification to force us to reject the classical Davidsonian account.

There are two features of ‘manner’ modification of state verbs that lead me to doubt that it really is parallel to event modification. First, the state verbs that can be modified by particular adverbs are lexically selected in a rather strict sense: *love* combines with *passionately* and *know* with *well*, but not the other way around, and neither of these adverbs combine with *own*. This contrasts sharply with the case of event verbs, where there is semantic but not lexical selection: *speak*, *kiss*, and even *eat* all combine with *passionately* and *well*. This may just mean that states are more finely grained than events, but alternately it might mean that we are dealing with phrasal idioms of a sort. Secondly, when they modify state verbs, these adverbs appear to be exclusively interpreted as degree modifiers. Although there is certainly some affective content associated with the word *passionate*, truth-conditionally (33a) means about the same as (33b).

- (33) a. He loves her more passionately than she does him.
b. He loves her more than she does him.

This, again, is in stark contrast to event modification. (34a) is certainly not synonymous with (34b).

- (34) a. He kissed her more passionately than she did him.
b. He kissed her more than she did him.

We will discuss degree modification shortly. The point here is simply that in the case of event verbs, VP adverbs express a whole range of properties of events, from their auditory quality (*loudly*) to the mood of their agent (*grumpily*), while in the case of state verbs they seem only to indicate the degree to which an individual can be claimed to have a given property.

Even Parsons accepts that degree modifiers such as *partway* are not to be treated as event predicates. He points out that the typical pattern of entailments associated with event adverbs is not found in examples containing *partway*. (35a), for example, does not entail (35b).

- (35) a. Max filled the tank partway.
b. Max filled the tank.

When they modify event verbs, such modifiers seem to indicate the degree to which the underlying event is of the type described by the verb. In (35a), then, the claim being made is that there was an event of which Max was the agent that was partial a tank filling. This contrasts with the way degree modification of state verbs behaves. Consider the contrast in (36).

- (36) a. Max barely kissed Alissa.
b. Max barely knows Alissa.

In (36a) the claim is that the event wasn't much of a kiss, that is that there was an event and it was a kissing, but it only barely qualifies as one. Whereas in (36b), the claim seems to be that the degree to which Max knows Alissa is very small. To put things another way, on the one hand it is the degree to which a particular event qualifies as belonging to a certain type which is being measured, on the other hand it is the degree to which an individual can be said to have a certain property. Without introducing a full-blown semantics of degrees, we can see that this is, at least in form, what we expect from a classical Davidsonian account:

- (37) a. $\exists e$ [barely(kiss)(e,Max,Alissa)]
b. barely(known)(Mary,Max)

The basic idea, then, is that the kind of adverbs that we see appearing with stative verbs but which clearly are not temporal or propositional modifiers are, in the end, predicate modifiers. It is at the level of predicates, I would suggest, that degree modification takes place. This accounts both for why it is available for state verbs as well as event verbs (one thing they have in common is that they are predicates).

Of course this is all rather sketchy, and how this semantic proposal is to be fleshed out is certainly the subject for additional research. Furthermore, how this proposal can be reconciled with the facts about nominalization is still somewhat of an open question. Clearly nominals such as *his love for her* must be given an analysis. Perhaps an analysis along the lines of the nominalized properties of Chierchia and Turner (1987) would be the most natural, taking these nominals to be terms that refer directly to properties. Once we take this step, however, we would seem to be left with questions to answer about the treatment of event nominals. Why, then, aren't they also to be treated as property nominalizations

An alternative is to treat the nominalization phenomenon as purely syntactic. I have only a speculation as to how this can be made to work: Under Marantz' (1999) theory of distributed morphology, lexical items enter the derivation without category specification, and that this is supplied later in the derivation. On this kind of theory, then, LOVE DEEP is a lexical idiom that enters the derivation as a unit and acquires the appropriate categorial status syntactically.

When introduced in a nominal context it is pronounced *deep love* (as in *his deep love for her*), while in a verbal context it is pronounced *love deeply*. Such an account would have the advantage of making sense of the strict lexical selection we noted at the beginning of this section, since this kind of modification is, essentially, lexical. Furthermore the distinction between predicate modifiers, which are lexically introduced, and event modifiers, which are not, is made overt in the syntax.

I do not find this discussion entirely satisfying, however, not because I think it points to a particular strength of the neo-Davidsonian approach over the classical Davidsonian, but rather because I fear that it indicates that the Davidsonian notion of event modification as simple co-predication, is so simple as to be wrong. It is clear that there are any number of VP modifiers that are event modifiers, but which, semantically don't look at all like event modifiers. In (38a) it is not the devouring event that is hungry, but the lion. In (38b) it is not the event that is temporary, but rather Peter's absence from the university.

- (38) a. The lion devoured the deer hungrily.
b. Peter left the university temporarily.

What these and many other examples illustrate is that event co-predication, of the sort argued for by Davidson, is really only one of a number of kinds of modification available, perhaps it is even simply a family of other more specific kinds of modification. Degree modification is another type (or family of types). Trying to make all kinds of VP modification fit into the same mold by introducing an underlying argument for every element that needs to be modified may seem good when the number of kinds of such elements is small. But when the number starts to grow the plausibility (not to speak of the tractability) of such an analysis becomes questionable. The problems I hope to have raised for treating VP adverbial modification of state verbs in a neo-Davidsonian fashion seems, then, to be only part of a more general reconsideration of how the fine structure of adverbial modification should be addressed.

6. Conclusion

In summary, then, I have claimed that there is a missing class of adverbs, namely adverbs that select only for state verbs, whose non-existence is not accounted for in the literature. I have further argued that this stative adverb gap (SAG) is not plausibly accounted for on the basis of adverbial selectional restrictions. I suggest that the gap is far too systematic to be accidental. The central claim of the paper, then, is that the SAG arises from the structure of the theory of sentence interpretation. I then laid out the bare bones of a particular theory, which I called the classical Davidsonian theory, in which the event state contrast is analyzed in terms of the presence or absence of an underlying eventuality argument. State verbs do not have such arguments. Further adopting a semantic theory of adverbial modification, I showed how the SAG follows from the classical Davidsonian assumptions. Somewhat surprisingly, the potential counterexamples *still* and *no longer* were actually shown to vindicate the line of argument taken in the paper. Finally we were perplexed by the existence of adverbs that behave much as we might expect adverbial predicates of underlying states to behave. We have suggested that this is due to their being an instance of lexical predicate modification. Whether this can be made to work, and how this influences the analysis of eventive modification is left as an open question.

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Modification and Underspecification: A Free Variable Account of Locative Modifiers*

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Abstract

The present paper offers evidence that there are two variants of adverbial modification that differ with respect to the way in which a modifier is linked to the verb's eventuality argument. So-called *external modifiers* relate to the full eventuality, whereas *internal modifiers* relate to some integral part of it. The choice between external and internal modification is shown to be dependent on the modifier's syntactic base position. External modifiers are base-generated at the VP periphery, whereas internal modifiers are base generated at the V periphery. These observations are accounted for by a refined version of the standard Davidsonian approach to adverbial modification according to which modification is mediated by a free variable. In the case of external modification, the grammar takes responsibility for identifying the free variable with the verb's eventuality argument, whereas in the case of internal modification, a value for the free variable is determined by the conceptual system on the basis of contextually salient world knowledge.

1. The Davidsonian Approach to Adverbial Modification

One of the merits of what has become known as the *Davidsonian paradigm* is that it provides a straightforward account of adverbial modification. If verbs introduce an eventuality argument, as was suggested by Davidson (1967), then adverbial modifiers can be analyzed as simple first order predicates that add information about the verb's eventuality argument.¹ Locative modifiers are generally considered to be a typical case in point. They specify the location of the referent they modify. In the case of adverbial modification this then is the set of eventualities referred to by the VP. According to this view, sentence (1) has a Semantic Form (SF)² as in (2), where *e* is a variable that ranges over eventualities, *LOC* is a relation between individuals (objects or eventualities) and spatial regions and the spatial function *IN* maps objects onto their inner region. According to (2) the signing of the contract by Eva is located in the inner region of the office. (Definites are abbreviated by an individual constant set in bold.)

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¹ The term "eventuality" was coined by Bach (1986) as a cover term for events, processes and states. Davidson (1967) himself uses the term "event" but cf. Kim (1969: 204): »When we talk about explaining an event, we are not excluding what, in a narrower sense of the term, is not an event but rather a state or a process«.

² Following Bierwisch (1982, 1996, 1997), Bierwisch & Lang (1989), Lang (1994), Dölling (1997, 2000) and related work, I assume that the difference between linguistic knowledge and world knowledge may best be accounted for by an analytic distinction at the level of meaning representation: the Semantic Form SF captures the strictly grammatically determined, context-invariant meaning of a linguistic expression. The conceptual structure CS elaborates SF in terms of context and world knowledge yielding a particular utterance meaning of the respective expression.

- (1) Eva signed the contract in the office.
- (2) $\exists e$ [SIGN(e) & AGENT (e, eva) & THEME (e, c) & CONTRACT(c) & LOC (e, IN (o)) & OFFICE (o)]

The advantages of this approach are, first, that it allows us to draw the inferences that relate to adverbial modifiers directly on the basis of the Semantic Form. That is, (3) follows from (2) simply by virtue of the logical rule of simplification.

- (3) Eva signed the contract.

And, second, it does not depend on special lexical entries designed especially for the needs of modification but conforms to independently established insights of lexical semantics according to which locatives, e.g., denote the property of being located in a certain spatial region irrespective of whether they happen to be used as arguments of locative verbs, as predicatives in copular sentences or as adnominal or adverbial modifiers; cf. e.g. Bierwisch (1988), Wunderlich (1991), Maienborn (1996, 1998). That is, the Davidsonian approach to adverbial modification meets the demands of compositional semantics.

The basic ingredients of the compositional machinery that are responsible for the derivation of the SF in (2) are laid out in (4) – (6). The semantic contributions of the locative and the VP are given in (4) and (5), respectively.³ The semantic operation that corresponds to modification can be isolated by a template MOD as in (6). MOD takes a modifier and an expression to be modified and yields a conjunction of predicates. This reflects the common understanding of intersective modification as it can be found (more or less explicitly) in Higginbotham (1985), Parsons (1990), Wunderlich (1997), Heim & Kratzer (1998) among many others; cf. also the contributions to this volume.

- (4) [PP in the office]: λx [LOC (x, IN (o)) & OFFICE (o)]
- (5) [VP Eva signed the contract]:
 λe [SIGN (e) & AGENT (e, eva) & THEME (e, c) & CONTRACT (c)]
- (6) MOD: $\lambda Q \lambda P \lambda x$ [P(x) & Q(x)]

The result of applying MOD to (4) and (5) is given in (7). Finally, existential quantification of the eventuality variable will lead to the SF in (2).

- (7) [VP [VP Eva signed the contract] [PP in the office]]:
 λe [SIGN (e) & AGENT (e, eva) & THEME (e, c) & CONTRACT(c) & LOC (e, IN (o)) & OFFICE (o)]

While I believe the general approach to adverbial modification outlined above to be basically correct I will argue that it is too coarse-grained in two respects: (a) It fails to cover the whole range of intersective modification. Besides supplying an eventuality predicate, adverbial modifiers may also relate more indirectly to the verb's eventuality argument. This calls for a revision or augmentation of the template MOD. And (b), it misses the influence

³ For the present purposes I will assume a VP-internal subject position but nothing hinges on this assumption.

that the syntactic position of a modifier bears on its interpretation. This calls for a compositional semantics that is more properly tuned to the syntax.

Sentence (8) may serve as a first illustration.

(8) Eva signed the contract on a separate sheet of paper.

The sentence in (8) displays a locative modifier which, unlike the locative in (1), does not express a location for the whole eventuality but supplies further details about the signing. According to sentence (8), not the whole event of signing the contract by Eva is located on a sheet of paper but only Eva's signature.

More generally speaking, I will argue that locative modifiers of the type exemplified in (8) express a spatial relationship that holds *within* the eventuality designated by the verb. For the sake of simplicity, I will dub these modifiers "internal modifiers" as opposed to "external modifiers", which apply to the eventuality argument as a whole; cf. (1). The actual target of an internal modifier will be shown to be semantically underspecified and may vary considerably. Its determination depends to a large extent on world knowledge. This raises the following questions:

1. What are the characteristics of semantically underspecified, internal modification?
2. What triggers underspecification and how is it resolved?
3. How do grammar and pragmatics conspire to produce the relevant interpretations?

The present paper gives an outline of an analysis of internal modifiers which tries to give (partial) answers to these questions. It is aimed at modifying the Davidsonian approach to adverbial modification such that besides external modifiers it can also account for internal modifiers while preserving the advantages of Davidson's original proposal (viz. inferences and lexical semantic parsimony).

The rest of this paper is organized as follows: In section 2, I will lay out the basic pattern of internal locative modifiers. The data that will be discussed are taken from German. Section 3 addresses the syntax and semantics of these modifiers. I will present a compositional account that is sensitive to the modifier's structural position. Section 4 addresses the pragmatics of internal modifiers. Using the formal framework of abduction, I will show how world knowledge affects the utterance meaning of internal modifiers. Finally, in section 5, I will offer some concluding remarks on the relation between modification and underspecification.

2. Some Observations about Internal Modifiers

Let us begin by looking at the characteristic properties of internal modifiers which set them apart from external modifiers exemplified in (1). Some German data are given in (9).⁴

- (9) a. Der Koch hat das Hähnchen in einer Marihuana-Tunke zubereitet.
The cook has the chicken in a Marihuana sauce prepared.
- b. Die Bankräuber sind auf Fahrrädern geflüchtet.
The bank robbers have on bicycles fled.

⁴ German example sentences are translated by word-for-word glosses. Idiomatic translations are only added if there is a major discrepancy between German and English.

- c. Paul steht auf dem Kopf.
 Paul stands on the head.
 'Paul is standing on his head.'⁵
- d. Maria zog Paul an den Haaren aus dem Zimmer.
 Maria pulled Paul at the hair out of the room.

First of all, all locative modifiers in (9) are ambiguous between an internal and an external reading but according to our world knowledge most of the external readings are rather bizarre. In (9a), e.g., we would have to assume that a cook is wading through floods of Marijuana sauce while preparing a chicken. For (9b) we would be forced to construct a fantasy scenario populated, e.g., by dwarfs crawling around on giant bicycles, and so on. So, unless there is explicit evidence, world knowledge discards the external reading of the locative modifiers in (9) in favor of the internal one. Yet, in some cases our world knowledge does not establish any preferences at all. For sentence (10), e.g., both readings of the locative modifier are available. According to the external reading, the event of making an appointment takes place in the museum. (It might be an appointment for going to the movies.) According to the internal reading, the modifier specifies the location of the appointed event.

- (10) Angela hat sich mit Bardo im Museum verabredet.
 Angela has REFL with Bardo in.the museum arranged-to-meet.

Interestingly, the distinct readings of (10) come with different accent patterns under neutral stress conditions.⁶ The external reading of the locative modifier is associated with primary sentence accent on the verb; cf. (10a). The internal reading requires primary sentence accent on the modifier; cf. (10b). (The constituent carrying primary sentence accent is marked by capital letters; secondary accent is indicated by stress on the accent bearing syllable.)

- (10) a. Angela hat sich mit Bardo im Muséum VERABREDET. *external reading*
 b. Angela hat sich mit Bardo im MUSEUM verabredet. *internal reading*

Thus, prosodic information gives us an important clue to the resolution of this kind of ambiguity. This suggests that the distinction between external and internal modifiers is rooted in the linguistic system. Hence, we can discard one possible reaction to the meaning differences between internal and external modifiers which might have come into mind, namely to propose a unified and therefore maximally underspecified semantic analysis that covers both cases. If we followed this line of argumentation, the only thing we could say about the semantics of locative modifiers would be that they were somehow related to the verb's eventuality argument. In this view, the distinction between internal vs. external modifiers would have no implications for the grammar but would be purely a matter of pragmatics. The prosodic data in (10) provide a first piece of evidence that the distinction between internal and external modifiers is indeed grammatically reflected and should therefore be accounted for in terms of compositional semantics.

⁵ Note that in German, unlike English, definites are a regular means for expressing pertinence. The internal reading of the locatives in (9c/d) is based on a pertinence interpretation of the DP.

⁶ For a discussion of the conditions on neutral stress in German cf., e.g., von Stechow & Uhmann (1986), Jacobs (1991, 1993), Féry (1993). Maienborn (1996) discusses the conditions for accent placement on (locative) modifiers.

One of the most striking features of internal modifiers is that their meaning contribution is interlinked with the eventuality referent of the verb in an intricate way and depends to a large extent on context and world knowledge. For instance, an appropriate interpretation of sentence (11a) and its variants in (11b) activates a large amount of background knowledge about roasting events. We need to know what the integral components of this cooking method are (heat source, container, medium, etc.) and how they are functionally arranged in order to decide whether an internal modifier makes sense or not.

- (11) a. Paul hat die Forelle an einem langen Spieß gebraten.
Paul has the trout on a long spit roasted.
b. in viel Öl / in einer großen Pfanne / auf einem Campingkocher / über dem Lagerfeuer
in much oil / in a large pan / on a camping stove / above the campfire

While (11a/b) are fine, our conceptual knowledge does not support an internal reading of the variants in (11c/d). They are ruled out because they cannot be coherently integrated into the conceptual structure of the corresponding event. While (11c) fails to provide suitable roasting utensils, the (11d) variants refer to the right utensils but place them in spatial configurations that prevent them from serving their intended purposes. Thus, the (11c/d) variants are conceptually ill-formed on the internal reading of the locative modifier leaving us with the external reading. ("§" marks conceptual ill-formedness.)

- (11) c. §in einer Marihuana-Tunke / §in Wasserdampf / §im Kühlschrank
in a Marihuana sauce / in steam / in.the fridge
d. §bei einem langen Spieß / §auf viel Öl / §neben dem Campingkocher
near a long spit / on much oil / besides the camping stove

The kind of knowledge that decides whether and how the meaning contribution of an internal modifier is successfully interlinked with the eventuality referred to by the verb is clearly extra-linguistic in nature. The linguistic system remains silent about these issues. That is, the Semantic Form of internal modifiers is underspecified in this respect. It does not decide what particular aspect of the corresponding eventuality is further elaborated on and, consequently, it does not determine which entity is ultimately located in the given spatial region.

The claim that internal modifiers are crucially underspecified at the level of SF is further substantiated by the observation that sentences like (9d), repeated here as (12), can be contextually specified in more than one way.

- (12) Maria zog Paul an den Haaren aus dem Zimmer.
Maria pulled Paul at the hair out of the room.

The case of (12) illustrates that the actual target of the locative cannot be determined at the level of SF but only with respect to context and world knowledge. The only suitable SF-referents in (12) (besides the verb's eventuality argument) are Maria and Paul, but none of them is a possible candidate for being the entity that is located at Paul's hair. Maria's hand would qualify as such according to our world knowledge, but the actual context might also provide evidence that Maria used her teeth, a pair of pinchers or something similar. Thus, the utterance meaning of an internal modifier depends crucially on the contextually relevant background knowledge. An adequate analysis should be able to account for this kind of semantic indeterminacy and its contextual resolution.

A particular puzzle concerning internal locative modifiers is raised by the observation that they tend to have an *instrumental* or *manner reading*. Consider, e.g., sentences (9a – c), repeated here as (13a – c).

- (13) a. Der Koch hat das Hähnchen in einer Marihuana-Tunke zubereitet.
The cook has the chicken in a Marihuana sauce prepared.
- b. Die Bankräuber sind auf Fahrrädern geflüchtet.
The bank robbers have on bicycles fled.
- c. Paul steht auf dem Kopf.
Paul stands on the head.
'Paul is standing on his head.'

The modifier in (13a) specifies a particular mode of preparing the food. Thus, it makes some sort of manner contribution. The modifier in (13b) supplies information about the means of transport that was used by the bank robbers. It could be replaced by a genuine instrumental phrase like *mit dem Taxi* ('with the cab'). In the case of (13c), you might even doubt whether the original locative meaning of the preposition is still present at all. In this case, there should be an entity that is located on Paul's head. What could that sensibly be? On the other hand, if the modifiers in (13) are genuine locatives, then where does this "instrumental/manner flavor" come from? These cases turn out to be a real challenge for an approach that relies on independently motivated and as far as possible unambiguous lexical entries.

The claim that internal locative modifiers may have instrumental or manner readings is substantiated by the observation that suitable questions asking about these modifiers are based on manner and instrumental interrogatives rather than locative ones. The questions in (14/15a) support an internal reading of the corresponding locative modifier whereas the b-versions enforce an external reading, whatever our world knowledge might say.

- (14) a. Wie/*Wo hat der Koch das Hähnchen zubereitet? *internal reading of (13a)*
How/Where has the cook the chicken prepared?
- b. *Wie/Wo hat der Koch das Hähnchen zubereitet? *external reading of (13a)*
How/Where has the cook the chicken prepared?
- (15) a. Wie/Womit/*Wo sind die Bankräuber geflüchtet? *internal reading of (13b)*
How/With what/Where did the bank robbers flee?
- b. *Wie/*Womit/Wo sind die Bankräuber geflüchtet? *external reading of (13b)*
How/With what/Where did the bank robbers flee?

The questions (16/17a) are ambiguous between an external and an internal reading. The answer in (16b) supports both readings whereas (17) facilitates disambiguation: our world knowledge strongly favors an internal reading for (17b) and it supports only an external reading of (17c).

- (16) a. Wo hat Angela sich mit Bardo verabredet?
Where did Angela REFL with Bardo arranged-to-meet?
- b. Im Museum.
In.the Museum.

- (17) a. Wo hat Angela Bardo gekitzelt?
Where did Angela Bardo tickle?
b. Unter den Füßen.
Under the feet.
c. Unter dem Apfelbaum.
Under the apple tree.

Note furthermore that besides *wo* ('where'), German allows for locative interrogatives that encode a particular spatial relation like *worin* ('in what', literally: 'where-in'), *worauf* ('on what', literally: 'where-on') etc. These interrogatives are subject to further semantic constraints. Most importantly for our concern, their external argument is sortally restricted to objects. Therefore, they cannot be used for asking about the location of an eventuality. That is, these interrogatives are only compatible with the internal reading of a locative modifier and rule out the external reading; cf. (18) and (19).

- (18) a. Worin hat der Koch das Hähnchen zubereitet?
Where-in has the cook the chicken prepared?
'What has the cook the chicken prepared in?'
b. In einer Marihuana-Tunke.
In a Marihuana sauce.
c. *In der Küche.
In the kitchen.
- (19) a. Worauf sind die Bankräuber geflohen?
Where-on did the bank robbers flee?
'What did the bank robbers flee on?'
b. Auf Fahrrädern.
On bicycles.
c. *Auf einer Insel.
On an island.

The data concerning interrogatives confirm that the distinction between internal and external modifiers is reflected by the linguistic system. The data (20) – (22) supply a further piece of evidence that internal modifiers are to be distinguished from external modifiers as well as from locative arguments.⁷

- (20) a. Paul flehte auf Knien um Gnade.
Paul craved on knees for mercy.
b. Paul flehte kniend um Gnade.
Paul craved kneeling for mercy.
- (21) a. Paul hat auf dem Tisch auf dem Kopf gestanden.
Paul has on the table on the head stood.
b. Paul hat auf dem Tisch kopfgestanden.
Paul has on the table headstood.
c. Paul hat auf dem Kopf *tischgestanden.
Paul has on the head tablestood.

⁷ I owe the data in (20) – (22) to Ewald Lang.

- (22) a. Paul lag auf dem Bauch im Dreck.
 Paul laid on the belly in.the dirt.
 b. Paul lag bäuchlings im Dreck.
 Paul laid "bellywise" in.the dirt.
 'Paul laid on his belly in the dirt.'
 c. Paul lag auf dem Bauch *drecklings.
 Paul laid on the belly "dirtwise".

(20) gives an example of a manner-like locative that has a synonymous adverbially used present participle. External modifiers never are subject to such a synonymy. The sentences in (21) and (22) illustrate some differences between internal modifiers and locative arguments of positional verbs. The German verb *kopfstehe*n (literally: 'to headstand') in (21b) can be analyzed as incorporation of the respective internal modifier in (21a). This option is not available for locative arguments; cf. (21c). And the adverbial *bäuchlings* in (22b) is derived from the internal modifier 'on one's belly'; cf. (22a). No such derivational process can take place in the case of locative arguments; cf. (22c). These data emphasize that there is a very intimate semantic/conceptual relationship between an internal modifier and the verb. Nevertheless, these locatives are definitely *modifiers*, i.e., they only enter a "loose" grammatical relationship with the verb. Unlike arguments, internal modifiers can be omitted without any harm and their admissibility cannot be predicted from grammatical properties of the verb; cf. Maienborn (1991) for a discussion of the conditions that govern the optionality of locative arguments.

In sum, there is ample evidence that internal modifiers are a class of their own. They do not locate the verb's eventuality referent but an entity that serves some function within this eventuality. A semantic analysis should account for the following observations:

1. Locative modifiers are potentially ambiguous, i.e. they have an internal as well as an external reading. Disambiguation is based on linguistic (cf. the prosodic data in (10)) and extralinguistic (world knowledge) constraints.
2. Internal modifiers are subject to semantic underspecification. The actual target of an internal modifier is not grammatically determined but depends on contextually salient world knowledge.
3. Internal modifiers may convey instrumental or manner information.

In the following, I shall outline an analysis of internal modifiers that does justice to their peculiar behavior but conforms to our tenets (a) that locatives invariably express a spatial relationship and (b) that modification is based on the conjunction of predicates.

3. A Compositional Semantics for Internal Modifiers

3.1. On the Syntax of Internal Modifiers

As a prerequisite for a compositional account of internal modifiers that distinguishes them from external modifiers we need to show that the semantic differences are paralleled by a syntactic distinction. If we can find a parallel syntactic difference, this might be exploited for the purposes of compositionality. I have shown in Maienborn (1996, 1998) that there is such a difference. The main findings concerning the syntax of internal modifiers as opposed to external modifiers are the following:

First, there is evidence that not only arguments but also modifiers have well-defined syntactic base positions. In the case of German, this is indicated by a series of base order tests based, e.g., on focus projection, quantifier scope, Principle C effects and remnant topicalization; cf. also Frey & Pittner (1998), Frey (2000), Pittner (2000).

Secondly, modifiers of a certain lexical type can exploit more than one base position. More specifically, locative modifiers encounter two potential base positions within VP.⁸ They may be base-generated either between the subject and the remaining arguments of the verb or below the verb's arguments in close proximity to the verb. (In the latter case, only predicatives and directional PPs may intervene between the locative and the verb.)

Thirdly, there is a strict correlation between the syntactic base position of a modifier and its semantic contribution. In the case of locatives, the higher base position is occupied by external modifiers while the lower base position is reserved for internal modifiers. Let us assume for convenience that external modifiers are analyzed syntactically as VP-adjuncts and internal modifiers as V-adjuncts; cf. Maienborn (1996: ch. 3) for a more detailed examination of the exact position of internal modifiers within the verbal complex. The relevant base order restrictions for German are given in (23). ('>' stands for 'is placed higher in the hierarchical structure'.)

(23) subject > external locative modifier > ... > direct object > internal locative modifier > V

The existence of different syntactic base positions provides a structural explanation for the potential ambiguity of a locative modifier. A sentence with an external modifier like (24a) has the underlying syntactic structure (24a'). The variant (24b), which has an internal modifier, is based on the syntactic structure (24b').

- (24) a. Luise hat auf der Treppe gepfiffen.
 Luise has on the stairs whistled.
 b. Luise hat auf den Fingern gepfiffen.
 Luise has on the fingers whistled.

- (24') a. Luise hat [_{VP} [_{PP} auf der Treppe] [_{VP} [_V gepfiffen]]]
 b. Luise hat [_{VP} [_V [_{PP} auf den Fingern] [_V gepfiffen]]]

We are now in the position to explain the prosodic differences observed in section 2; cf. (10). Under neutral stress conditions, a verb-adjacent modifier may only bear the primary sentence accent if it belongs to the verbal complex. Otherwise, primary accent falls onto the verb; cf. Maienborn (1996: 123ff). That is, a verb-adjacent internal modifier but not a verb-

⁸ Besides two potential base positions inside VP, there is a third integration site for locative modifiers outside VP at the CP periphery. Locative modifiers that take this third option belong to the class of so-called frame-setting modifiers. They do not relate to the verb's eventuality argument but restrict the overall proposition; cf. Maienborn (1996, 1998). Illustrations are given in (i) and (ii).

- (i) In Europa ist Fußball eine sehr beliebte Sportart.
 In Europe is soccer a very popular sport.
 (ii) In Chile genießt Pinochet diplomatische Immunität.
 In Chile enjoys Pinochet diplomatic immunity.

Frame-setting modifiers will not be discussed here, since they do not relate to the Davidsonian eventuality argument.

adjacent external modifier may receive primary sentence accent; cf. the accent distribution in (24").

- (24") a. Luise hat auf der Tréppe GEPFIFFEN.
 b. Luise hat auf den FINGERN gepfiffen.

These findings about the syntactic distribution of locative modifiers prove that the distinction between external and internal modifiers is firmly established in the linguistic system and may hence be accounted for in terms of compositional semantics.

3.2. A Free Variable Account of Internal Modifiers

Given the syntactic differences worked out above, we are now in the position to develop a structural explanation for the semantic differences between external and internal modifiers. The strategy will be to show that the semantic differences can be traced back to the different structural environments of the modifiers. As we have seen in section 1, the template MOD in (6) accounts properly for the semantic integration of external modifiers. MOD is repeated in (25) and its contribution to the compositional process is illustrated in (26).

(25) MOD: $\lambda Q \lambda P \lambda x [P(x) \ \& \ Q(x)]$

(26) Der Bankräuber ist auf der Insel geflohen.

The bank robber has on the island fled.

a. [_{PP} auf der Insel]: $\lambda x [LOC(x, ON(i)) \ \& \ ISLAND(i)]$

b. [_{VP} [_V geflohen]]: $\lambda x \lambda e [FLEE(e) \ \& \ THEME(e, x)]$

c. [_{VP} [_{PP} auf der Insel] [_{VP} geflohen]]:

$\lambda x \lambda e [FLEE(e) \ \& \ THEME(e, x) \ \& \ LOC(e, ON(i)) \ \& \ ISLAND(i)]$

The question is now: what kind of operation is responsible for the semantic integration of internal modifiers? According to our observations in section 2, internal modifiers are underspecified with respect to their actual target at the level of SF, i.e. at the level of the grammatically determined, context-invariant meaning constitution. I propose to account for this semantic indeterminacy by an *SF-parameter* for the located entity. Such a parameter is introduced as a free variable at the level of SF and must be instantiated in the course of determining the utterance meaning at the level of CS; cf. section 4. To begin with, let us assume a second template MOD' that accounts for the semantic integration of internal modifiers as in (27) with *v* as free variable.

(27) MOD': $\lambda Q \lambda P \lambda x [P(x) \ \& \ PART-OF(x, v) \ \& \ Q(v)]$

The relation PART-OF pairs entities with their integral constituents. In the case of eventualities, among these are, e.g., their participants. PART-OF will be spelled out at the level of CS; cf. section 4. The result of integrating an internal modifier via MOD' is illustrated in (28).

(28) Der Bankräuber ist auf dem Fahrrad geflohen.

The bank robber has on the bicycle fled.

a. [_{PP} auf dem Fahrrad]: $\lambda x [LOC(x, ON(b)) \ \& \ BIKE(b)]$

b. [_V geflohen]: $\lambda x \lambda e [FLEE(e) \ \& \ THEME(e, x)]$

c. [_V [_{PP} auf dem Fahrrad] [_V geflohen]]:

$\lambda x \lambda e [FLEE(e) \ \& \ THEME(e, x) \ \& \ PART-OF(e, v) \ \& \ LOC(v, ON(b)) \ \& \ BIKE(b)]$

According to the SF in (28c), an entity *v* which is involved in the fleeing event is located on the bicycle. This is all that can be said context-independently about the meaning contribution of the internal modifier. The identification of *v* and its exact role in *e* is an issue of the conceptual system.

Notice that modification mediated by a free variable is not a peculiarity of locatives but seems to be a more general option. Several proposals have been made recently that can be described as free-variable-accounts to certain kinds of modification. Among them are the analysis of German *mit*-PPs ('with'-PPs) in Strigin (1995) and Dölling's (1998, 2000) analysis of temporal modifiers that specify the resultant state of an event, such as *for 10 minutes* or the restitutive reading of German *wieder* ('again'); cf. also Jäger & Blutner's (2000) free-variable-account of the repetitive/restitutive ambiguity of *wieder*. In fact, these expressions can be shown to be internal modifiers from a syntactic point of view. That is, they have a syntactic base position in close proximity to the verb; cf. Frey & Pittner (1998), Frey (2000), Pittner (2000). Therefore, we expect them to behave compositionally like locative internal modifiers. While Strigin, Dölling and Jäger & Blutner widely neglect the syntactic properties of these modifiers, the present account predicts that adverbial modification mediated by a free variable is only licensed if the modifier is base generated within the verbal complex.⁹

As it stands now, our theory assumes that there are two separate templates, MOD and MOD', that govern the compositional semantic integration of modifiers. Yet, it is evident that these templates are closely related. A comparison shows, first, that both templates are based on conjunction. Hence, they both support the inferences that relate to adverbial modification. That is, MOD as well as MOD' warrants that (29) will follow from the respective SFs for the sentences (26) and (28).

(29) The bank robber fled.

Secondly, both templates relate the semantic contribution of the modifier to the referential argument of the modified expression. In the case of adverbial modification, this is the verb's eventuality argument. That is, external as well as internal modifiers, both provide an additional semantic constraint on the verbal referent. They differ with respect to the issue of whether this constraint applies directly to the verbal referent or indirectly, i.e., mediated by a free variable. Whereas MOD establishes a direct link, leaving no space for contextual variation, MOD' constrains the verbal referent indirectly via an SF-parameter that is subject to conceptual specification.

The close affinity of MOD and MOD' can be made explicit by a more restrictive formulation of the theory according to which modification is accounted for by a single, more abstract template that accounts for the commonalities of internal and external modifiers and a condition that rules its specification depending on the modifier's syntactic environment. That is, MOD and MOD' can be replaced by the template MOD* as given in (30).¹⁰

⁹ An issue that needs further clarification is the question whether modification mediated by a free variable as opposed to direct modification is also available in the realm of nouns and, if so, whether it is paralleled by an analogous syntactic difference. The proposal of Partee & Borschev (2000) for adnominal genitives points towards this direction.

¹⁰ The formulation in (30) is similar in spirit to the proposal in Dölling (2000). Yet, there are two major differences. First, following Dölling, an underspecified relation is inserted into the compositional process whenever a first-order predicate is integrated. According to the present proposal, this kind of underspecification is only licensed in the structural configuration of modification. Secondly, Dölling assumes that the resolution of underspecification is exclusively a matter of the conceptual system, i.e. in Dölling's framework the compositional semantics is not restricted by a constraint like (30b). The present proposal claims instead that the condition in (30b) is a genuinely linguistic constraint which applies to the compositional process, thus leading to a more restrictive semantics. See also Dölling (2000) for a comparison of the two approaches.

(30) a. MOD*: $\lambda Q \lambda P \lambda x [P(x) \ \& \ R(x, v) \ \& \ Q(v)]$

b. Condition on the Application of MOD*:

If MOD* is applied in a structural environment of categorial type X, then R = PART-OF, otherwise (i.e. in an XP-environment) R is the identity function.

MOD* introduces a free variable *v* and a relational variable R. If applied to an X-category, R is instantiated as PART-OF. This is the case of internal modifiers. If MOD* is applied in an XP-environment, R is instantiated as identity, i.e. *v* is identified with the referential argument of the modified expression. This is the case of external modifiers.

(30) provides the essentials of the proposed compositional semantics for modification, which was designed to overcome the deficiencies of the standard Davidsonian approach sketched in section 1: (a) besides external modifiers it also covers internal modifiers and (b) it is sensitive to a modifier's structural environment.

What remains to be clarified is whether the condition in (30b) must be stipulated or whether it can be derived from some more fundamental principles of natural language semantics. We might speculate, e.g., that internal modification, which relates to the internal structure of the referential argument, is only possible at the stage of word formation, whereas external modification, which applies holistically to the referential argument, requires the word formation process to be completed. This would explain why internal modifiers are only licensed in an X-environment while external modifiers are bound to an XP-environment. That is, ideally, we would not need to postulate a condition like (30b) in association with particular base adjunction sites for modifiers (cf. Wyner (1998) for a criticism of such a strategy in the realm of manner adverbs and the reply in Shaer (2000)) but the distribution of modifiers and their particular interpretations would follow from independent principles. In this sense, the formulation in (30) is still preliminary. What has been achieved with (30) is an isolation of the genuinely linguistic constraints on the interpretation of adverbial modifiers. In the case of internal modifiers, these linguistic constraints produce an SF that is subject to underspecification.

4. A Pragmatic Account of Underspecification

Let us turn now to the pragmatic resolution of the semantic indeterminacy that is built into the compositional semantics of internal modifiers. In order to determine the utterance meaning of an internal modifier, its SF-parameter for the located entity must be instantiated taking into account the contextually salient world knowledge. In short, I will argue that internal modifiers supply further information about a spatial configuration that is independently established within the conceptual structure (CS) of the eventuality referent to which they attach. More specifically, the SF-parameter is instantiated as a result of merging the spatial relation expressed by the locative with a spatial configuration that holds within the eventuality. Why should the internal structure of eventualities relate to spatial notions? The reason is the following: conceptual knowledge about eventuality types includes knowledge about functional relations holding among their participants. These functional relations are often based on spatial configurations. That is, participants must meet certain spatial conditions in order to perform their designated function. Here is where internal modifiers come in: they elaborate on implicit spatial conditions that are part of the verb's CS. Let us have a look at the conceptual machinery in some more detail.

4.1. Parameter Fixing by Abduction

Following Dölling (1997, 1998, 2000), I use abductive interpretation as a formal means of parameter fixing. Abductive reasoning is inference to the best explanation; cf. Hobbs et al. (1993). In abductive frameworks, the interpretation of a sentence consists in deriving its most economical explanation that is consistent with what we know. That is, abductive reasoning is based on reductive inferences rather than deductive ones. In our case, it takes an underspecified SF and tries to prove it from a conceptual knowledge base (CKB) that provides axioms, facts, and additional contextually legitimated assumptions. CKB is presumed to be mutually known by the speaker and the hearer. As a by-product, abductive reasoning leads to a parameter-fixed CS that "explains" SF with respect to CKB. The abductive inference pattern is given in (31).

$$\begin{array}{ll}
 (31) & P \rightarrow Q & \textit{conceptual knowledge} \\
 & \underline{Q} & \textit{underspecified SF} \\
 & P & \textit{parameter-fixed CS}
 \end{array}$$

With respect to the conceptual knowledge $P \rightarrow Q$, the parameter-fixed CS P could be a sensible explanation of the underspecified SF Q . That is, we try to find a conceptual explanation for our underspecified SF by backward chaining. Since (31) does not provide a valid inference mode, CKB might license more than one CS explanation for SF, i.e., there might be several utterance meanings that satisfy the SF conditions. (These could be weighted according to different criteria; cf. Hobbs et al. (1993) but I will neglect the rating of explanations.)

A crucial feature of abductive reasoning is so-called *factoring*, which serves to reduce redundancies thereby leading to more economical explanations. Factoring licenses the unification of compatible expressions if the result is consistent with the rest of what is known. Given an expression of the form (32a), factoring assumes the variables x and y to be identical, yielding an expression of the form (32b); cf. Hobbs et al. (1993: 83). This carries over to the identification of an existentially bound variable with a suitable constant; cf. (33). Factoring applies freely in the course of abductive interpretation.

$$\begin{array}{l}
 (32) \text{ a. } \exists \dots xy \dots [\dots \& P(x) \& \dots \& P(y) \& \dots] \\
 \text{ b. } \exists \dots x \dots [\dots \& P(x) \& \dots]
 \end{array}$$

$$\begin{array}{l}
 (33) \text{ a. } \exists \dots x \dots [\dots \& P(x) \& \dots \& P(\mathbf{a}) \& \dots] \\
 \text{ b. } \exists \dots [\dots \& P(\mathbf{a}) \& \dots]
 \end{array}$$

The general procedure of parameter fixing is the following: (1) We take an underspecified SF whose need for conceptual specification is indicated by SF-parameters and (2) try to instantiate these parameters with respect to our CKB by backward chaining and factoring where possible. (3) This yields a parameter-fixed CS. (4) In order to show that this CS is indeed a possible explanation for SF, we then try to prove SF from CS on the basis of the shared knowledge, making additional assumptions where necessary. These additional assumptions are taken to be the new information of the sentence.

4.2. Some Illustrations

In the following, I will go through some examples and show how the SF-parameter of an internal modifier is instantiated at CS. Let us start with the sample sentence (28), repeated in (34a). Its SF is given in (34b).

- (34) a. Der Bankräuber ist auf dem Fahrrad geflohen.
 The bank robber has on the bicycle fled.
- b. SF: $\exists e$ [FLEE (e) & THEME (e, **r**) & BANK-ROBBER (**r**) & PART-OF (e, v)
 & LOC (v, ON (**b**)) & BIKE (**b**)]

What kind of conceptual knowledge do we need in order to determine the utterance meaning of (34a)? To start with, let us assume that the interlocutors have some common knowledge about locomotion. For our purposes it will be useful to draw a distinction between *extrinsic movement* (EXTR-MOVE) and *intrinsic movement* (INTR-MOVE). The former relies on an extrinsic vehicle, the latter is based on intrinsic means of locomotion. Riding and driving, e.g., belong to the kind of extrinsic movement, while walking and jumping are intrinsic movements. Fleeing and chasing can be performed in either way. So, let us assume a CKB which provides an axiomatization of this bit of common sense knowledge about locomotion; cf. the axioms (35) – (39).

- (35) a. $\forall exz$ [MOVE (e) & THEME (e, x) & INSTR (e, z) & VEHICLE (z) & SUPPORT (z, x)
 \rightarrow EXTR-MOVE (e)]
- b. $\forall exyz$ [MOVE (e) & THEME (e, x) & INSTR (e, z) & $z \sqsubset x$ & $y=x-z$ & SUPPORT (z, y)
 \rightarrow INTR-MOVE (e)]
- c. $\forall ex$ [EXTR-MOVE (e) & THEME (e, x) \rightarrow MOVED-ITEM (e, x)]
- d. $\forall exyz$ [INTR-MOVE (e) & THEME (e, x) & INSTR (e, z) & $y=x-z$ \rightarrow MOVED-ITEM (e, y)]

The axioms in (35) establish the relevant difference between extrinsic and intrinsic movement: extrinsic movement involves a vehicle which is used as an instrument of locomotion. This vehicle must support (see below) the theme, otherwise the latter could not benefit from the vehicle's motion in the intended sense; cf. (35a). Intrinsic movement, by contrast, is given if a part of the object that undergoes movement is used as a means of locomotion. In this case, the moving part supports the rest of the object; cf. (35b). The item whose movement is dependent on the instrument (MOVED-ITEM) is the theme, in the case of extrinsic movement, and the theme minus the bodypart that serves as instrument, in the case of intrinsic movement; cf. (35c/d). (The axioms in (35) use the mereological notions *proper part* " \sqsubset " and *mereological difference* "-"; cf. e.g. Simons 1987.)

- (36) a. $\forall e$ [EXTR-MOVE (e) & ETC_{RIDE} (e) \rightarrow RIDE (e)]
 b. $\forall e$ [EXTR-MOVE (e) & ETC_{DRIVE} (e) \rightarrow DRIVE (e)]
 etc.

- (37) a. $\forall e$ [INTR-MOVE (e) & ETC_{WALK} (e) \rightarrow WALK (e)]
 b. $\forall e$ [INTR-MOVE (e) & ETC_{JUMP} (e) \rightarrow JUMP (e)]
 etc.

- (38) a. $\forall e [X\text{-MOVE}(e) \ \& \ \text{ETC}_{\text{FLEE}}(e) \rightarrow \text{FLEE}(e)]$
 b. $\forall e [X\text{-MOVE}(e) \ \& \ \text{ETC}_{\text{CHASE}}(e) \rightarrow \text{CHASE}(e)]$
 etc.

- (39) a. $\forall e [\text{EXTR-MOVE}(e) \rightarrow X\text{-MOVE}(e)]$
 b. $\forall e [\text{INTR-MOVE}(e) \rightarrow X\text{-MOVE}(e)]$

The axioms in (36) – (38) make use of so-called *ETC-predicates*. Hobbs et al. (1993: 85ff) introduce them as a tool for exploiting superset information in the course of abductive reasoning. The reason is the following: if we wanted to express, e.g., that riding eventualities are a subset of extrinsic-movements as in (36'a), we would not be able to use this information while backward chaining. ETC-predicates allow us to convert such axioms into biconditionals, which then can be used in either direction; cf. (36''a). Thus, ETC-predicates are place-holders for the *differentia specifica* that distinguishes a *species* from its *genus proximum*. It might be impossible or undesirable to spell them out completely but they can be assumed by abduction. (Therefore, we need only the direction given in (36a).) This is what makes them a useful tool for abductive reasoning.

- (36') a. $\forall e [\text{RIDE}(e) \rightarrow \text{EXTR-MOVE}(e)]$

- (36'') a. $\forall e [\text{EXTR-MOVE}(e) \ \& \ \text{ETC}_{\text{RIDE}}(e) \leftrightarrow \text{RIDE}(e)]$

The axioms in (36) cover genuinely extrinsic locomotions; (37) addresses locomotions that are intrinsic. The axioms in (38) account for locomotions that can be performed by extrinsic as well as intrinsic means with the aid of an auxiliary parameter X-MOVE whose possible values are given in (39). Let us add furthermore a piece of knowledge about common subkinds of vehicles:

- (40) a. $\forall x [\text{VEHICLE}(x) \ \& \ \text{ETC}_{\text{BIKE}}(x) \rightarrow \text{BIKE}(x)]$
 b. $\forall x [\text{VEHICLE}(x) \ \& \ \text{ETC}_{\text{TRAIN}}(x) \rightarrow \text{TRAIN}(x)]$
 etc.

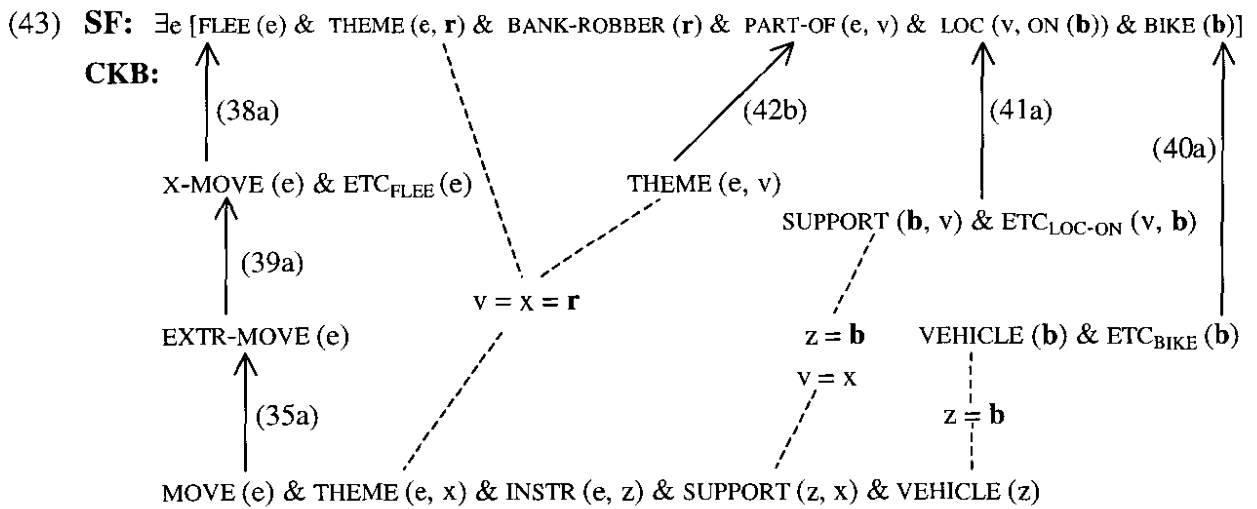
Besides this kind of knowledge about locomotion, our CKB includes the axioms in (41), which relate spatial configurations with functional concepts of containment and support. If an object y is located at the surface of an object x this is a subkind of x supporting y (i.e. x stops the effect of gravity on y); cf. (41a). If an object y is located at the inner region of an object x this is a subkind of x containing y (cf. (41b)), which itself is a subkind of support; cf. (41c).

- (41) a. $\forall xy [\text{SUPPORT}(x, y) \ \& \ \text{ETC}_{\text{LOC-ON}}(y, x) \rightarrow \text{LOC}(y, \text{ON}(x))]$
 b. $\forall xy [\text{CONTAIN}(x, y) \ \& \ \text{ETC}_{\text{LOC-IN}}(y, x) \rightarrow \text{LOC}(y, \text{IN}(x))]$
 c. $\forall xy [\text{SUPPORT}(x, y) \ \& \ \text{ETC}_{\text{CONTAIN}}(x, y) \rightarrow \text{CONTAIN}(x, y)]$

Finally, we need some axioms that specify what it means for an entity to be an integral part of an eventuality. The axioms in (42) guarantee that the participants of an eventuality qualify as its integral parts.

- (42) a. $\forall ex$ [AGENT (e, x) \rightarrow PART-OF (e, x)]
 b. $\forall ex$ [THEME (e, x) \rightarrow PART-OF (e, x)]
 c. $\forall ex$ [INSTR (e, x) \rightarrow PART-OF (e, x)]
 d. $\forall ex$ [MOVED-ITEM (e, x) \rightarrow PART-OF (e, x)]
 etc.

The axioms (35) – (42) provide a suitable background for the abductive interpretation of sentence (34a). Applying backward chaining and factoring to our initial SF (34b) yields a possible conceptual specification which identifies the discourse referent of *der Bankräuber* as value for the SF-parameter v. This is illustrated in the graph (43). (The relevant axioms are noted besides the arrows. Factoring is indicated by equations that are linked to the relevant literals by dotted lines.)



The respective parameter-fixed CS is given in (34c). If we replace the ETC-predicates by the literals that triggered them, we add a little redundancy but improve readability; cf. (34'c).

- (34) c. CS: $\exists e$ [MOVE (e) & ETC_FLEE (e) & THEME (e, r) & BANK-ROBBER (r) & INSTR (e, b) & VEHICLE (b) & ETC_BIKE (b) & SUPPORT (b, r) & ETC_LOC-ON (r, b)]
- (34') c. CS: $\exists e$ [EXTR-MOVE (e) & FLEE (e) & THEME (e, r) & BANK-ROBBER (r) & INSTR (e, b) & VEHICLE (b) & BIKE (b) & SUPPORT (b, r) & LOC (r, ON (b))]

This CS gives us a plausible utterance meaning for sentence (34a). It goes beyond the grammatically determined meaning in the following respects: (a) it specifies that the escape was taken by extrinsic means. As a consequence, (b) the bike is identified as the instrument of locomotion in the given event. This in turn leads (c) to an instantiation of the SF-parameter v by the discourse referent representing the bank robber.

Now we have derived a parameter-fixed CS for our sentence (34a). The last step of abductive reasoning consists in proving the underspecified SF (34b) from this CS. If we assume the new information of (34c) to be true and if we assume furthermore that our CKB provides uniquely identifiable discourse referents **r** and **b** for the bank robber and the bike, then there is a straightforward derivation of the SF (34b) from the CS (34c) by simplification and generalization of the constant **r** to the parameter v. Thus, CS is in fact a possible

specification of the underspecified SF with respect to CKB. This completes the abductive interpretation of our sample sentence.

Let me add a remark on factoring. This is an extremely powerful tool, of course, and we are well advised to develop strategies for controlling it. In fact, factoring should be constrained by overall principles of conceptual economy. A concrete version that addresses natural language interpretation (adapted from Lang 1985: 106) is formulated as a pragmatic condition on variable instantiation in (44).

(44) Pragmatic Condition on the Instantiation of Underspecified Variables:

An existentially quantified or free variable x is instantiated preferentially by a referent that is introduced by linguistic means, always provided that it meets the conditions on x .

The condition in (44) assures the primacy of linguistically introduced referents for the interpretation of natural language expressions and it warrants parsimony with respect to conceptual assumptions that are not independently motivated. In view of (44), the CS (34c) turns out to be an extraordinarily promising explanation for the underspecified SF, because it refers only to linguistically introduced referents.

The abductive interpretation of sentence (45a) proceeds along the lines of (34). The corresponding CS is given in (45c).

- (45) a. Der Bankräuber ist im Zug nach Rom geflüchtet.
The bank robber has in.the train to Rome fled.
- b. SF: $\exists e$ [FLEE (e) & THEME (e, **r**) & BANK-ROBBER (**r**) & GOAL (e, **rome**) & PART-OF (e, v) & LOC (v, IN (t)) & TRAIN (t)]
- c. CS: $\exists e$ [EXTR-MOVE (e) & FLEE (e) & THEME (e, **r**) & BANK-ROBBER(**r**) & GOAL (e, **rome**) & INSTR (e, t) & TRAIN (t) & CONTAIN (t, **r**) & LOC (**r**, IN(t))]

The variant (46) works differently. Suppose that the restaurant car is part of the train – although very plausible, this assumption is not really enforced by the linguistic system – then the train cannot figure as an instrument in the given event anymore. (I refrain from spelling out the corresponding axioms.) That is, the train fails to be identifiable with the inferred vehicle of extrinsic movement and, consequently, a suitable instantiation of the SF-parameter with respect to the CS of the verbal referent cannot be obtained. Thus, (46) is conceptually ill-formed under an internal reading of the locative modifier. It does support an external interpretation, of course.

- (46) §Der Bankräuber ist im Zug in den Speisewagen geflüchtet.
The bank robber has in.the train into the restaurant car fled.

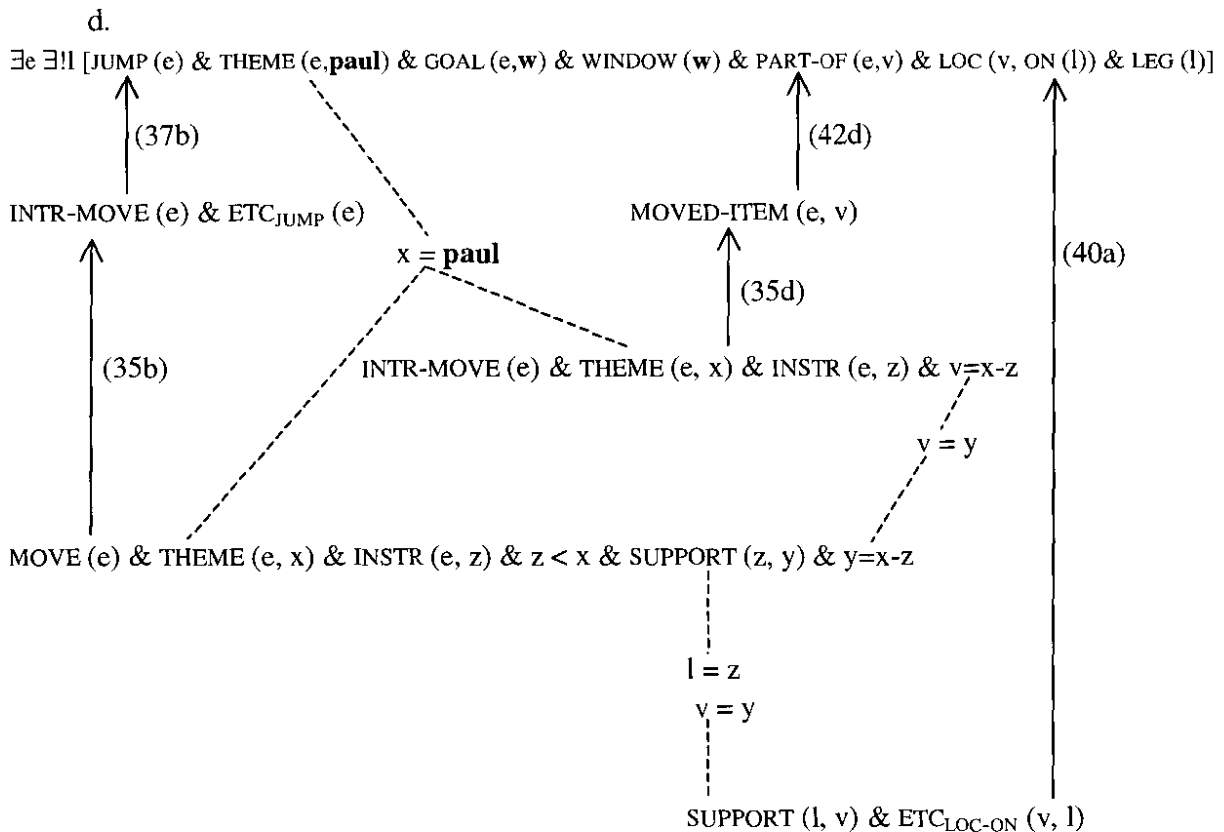
In (46), the integration of the locative into the conceptual structure of the verb is blocked by the linguistic context (by the interpretation of the directional PP, to be precise). In the case of (47), this conceptual clash is produced by a mismatch of the knowledge that is associated with the locative and the verb.

- (47) a. §Der Bankräuber ist neben dem Zug geflüchtet.
The bank robber has beside the train fled.
- b. §Der Bankräuber ist im Zug nach Rom gerannt.
The bank robber has in.the train to Rome run.

In (47a), there is no way to infer some kind of support between the train and the bank robber from the spatial relation expressed by the locative preposition *neben* ('beside'). That is, CKB does not contain any axiom that allows us to derive abductively SUPPORT (y, x) from LOC (x, BESIDE (y)). Hence, the train does not meet the necessary conditions for qualifying as instrument in the given eventuality. In (47b), on the other hand, the locative cannot be interpreted as supplying information about an extrinsic means of locomotion because the kind of movement determined by the verb is intrinsic. In both cases, no instantiation of the SF-parameter is obtained.

Let us have a closer look at the interpretation of internal modifiers in sentences referring to intrinsic movements. Take, e.g., (48a): its SF is given in (48b) and a straightforward conceptual specification with respect to the CKB developed above could be (48c); cf. the derivation in (48d).

- (48) a. Paul hüpfte auf einem Bein zum Fenster.
 Paul jumped on one leg to the window.
- b. SF: $\exists e \exists ! l$ [JUMP (e) & THEME (e, **paul**) & GOAL (e, **w**) & WINDOW (w) & PART-OF (e, v) & LOC (v, ON (l)) & LEG (l)]
- c. CS: $\exists e \exists ! l$ [JUMP (e) & THEME (e, **paul**) & GOAL (e, **w**) & WINDOW (w) & INSTR (e, l) & LEG (l) & l < **paul** & y = **paul-l** & MOVED-ITEM (e, y) & SUPPORT (l, y) & LOC (y, ON (l))]



The CS (48c) goes beyond the linguistically determined meaning representation (48b) in that it identifies the leg x as that part of Paul that is employed as intrinsic means of locomotion. For this purpose, the leg must support Paul's remaining body in the given event. That is, the SF-parameter v is conceptually specified as Paul's body minus one leg.

The interpretation of the sentences in (49) proceeds along the same lines. Conceptual knowledge about the underlying eventuality types involves constraints on the (canonical or typical) position of participants. These constraints refer to the part-whole organization of

human bodies and can be spelled out in terms of positional and dimensional properties of physical objects; cf. Lang (1989), Lang et al. (1991).

- (49) a. Paul steht auf dem Kopf.
 Paul stands on the head.
 'Paul is standing on his head.'
- b. Paul schläft auf dem Rücken.
 Paul sleeps on the back.
- c. Paul flehte auf Knien um Gnade.
 Paul craved on knees for mercy.

Take, e.g., sentence (49a): the internal modifier in (49a) definitely does not supply information about the location of the respective eventuality nor does it locate Paul. Rather, it provides information about Paul's position. One might conclude that the original locative meaning of the modifier was not at work at all. This would call for an additional lexical meaning designed for the positional use of locatives, thereby implementing polysemy with all its undesired concomitants into the system of locative prepositions. The current approach does not take this move. It takes the genuinely locative meaning contribution of the modifier seriously and tries to find a suitable instance of the relevant spatial relation in the course of conceptual reasoning. This leads to a CS for (49a) that includes a relation of support between Paul's head and his remaining body. That is, the internal modifier in (49a) indeed does not locate Paul, yet it does provide a location of Paul's remaining body relative to his head. Thus, even the cases that appear on first glance to challenge the assumption of a uniform meaning contribution of locatives can be explained by applying the very same conceptual mechanism that was illustrated here with examples from the domain of extrinsic and intrinsic movement to invariant lexical-semantic representations. (I will not give the details of the interpretations for (49) here because they need a certain amount of axiomatization in the conceptual domain of physical objects but cf. Maienborn (1996: 237ff) for a thorough analysis of (49a).)

Finally, I want to discuss a case where our CKB licenses more than one CS-instantiation of the SF-parameter *v*. Take, e.g., sentence (50a) and its SF in (50b).

- (50) a. Paul zieht Maria an ihrem Pferdeschwanz.
 Paul is pulling Maria at her pony-tail.
- b. SF: $\exists e$ [PULL (*e*) & AGENT (*e*, **paul**) & THEME (*e*, **maria**) & PART-OF (*e*, *v*)
 & LOC (*v*, AT (**pt**)) & PONY-TAIL (**pt**) & **pt** \sqsubset **maria**]

We need to augment our CKB in order to deal with (50). Some axioms for spatial contact are given in (51). (51a) links the predicates LOC and CONTACT: being located at the border region of an object (spatial function AT) is defined as a subkind of having contact with that same object. (51b) states that CONTACT is a symmetrical relation and (51c) guarantees part-whole inheritance. (" \sqsubseteq " stands for the mereological *improper part*.)

- (51) a. $\forall xy$ [CONTACT (*x*, *y*) & ETC_{LOC-AT} (*y*, *x*) \rightarrow LOC (*y*, AT (*x*))]
 b. $\forall xy$ [CONTACT (*x*, *y*) \rightarrow CONTACT (*y*, *x*)]
 c. $\forall xy$ [CONTACT (*x*, *y*) \rightarrow $\exists z$ [CONTACT (*x*, *z*) & *z* \sqsubseteq *y*]]

The axioms (52) and (53) supply some information about the eventuality type PULL. (52) states that pulling an object *y* is defined by exerting force (EXERT-FORCE) on *y* via an

instrument that is controlled by the agent and is in contact with *y*. The axioms in (53) address common sense knowledge about typical and/or admissible instruments like the agent's hand(s) or a pair of pinchers.

(52) $\forall exyz$ [EXERT-FORCE (*e*) & AGENT (*e*, *x*) & THEME (*e*, *y*) & INSTR (*e*, *z*)
& CONTACT (*z*, *y*) & CONTROL (*x*, *z*) & ETC_{PULL} (*e*) \rightarrow PULL (*e*)]

(53) a. $\forall exz$ [AGENT (*e*, *x*) & INSTR (*e*, *z*) & HAND (*z*) & $z \sqsubset x \rightarrow$ CONTROL (*x*, *z*)]
b. $\forall exz$ [AGENT (*e*, *x*) & INSTR (*e*, *z*) & PINCHERS (*z*) \rightarrow CONTROL (*x*, *z*)]
etc.

Abductive reasoning leads to two potential specifications of the SF in (50b) that differ with respect to the instrument that is used for pulling and, consequently, with respect to the value of the parameter *v*. Our CKB supports an instantiation of *v* with either the agent's hand (50c) or with pinchers (50d). Which of these conceptual specifications of (50b) will actually turn out to be the appropriate interpretation can only be determined in view of the relevant context.

(50) c. CS₁: $\exists ez$ [PULL (*e*) & AGENT (*e*, **paul**) & THEME (*e*, **maria**) & INSTR (*e*, *z*)
& HAND (*z*) & $z \sqsubset$ **paul** & CONTACT (*z*, **pt**) & PONY-TAIL (**pt**) & **pt** \sqsubset **maria**
& LOC (*z*, AT (**pt**))]
b. CS₂: $\exists ez$ [PULL (*e*) & AGENT (*e*, **paul**) & THEME (*e*, **maria**) & INSTR (*e*, *z*)
& PINCHERS (*z*) & CONTACT (*z*, **pt**) & PONY-TAIL (**pt**) & **pt** \sqsubset **maria**
& LOC (*z*, AT (**pt**))]

These were some illustrations of pragmatic parameter fixing that leads to conceptually specified utterance meanings for sentences with internal modifiers. The axiomatization of world knowledge I used here is still preliminary to say the least. Conceptual matters will certainly turn out to be much more complex. But this does not affect the outline of parameter fixing itself, which turns a grammatically determined SF into a contextually specified CS in accordance with a more or less carefully modelled conceptual knowledge base.

4.3. Some Concluding Remarks on the Conceptual Specification of Internal Modifiers

Let us take stock of what has been achieved so far. According to the proposal developed above, an internal modifier elaborates on independently established spatial constraints which are part of the conceptual knowledge that is associated with a certain eventuality type. Spatial relations are basic building blocks of functional notions. This explains the virtual ubiquity of conceptual integration sites for locatives and lends further support to the widely acknowledged thesis that spatial concepts are central to the mental organization of knowledge; cf. Talmy (1983), Landau & Jackendoff (1993), Bierwisch (1996), Bowerman (1996), Jackendoff (1996) among others. The study also suggests, and this is less commonplace, that eventualities, as accessed by natural language expressions, should not just be viewed as monolithic spatiotemporal entities but display a coherent functional organization in terms of participants, spatial constraints, part-whole relations, etc.; cf. Maienborn (2000). Thus, locative modifiers both enable and enforce a closer look into the internal structure of eventualities.

Having expounded the present account of internal modifiers, let us now revert to the main observations about their semantic peculiarities in section 2: semantic indeterminacy with respect to the located entity and the ability to convey instrumental or manner information.

The semantic indeterminacy of situation-internal modifiers was reconstructed by an SF-parameter that is subject to conceptual specification. Semantic indeterminacy was shown to hold in two respects. First, several entities may qualify as suitable instances of the SF-parameter according to our common sense knowledge. Consequently, sentences may turn out to have several utterance meanings; cf. the discussion of sentence (50a). Secondly, the set of appropriate parameter instances includes besides linguistically established referents like the theme in (34) and (45) also entities that do not show up in the grammatically determined meaning representation, viz. conceptually inferred entities like the agent's hand or some pinchers used as instrument in (50) or the theme's body minus one leg in (48). The present approach can account for all of these cases by a uniform conceptual mechanism of parameter fixing, operating on a compositionally determined, underspecified meaning representation.

What about the instrumental or manner reading that seems to be superimposed over the locative; cf. the discussion of (13) – (15) in section 2? It turns out to be simply a side effect of the conceptual parameter fixing. Note that in the course of abductive reasoning the internal argument of the locative may be identified via factoring with an independently established entity that serves some function within the corresponding eventuality. If this entity is used, e.g., as an instrument this carries over to the locative's internal argument and we obtain an instrumental reading of the locative; cf. e.g. (34). The manner reading basically follows the same pattern.¹¹ Thus, the approach developed here does not have to assume that locative prepositions may occasionally have a defective or in some sense mutated semantic content, but accounts for the peculiar interpretation of internal modifiers by emphasizing precisely this genuinely locative meaning component.

Finally, it is worth mentioning that the analysis of internal modifiers presented here is essentially guided by a modular conception of meaning constitution. On the one hand, there is a sharp distinction between a strictly grammatically determined, contextually invariant meaning skeleton, SF, and its conceptual augmentation in a particular context, CS. This is a crucial tool for revealing the genuinely linguistic aspects of natural language meaning and their interaction with extra-linguistic facets of human cognition. On the other hand, modularity also applies to the conceptual system. The analysis is based on three independent sources of conceptual knowledge: (a) knowledge about spatial relations, viz. the axioms given in (41) and (51), (b) knowledge about eventuality types in terms of participants serving particular functions and (c) knowledge about the part-whole organization of physical objects. That is, the present proposal is able to cope with the peculiarities of internal modifiers without having to postulate idiosyncrasy either in the linguistic system (by assuming additional lexical entries for locative prepositions) or in the conceptual system (by adding special purpose rules for the interpretation of internal modifiers). Rather, the grammar operates on unambiguous lexical representations for locative prepositions and produces a compositional meaning with a clearly shaped request for specification which is satisfied by consulting independently established knowledge of the conceptual system.

¹¹ The exact conditions under which the contribution of a locative is conceptualized as manner information rather than purely locative information remain to be worked out.

5. Conclusion

In this study, I have offered evidence that there are two variants of adverbial modification, which differ with respect to the way in which a modifier is linked to the verb's eventuality argument. External modifiers relate to the full eventuality, whereas internal modifiers relate to some integral part of it. Furthermore, I have shown that the choice between external and internal modification is dependent on the modifier's syntactic base position. External modifiers are base-generated at the VP periphery, whereas internal modifiers are base generated at the V periphery. These findings call for a refinement of the standard Davidsonian approach to adverbial modification. In particular, I have argued that the classical approach must be augmented by the notion of underspecification in order to account properly for the case of internal modification. By way of conclusion, let us see what kind of answers the present study provides to the questions concerning underspecification that were raised in section 1:

1. What are the characteristics of semantically underspecified, internal modification?
2. What triggers underspecification and how is it resolved?
3. How do grammar and pragmatics conspire to produce the relevant interpretations?

As concerns the first question, the discussion of the relevant data has revealed that internal modifiers are underspecified with respect to the located entity. The actual target of an internal modifier cannot be determined on the basis of grammatical knowledge alone but depends on the contextually salient world knowledge. Possible targets are given by the set of entities that are integral parts of the eventuality. That is, not just any entity that is arbitrarily related to the eventuality qualifies as a potential target for an internal modifier but only those entities whose function is crucial for the eventuality to take place. This explains why locatives are particularly well suited to internal modification and why they tend to convey instrumental or manner information: internal locative modifiers supply additional information about implicit spatial constraints that form the backbone of an eventualities functional skeleton.

As concerns the second question, the present study suggests that underspecification is triggered by a particular structural configuration. The kind of semantic indeterminacy that we observed here has no lexical roots. Taken in isolation, neither the locative nor the verb are underspecified in the relevant sense. The characteristic pattern of underspecification only shows up if they are combined via modification. Underspecification is resolved in the course of merging the modifier's meaning contribution with an independently established relation that is part of the conceptual structure of the eventuality. This underlines the parasitic nature of modifiers. Wherever they find a suitable integration site, they attach to it and supply additional and uncalled-for information.

Finally, what about the third question? How do grammar and pragmatics conspire to produce the relevant interpretations? The present study advocates a combined strategy that accommodates linguistic as well as extra-linguistic constraints. In particular, I claim that underspecification is essentially regulated by the grammatical system: the grammar confines underspecification to only those modifiers that attach to an X-environment. Modifiers in an XP-environment (i.e. external modifiers) are not subject to the observed semantic indeterminacy. Therefore, I suggest that adverbial modification is accounted for by a single, elementary semantic operation that is spelled out as underspecified or not according to the modifier's structural environment. This contradicts more liberal analyses according to which underspecification is introduced rather freely by the linguistic system and it is only

pragmatics that tells us which of the potential conceptual specifications is a suitable interpretation.

A key-role in the process of linking linguistic and extra-linguistic knowledge is taken by so-called *SF-parameters*. These are free variables that are installed under well defined conditions at SF and which are required to be instantiated at the level of CS. SF-parameters are a means of triggering and controlling the conceptual enrichment of a grammatically determined meaning representation: they delineate precisely the gaps within the Semantic Form that call for conceptual specification and they impose sortal restrictions on potential conceptual fillers. Thus, SF-parameters can be seen as a kind of interface between grammar and pragmatics. By giving detailed conceptual analyses of some illustrative examples, I hope to have demonstrated that SF-parameters and their conceptual specification via abduction are indeed a useful tool that allows us to gain a deeper understanding of the kind of knowledge that is involved in the determination of the utterance meaning of natural language expressions.

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Genitives, Relational Nouns, and the Argument-Modifier Distinction¹

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Abstract

The argument-modifier distinction is less clear in NPs than in VPs; nouns do not typically take arguments. The clearest cases of arguments in NPs are in certain kinds of nominalizations which retain some “verbal” properties (Grimshaw 1990). The status of apparent arguments of non-deverbal relational nouns like *sister* is more controversial.

Genitive constructions like *John's teacher*, *team of John's* offer a challenging testing ground for the argument-modifier distinction in NPs, both in English and cross-linguistically. On the analyses of Partee (1983/97) and Barker (1995), the DP in a genitive phrase (i.e. *John* in *John's*) is always an argument of *some* relation, but the relation does not always come from the head noun. On those “ambiguity” analyses, some genitives are argument-like and some are modifier-like. Recent proposals by Jensen and Vikner and by Borshev and Partee analyze *all* genitives as argument-like, a conclusion we are no longer sure of.

In this paper we explore a range of possible analyses: argument-only, modifier-only, and ambiguity analyses, and consider the kinds of semantic evidence that suggest that different analyses may be correct for different genitive or possessive constructions in different languages.

1. The argument-modifier distinction in NPs

The argument-modifier distinction is less clear in NPs than in VPs; nouns do not typically take arguments. The clearest cases of arguments in NPs are in some nominalizations (Grimshaw 1990). Non-deverbal relational nouns like *sister*, *mayor*, *enemy*, *picture*, *edge*, *height* in some sense also seem to take arguments. C.L. Baker (1978) proposed a test using English *one* anaphora: *one* substitutes for N-bar, which obligatorily includes all of a noun's arguments. By that test, (1a) *to Oslo* is a modifier, while *of Boston* in (1b) is an argument. But neither this nor any other known test has seemed conclusive, and the question of whether and in what sense “true nouns” take arguments remains controversial.

- (1) a. The train to Oslo takes longer than the one to Stockholm.
b. *The mayor of Boston has more power than the one of Baltimore.

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Genitive² constructions like those in (2a,b) offer an interesting test-bed for the argument-modifier distinction in NPs, in English and Russian and cross-linguistically.

- (2) a. English: *John's teacher, John's chair, friend of John's*
 b. Russian: *Mašin učitel, Mašin stul, drug Maši*
 Maša-POSS-M.SG. teacher, Maša-POSS-M.SG chair, friend Maša-GEN
 Maša's teacher, Maša's chair, Maša's friend

Many, perhaps all, genitives seem to have some properties of arguments and some of modifiers, but some seem more argument-like and some more modifier-like. Recent proposals by Jensen and Vikner (1994), Vikner and Jensen (ms.1999), Partee and Borschev (1998), Borschev and Partee (1999a,b) analyze *all* genitives as argument-like, a conclusion we are no longer sure of for English (see Partee and Borschev, in press a). But while we now doubt that such an analysis is correct for all kinds of genitives in all languages, we believe that it is correct for some kinds of genitives in some languages. It is not easy to settle the question of whether there is a substantive difference between these two “roles” of genitives, and it may well be the case that all or many genitives play both roles at once.

In both English and Russian there are several constructions which may in some (possibly metaphorical) sense express “possession”; and in each language there seem to be several different kinds of meanings for constructions involving the “genitive” (genitive morphology in Russian, the morpheme *'-s* in English). The correlation between constructions and meanings is not transparent.

One central question about genitive constructions, then, is the following: Are all, some, or no genitives arguments of nouns, and if so, which ones (and how can we tell?), and of what kind, and at what ‘level’ of analysis? Are some genitives able to get argument-like interpretations without actually being arguments in any structural sense?

In this paper we examine semantic aspects of the question of whether all genitives can and should be given a unified analysis, or whether we can find a satisfying way of accommodating a two-structures analysis, remaining as neutral as possible throughout on the syntactic aspects of the question.

2. Genitives and related constructions: the challenge

The terminology surrounding “possessives” and “genitives” is confusing, since the correspondences among morphological forms, syntactic positions, grammatical relations, and semantic interpretations are complex and debated, and vary considerably across languages. For clarification, let us distinguish at least the following:³

- (3) a. Possessive pronouns: E. *my, his*; R. *moj* ‘my’, *ego* ‘his’; E. predicative forms *mine, his* and postnominal forms *of mine, of his*.
 b. English “Saxon genitives”: *John's*, and the postnominal Saxon genitive *of John's*.
 c. English PP with *of* + Acc.
 d. Russian postnominal genitive NP: *Mendeleeva* ‘of Mendeleev’, *tigra* ‘of a/the tiger’
 e. Russian prenominal possessive: *Mašin dom* ‘Masha's house’.

² As noted in the next section, there is no perfect term to cover the whole range of “genitive” and “possessive” constructions. We use “genitive” as our neutral cover term, reserving “possessive” for notional possessives.

³ We use English and Russian for illustrative purposes, abbreviated below as E and R.

Some of the problems of the semantics of genitives affect all of these, while some of the problems require making distinctions. Very similar problems arise in corresponding constructions in many other languages, and related problems arise with the English verb *have* and its lexical and constructional counterparts in other languages (Bach 1967, Freeze 1992, Landman and Partee 1984, Szabolcsi 1994, Jensen and Vikner 1996, Partee 1999b). The present work concerns the possible need for a distinction between genitives as modifiers and genitives as arguments, and the role that predicate possessives may play in resolving that issue. We leave out of discussion the most clearly modifier-like genitives that occur in compounds like *a boys' club*, although Munn 1995 has shown that the line between those and other genitives is not as sharp as had been thought.

One starting point is the following data from Partee (1983/97: 464):

- (4) a. John's team
b. A team of John's
c. That team is John's

- (5) a. John's brother
b. A brother of John's
c. (#) That brother is John's

- (6) a. John's favorite movie
b. A favorite movie of John's
c. (#) That favorite movie is John's

Informally, a unified interpretation of genitive phrase "John's" that applies to all of these cases is that the genitive phrase always expresses one argument of a relation, for which we will use the descriptive term "genitive relation", following Jensen & Vikner (1994). But the relation can come from any of three sources: (i) the context, as in (4) ("plays for" "owns", "is a fan of", etc.); this happens when the noun is a plain 1-place predicate; (ii) an inherently relational noun like "brother"; (iii) an inherently relational adjective like *favorite*.

Following Partee (1983/97), we call case (i) the "free *R*" reading, and cases (ii) and (iii) "inherent *R*" readings.

The puzzles include these: can (and should) examples (4a) and (5a) be given a uniform analysis, and if so, how? Or does the genitive construction combine differently with plain and relational nouns, and if so, are these differences predictable from some general principles? Should the first case be split into two distinct cases, one being a default preference of the "genitive" construction itself for a genitive relation in the family of "owns", "possesses", "controls", possibly with a distinct syntactic source from the context-dependent "free *R*" readings? And does the analysis of genitives require that phrasal as well as lexical categories be able to take complements? The examples in (6) show that argument-like genitives cannot always simply be analyzed as complements of a lexical noun, since it is the whole N-bar *favorite movie* that provides the relation of which *John* is an argument⁴.

⁴ We are grateful to Marcel den Dikken for suggesting that one should explore a possible approach on which the genitive in (6) is a complement of the lexical adjective *favorite*, so that genitives, when complements, would always be complements of some lexical item. That could certainly be made to work semantically, as long as the adjective *favorite* is always a function applying to the noun's meaning. As den Dikken notes, "it does complicate the syntax at first blush"; we suspect that a fuller investigation might best be carried out in connection with a study of the interaction of genitives with superlative and superlative-like constructions as in *John's best picture*, *John's first picture*.

The Russian “genitive modifier” (GM) construction exemplified in (7) presents similar challenges, showing a similarly diverse range of “genitive relations”, with a similar range of relational and non-relational nouns, although there are interesting differences between English and Russian to account for as well.

- (7) a. *ljubitel' košek*
lover-NOM.SG cat-GEN.PL
'lover of cats, cat-lover'
- b. *rost čeloveka*
height-NOM.SG man-GEN.SG
'height of the/a man'
- c. *nožka stola*
leg-NOM.SG table-GEN.SG
'leg of the table, table leg'
- d. *krug syra*
circle-NOM.SG cheese-GEN.SG
'circle (wheel) of cheese'
- e. *stakan moloka*
glass-NOM.SG milk-GEN.SG
'glass of milk'
- f. *portret Peti*
portrait-NOM.SG Petja-GEN
'picture of Petja'
- g. *sled tigra*
track-NOM.SG tiger-GEN.SG
'track of the/a tiger'
- h. *sobaka dočeri*
dog-NOM.SG daughter-GEN.SG
'the daughter's dog'
- i. *nebo Andreja Bolkonskogo*
sky-NOM.SG Andrej-GEN Bolkonsky-GEN
'Andrej Bolkonsky's sky'

In the case of Russian, the question of whether the examples in (7) are all instances of a single construction is even more difficult than in the case of English, since the uses of the Russian genitive NP cover uses analogous to both the English Saxon genitive in (4-6) and English PPs with *of* + Acc.

At a descriptive level, virtually all authors who have grappled with the semantics of genitive constructions are in agreement that in some cases the genitive NP seems argument-like and in other cases it seems modifier-like. The “argument” nature of at least some genitives is clearest in the case of some deverbal nouns, those called “Complex Event Nominals” by Grimshaw (1990) and Schoorlemmer (1995), “Derived Nominals” by Babby (1997), and “process nominals” by Rappaport (1998).

To be slightly more precise about our relatively neutral assumed syntax for the first of these constructions, and for the Russian postnominal genitive construction, we represent the syntactic structure as in (8) below, a linearized form of the schematic phrase structure tree of Borschev and Partee (1999b):

- (8) $[_N \ N \ NP_{\text{GEN}}]$, where N is a cover term for N^0 and non-maximal N-bar (Montague 1973's CN and CNP), and NP is a cover term for both N^{MAX} and DP.

The semantic question is: do the genitive constructions $[N \ N \ NP_{\text{GEN}}]$ have a uniform compositional interpretation?

3. Uniform approaches and ‘splitting’ approaches

As we will illustrate in Section 4, given the possibilities that have been raised by work on type-shifting in the past decade or so, it seems that the semantics of any simple “NP’s N” or “N NP_{GEN}” construction *could* be given either an analysis in which the genitive NP is an argument or one in which it is a modifier. In this paper we are not trying to settle all the relevant arguments for even one such construction, but rather to explore the available alternatives from a semantic point of view. A full analysis of any genitive construction in any language requires greater syntactic specificity than we are providing here, as well as a theory of the interaction among lexical, structural, and contextual factors, and relevant evidence may be of many kinds, including binding and extraction facts, behavior in coordinate constructions, iterability, word order constraints, quantificational properties, and other properties. There are many proposals for many such constructions in many languages in the literature by now, in a variety of theoretical frameworks, and we are not prepared to enter the sometimes crucial syntactic debates that are involved in some of the competing analyses. But with little more than the minimal syntactic assumptions noted above, we can address some of the central issues of semantics and compositionality.

For concreteness, let us discuss approaches to the semantics of the English genitive construction illustrated by the phrase *book of John’s*⁵.

There are in principle three possibilities, a splitting approach and two kinds of uniform approaches.

(i) One possibility is to split the construction into two different genitive constructions, treating “inherent *R*” genitives (*brother of John’s*) as type-raised arguments and “free *R*” genitives (*team of John’s*) as (intersective) modifiers (Partee 1983/97, Barker 1995). This approach starts from the intuition that some genitives are arguments and some are modifiers. We illustrate it in Section 4 below. If no uniform approach can be made to work (for a given genitive construction in a given language), a splitting approach may be necessary. One of our main points here will be, however, that raw intuitions of ambiguity or of ‘argumenthood vs. modifierhood’ are not real evidence⁶. Most linguists would tend to prefer a uniform analysis if it can be made to work, but as Dowty (1997; 2000) argues, that is not an uncontroversial attitude. In the subsequent sections of this paper, we explore empirical arguments for and against the ambiguity of various genitive constructions.

(ii) One possibility of a uniform approach is to assimilate all cases to the “inherent *R*” reading, treating all genitives as arguments, or as type-lifted arguments. This option was introduced by Jensen and Vikner (1994), and further explored in Partee and Borschev (1998), Borschev and Partee (1999a,b), and Vikner and Jensen (ms. 1999). We describe this approach

⁵ There is already a problem in using this construction for illustration, since a number of authors, including Barker (1995), have argued that the English postposed genitive is a reduced partitive, *book of John’s books*, and that there is therefore no simple construction of the form $[N \ N \ NP_{\text{GEN}}]$ in English. The reason we are not using the construction *John’s book* for our ‘basic’ case is that the preposed genitive in English seems to combine the “basic” genitive with an implicit definite article. We are assuming here that the postposed genitive is a basic construction in English (see also Lyons 1986), but the general points we make would also hold for the preposed genitive “minus the meaning of the definite article”. Thanks to Michael Brody (p.c.) for noting that one should of course explore the “underlying position” of the preposed genitive, which may move into a determiner position from somewhere else, at least in theories with syntactic movement.

⁶ This point is made more systematically for a wide range of constructions in Dowty (2000).

in Section 4 below, and show some empirical advantages of this approach over a splitting approach. In Section 5 we review arguments from Partee and Borshev (in press a) to the effect that in spite of these attractions, this uniform approach seems not to be correct for all genitive constructions in all languages, although it may well be correct for some. These conclusions open up interesting typological questions and invite the task of finding more kinds of evidence for ‘true arguments’ of nouns.

(iii) Another possibility of a uniform approach is to assimilate all cases to the “free R ” reading. A variant of that option was proposed by Hellan (1980). Partee (1983/97) argued against it on the basis of the contrast among the (c) examples in (4-6), but we will return to it in Section 6. On this kind of analysis, all genitives are basically modifiers. Within approaches to modifier genitives, recent work by Kolliakou (1999) shows the need for a further distinction between genitives as predicates of type $\langle e,t \rangle$, i.e. as intersective modifiers, and genitives as possibly non-intersective intensional modifiers of type $\langle \langle e,t \rangle, \langle e,t \rangle \rangle$. As we will discuss in Section 6, some of the principal challenges to treating all genitives as modifiers include the obligatoriness or near-obligatoriness of a genitive “complement” with some relational nouns, and the apparent systematicity of argument-inheritance with some kinds of deverbal nouns. For the treatment of genitives as intersective modifiers, another problem is the apparent impossibility of some genitives in predicate position, as illustrated in the contrasts in (4-6) above.

4. Two theories of genitives

Partee (1983/97) proposed two distinct genitive constructions with relational and non-relational nouns, the latter incorporating a “free relation variable R ” whose value must be supplied by context. On the other hand, (a modified version of) Jensen and Vikner (1994) offers a uniform interpretation of the genitive, with coerced type-shifting of the N-bar to a relational reading when necessary. The investigation of the differences between these two approaches, in part through an ongoing dialogue which Borshev and Partee have been carrying on with Jensen and Vikner over the past two years, has led us to an appreciation that the problem of the semantics of the genitive construction(s) is a much richer domain of inquiry than we had originally imagined, and to convergence on some issues and new questions on others.

A note about notation: in what follows we use CN for a (“plain”) N-bar of type $\langle e,t \rangle$ (one-place predicate, with only a “referential” θ -role (Williams 1981; the R role of Babby 1997)), and TCN for a (“transitive” or “relational”) N-bar of type $\langle e, \langle e,t \rangle \rangle$ like *father*, *favorite movie*.

The analysis of Partee (1983/97) posits an ambiguity in the construction, with the N-bar supplying the relation if it is relational, and with the construction supplying a “free relation variable” if the N-bar is not relational. We illustrate the postnominal genitive, as in (4b), (5b), (6b), which Partee (1983/97) analyzed as a modifier, treating the prenominal genitive in (4a), (5a), (6a) as a composition of the postnominal genitive with an implicit definite determiner.

Postnominal genitive (of John’s): *combines with CN or TCN to make a CN.*

When a genitive NP combines with a plain CN, type $\langle e,t \rangle$: the construction provides a “free R ”, a variable of type $\langle e, \langle e,t \rangle \rangle$ which we write as R_i .⁷

⁷ As with the use of free variables like x_i to represent pronouns used without linguistic antecedent, we assume as a felicity condition on the use of free R_i that the context should make it sufficiently clear to the hearer what particular relation the speaker has in mind.

- (9) *of John's*: $\lambda P\lambda x[P(x) \ \& \ R_i(\text{John})(x)]$
team of John's: $\lambda x[\text{team}(x) \ \& \ R_i(\text{John})(x)]$

When a genitive NP combines with a TCN, type $\langle e, \langle e, t \rangle \rangle$, the TCN provides its “inherent *R*”.

- (10) *of John's*: $\lambda R[\lambda x[R(\text{John})(x)]]$ or equivalently, $\lambda R[R(\text{John})]$
teacher of John's: $\lambda x[\text{teacher}(\text{John})(x)]$

Jensen and Vikner (1994) propose that an analysis which incorporates coerced type-shifting in the sense of Partee (1987) should be able to do without two separate rules for the genitive. They present an alternative analysis, building on the framework of Pustejovsky (1993, 1995): the genitive must always combine with a relational common noun (phrase), coercing a one-place predicate noun to a two-place relational meaning (“team” to an appropriate sense of “team-of”). Their analysis corresponds to the “inherent *R*” case of Partee (1983/97), and with a relational noun like *teacher* the two analyses agree. The difference arises with a plain one-place CN like *chair* or *team*, which on their analysis is coerced to a TCN interpretation. Jensen and Vikner follow Pustejovsky in appealing to the *qualia structure* of the lexical entry to guide the coercion, so that for instance the *telic* role of *chair* (“chairs are to sit in”) licenses the shift of CN *chair* to TCN *chair* illustrated below.

- (11) CN *chair*: $\lambda x[\text{chair}(x)]$
 TCN *chair*: $\lambda y\lambda x[\text{chair}(x) \ \& \ \text{sits-in}(x)(y)]$

Initially we had some important differences with Jensen and Vikner concerning the degree to which lexical meaning drives coercion. In Vikner and Jensen (ms. 1999) and Partee and Borschev (1998), there is agreement that on the most general version of their approach, the genitive construction should always demand a TCN to combine with, and if it finds instead a CN it will coerce it by whatever means are available and “natural”, sometimes lexical, sometimes pragmatic. (We make a less sharp distinction between lexically and contextually supplied shifted meanings than Jensen and Vikner do, because of the outlook on the integration of information from lexical and other sources described in Partee and Borschev 1998, Borschev and Partee 1998.) A “pragmatic” coercion is seen as shifting the noun to a relational reading that incorporates the “free relation variable” of Partee (1983/97) into the shifted noun meaning.

- (12) TCN *team*: $\lambda y\lambda x[\text{team}(x) \ \& \ R_i(x)(y)]$

As in Partee’s analysis, a felicitous use of an expression with a free variable requires that the context make a particular choice of value for the variable salient. Partee and Borschev (1998, in press b), Borschev and Partee (1999a) propose extensions to Jensen and Vikner’s coercion approach to cover also the “contextual” cases, and point to a need for more fine-grained coercion principles to cover phenomena involving the relational adjective *favorite* and the difference in “most likely relation” in the interpretation of examples like *John’s movie* and *John’s favorite movie*.

One main difference between the two approaches is then in *where* a “free relation variable” is added in a case where context is driving a pragmatically based coercion. Let’s suppose that *team of Mary’s* is such a case.

(13) **Jensen and Vikner:**

<i>of Mary's</i> :	$\lambda R[\lambda x[R(\text{Mary})(x)]]$
(shifted) <i>team</i> :	$\lambda y[\lambda x[\text{team}(x) \ \& \ R_i(y)(x)]]$
<i>team of Mary's</i> :	$\lambda x[\text{team}(x) \ \& \ R_i(\text{Mary})(x)]]$

(14) **Partee (1983):**

<i>of Mary's</i> :	$\lambda P\lambda x[P(x) \ \& \ R_i(\text{Mary})(x)]$
(non-shifted) <i>team</i> :	team
<i>team of Mary's</i> :	$\lambda x[\text{team}(x) \ \& \ R_i(\text{Mary})(x)]]$

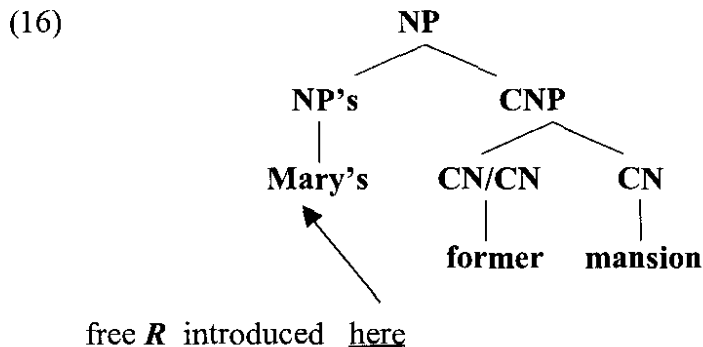
The final result is the same; but for Jensen and Vikner the free relation variable comes in as part of the meaning of the shifted noun, while for Partee (1983/97) it comes in as part of the meaning of the genitive construction itself. Does this difference in “where” the free relation variable is situated ever make a detectable difference? Yes.

Partee and Borschev (1998) give an empirical argument in favor of Jensen and Vikner’s approach, based on an analysis of the example *Mary’s former mansion*, suggested to us by Norvin Richards (p.c.). The argument rests on four assumptions, as spelled out in (15) below.

(15) Assumptions:

- (i) *mansion* is lexically a 1-place noun.
- (ii) *former* is an endocentric modifier, lexically a CN/CN, shiftable to a TCN/TCN.
former as CN/CN: *former monastery, former dancer.*
former as TCN/TCN: *former owner, former friend.*
- (iii) The “free relation” variable in this case has as one of its most salient values something like “owns” or “lives in”.
- (iv) *Mary’s former mansion* has two readings: “Reading A”: a former mansion (perhaps now just a ruin) that is (now) Mary’s. I.e., now Mary’s, formerly a mansion; and “Reading B”: something that was formerly Mary’s mansion; it may still be a mansion, but it’s no longer Mary’s.

On the Partee (1983/97) account, there is no motivation for any type-shifting to occur, and the “free relation” “owns” will be introduced with the genitive *Mary’s*, after *former* has combined with *mansion*. This means that the free relation (“owns”) in the interpretation of the genitive *Mary’s* will never be under the scope of *former*. As a result, Partee (1983/97) can derive Reading A above, but not Reading B. Tree (16) shows the compositional structure of *Mary’s former mansion* on the account of Partee (1983/97).



But Jensen and Vikner’s account, with coercion of CN to TCN, *does* provide derivations for both readings, which Partee’s account cannot. For Jensen and Vikner, *Mary’s* coerces *former*

mansion to a relational TCN. Given our assumptions, there are two ways that *former mansion* could shift to a TCN.

(i) Initially leave *mansion* as a CN, treat *former* as CN/CN, combine them to form a CN, as on Partee account; then shift that CN to a TCN, bringing in the free variable at that stage to get the shifted meaning of *former mansion* shown below in (17):

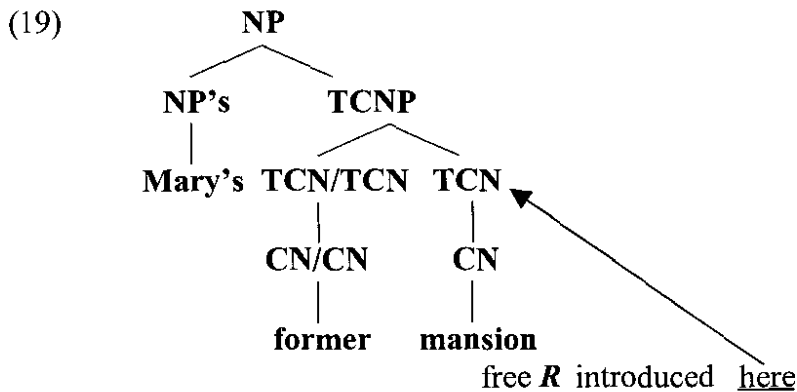
$$(17) \lambda y[\lambda x[\text{former}(\text{mansion})(x) \ \& \ R_i(y)(x)]] \ [R_i: \text{“is owned by”}]$$

This corresponds to Reading A above, with the free *R* introduced at the point where the CNP shifts to become a TCNP. The compositional structure would be almost identical to that in tree (16), differing only in “where” the free *R* is introduced.

(ii) Or shift *mansion* to a TCN, and *former* to a TCN/TCN, combine them to form a TCN as shown below in (18):

$$(18) \lambda y[\lambda x[\text{former}(\text{mansion-of})(x)(y)]] \ , \ \text{where } \text{mansion-of} \text{ is an abbreviation for } \lambda y[\lambda x[\text{mansion}(x) \ \& \ R_i(y)(x)]]$$

This corresponds to Reading B above, with compositional structure as in (19) below.



We assume that both of these ways of coercing the phrase *former mansion* are structurally available; different choices of lexical items or different contexts may favor one over the other, but since both are consistent with all the principles that we are aware of, the Jensen and Vikner approach successfully predicts the ambiguity and therefore has a clear empirical advantage over the Partee (1983/97) approach⁸.

5. Problems for the “argument-only” unified approach

In spite of the theoretical appeal of the “one genitive” approach and its ability to solve the problem of *Mary’s former mansion*, we are still not convinced that it is correct for English. Interestingly, the arguments against a uniform analysis for English genitives do not apply to Russian genitives. Russian seems to show a clearer split between a genitive construction which does indeed seem to be uniformly argumental and a prenominal possessive which is more modifier-like.

One of our main worries, discussed in Partee and Borschev (in press a), concerns predicate genitives, and our earlier observation that predicate genitives seem to favor “free *R*”

⁸ An alternative analysis of the ambiguity, based on different assumptions which we do not share, has since been offered by Larson and Cho (1999). As noted by Marcel Den Dikken (p.c.), one non-standard assumption we are making is that phrasal categories (like TCNP) can take argument; this is a standard assumption in categorial grammar but not in most other frameworks.

interpretations, together with the fact that predicate genitives are not in a structural argument position unless one posits an empty head noun accompanying all predicate genitives.

As we examine predicate genitives and contrast them with the better candidates for ‘argument genitives’, it will emerge that the semantics of the most clearly predicate genitives seems to center on the notion of possession; so the key distinction may not after all be “free *R*” vs. “inherent *R*”, but rather a distinction between “possessive” modifiers and genitive arguments. We address this issue further in Sections 6 and 7.

5.1. Predicate genitives: a problem for the “one genitive” approach?

If some genitives can occur as basic $\langle e, t \rangle$ predicates, that would suggest that when those same genitives occur inside the NP, they are basically modifiers, and not arguments, returning us to the distinction posited in the earlier Partee (1983/1997) approach.

If there are no genitives that demand a treatment as basic type $\langle e, t \rangle$ predicates, that would be an argument in favor of treating all ‘modifier genitives’ occurring inside an NP within the “one genitive” approach of Jensen and Vikner.

But if we find in some languages that there are systematic differences in form and/or interpretation between certain genitives that occur only NP-internally and others that occur both predicatively and NP-internally, that would present a serious challenge to the “one genitive” approach, at least for those languages.

But the issue is empirically complex for at least two reasons:

- (i) there may be independent reasons (syntactic or morphological) why some kinds of genitives (e.g. Russian genitives) cannot occur as predicates;
- (ii) and some predicate genitives may be elliptical full NPs; it is not always easy to tell. Much of what follows is concerned with this problem.

In the following sections, we look at evidence about predicate genitives in English, Russian, German, and Polish. The evidence supports the idea of two semantically different kinds of genitives, with some forms, such as English Saxon genitives, used for both.

One kind are argument genitives, which fit the Jensen and Vikner analysis; these occur in construction with a relationally interpreted noun (or with an adjective like *favorite* plus a noun). Argument genitives do not occur in type $\langle e, t \rangle$, so when they occur alone, they are interpreted as elliptical NPs with a relational noun implicitly understood. The Russian genitive appears to be of this type, and we consider the Jensen and Vikner analysis correct for the Russian genitive construction.

The other kind are true predicative genitives, basically of type $\langle e, t \rangle$, interpreted approximately as in the corresponding analysis of Partee (1983/97), but with the “free *R*” preferentially interpreted as some kind of “possession” or “control”. To represent the way this distinction differs from the original distinction of Partee (1983/97), we will stop referring to the “free *R*” and refer instead to *R*_{POSS}. When this kind of genitive occurs inside an NP, it is a modifier rather than an argument. We believe that the Russian pronominal genitive forms discussed in Section 5.1.2 are of this type.

Since the English Saxon genitives, as well as genitive pronouns in all four of the languages looked at here, have both uses, we conclude that the “one genitive” approach cannot be correct for those constructions.

But we are left with a puzzle concerning the large proportion of cases which could seemingly be analyzed either way: are they all “ambiguous”? We will return to this puzzle, which remains open, in Section 7.

5.1.1. Predicate genitives in English

The nature of predicate genitives is less clear in English than in some other languages. It is difficult to be sure whether an apparent predicate genitive like *John’s* in (4c), repeated below,

is a simple one-place predicate with an *R*_{POSS} or “possession” reading, or is an ‘argument genitive’ occurring as part of an elliptical NP, i.e. with *John’s* implicitly in construction with another occurrence of *team*.

(4c) That team is John’s.

But:

- (20) a. *That father is John’s.
 b. *That favorite movie is John’s.
 c. That teacher is John’s.
 d. His [pointing] father is also John’s.
 e. Dad’s favorite movie is also mine.
 f. *That father is John’s father.

The good examples in (20), namely (20c,d,e), all have predicate genitives that may be interpreted as elliptical NPs⁹: *John’s teacher*, *John’s father*, *my favorite movie*. The bad examples (20a,b,f) all have intrinsically relational head nouns (or common noun phrase in the case of 20b) that have to be interpreted non-relationally in the subject but relationally in the predicate, assuming that (20a,b) have elliptical predicate genitives. The head noun in the subject in examples (20a,b,f) must shift to a non-relational reading in order to be compatible with the demonstrative determiner *that*.

It may be that there is a restriction (perhaps a processing restriction) on shifting an expression “away from” its basic meaning and then “back again” (The “bad” sentences are probably indeed not ‘ungrammatical’, but are nearly impossible with respect to the intended readings ‘John’s father’, etc..) In the good examples (20d,e) we have the relational readings of the head noun (phrases) in both the subject and the (elliptical) predicate.

The relevant difference between the good (20c) and the bad (20a) may be that unlike *father*, *teacher* is lexically supplied with equally salient and closely related relational and non-relational readings, so that one wouldn’t have to ‘suppress’ the relational reading by shifting in order to interpret *teacher* in the subject NP non-relationally.

The data above, reinforced by the Dutch data mentioned in footnote 9, strongly suggest that predicate genitives may sometimes be “elliptical” NPs or “Determiner-only” NPs. And if all bare genitives in all languages could be interpreted as elliptical NPs, then predicate genitives would not pose a problem for the “one-genitive” analysis; the difference between genitive or genitive forms that can and that cannot occur “bare” as predicates would simply reflect constraints on NP ellipsis.

⁹ We thank Ash Asudeh (p.c.) for example (20c), and Ekaterina Rakhilina and Elena Paducheva for examples (20d,e). We are also grateful to Per Anker Jensen for similar examples, and to all of them for helpful discussion of the possible differences between the good and bad examples.

We thank M. den Dikken for pointing out that in Dutch, the predicate possessive in example (20c) is even more clearly an elliptical NP than in English, and that Dutch furthermore is a language which clearly distinguishes elliptical from non-elliptical predicate possessives. In Dutch, in the rendition of (20c), the d-word *die*, signalling the presence of nominal structure, is obligatory, as shown in (i).

(i) *Die docent is *(die) van Jan.*
 That teacher is *(that) of Jan
 ‘That teacher is Jan’s.’

By contrast, in (ii) both options are possible.

(ii) *Die auto is (die) van Jan.*
 That car is (that) of Jan
 ‘That car is Jan’s.’

But we believe that not all predicate genitives are elliptical.

We do not have conclusive arguments for English; there are several complicating factors, including problems in the analysis of copular sentences (Williams (1983), Partee (1986), Moro (1997), Heycock and Kroch (1998,1999), Partee (1999a).) So rather than try to support our intuitions about the English examples, we turn to some languages where we have found some syntactic and/or morphological distinctions that provide evidence for a distinction between modifier genitives and argument genitives¹⁰.

5.1.2. Russian prenominal genitives vs. genitives

In Russian, genitive pronouns and the normally prenominal quasi-adjectival possessive forms can occur in predicate position but genitive NPs cannot¹¹. This suggests that Russian genitive NPs may always be argument-like, and that the Jensen & Vikner uniform analysis with coercion of CNs to TCNs (extended to Russian in Borschev and Partee 1999a,b) is correct for the Russian genitive construction. It also suggests that the Russian prenominal possessive forms, and possessive pronouns (see 5.1.4), are at least sometimes modifier-like.

The Russian prenominal possessive construction studied by Koptjevskaja-Tamm and Šmelev (1994) and by Babyonyshev (1997) is illustrated in (21) and the genitive construction in (22).

- (21) a. *Petin* *stul*
 Petja-POSS-M.SG. chair-M.SG.
 ‘Petja’s chair.’
- b. *Mamin* *portret*
 Mama-POSS-M.SG. portrait-M.SG.
 ‘Mama’s portrait.’
- (22) a. *stul* *Peti*
 chair-M.SG. Petja-GEN.SG.
 ‘Petja’s chair.’
- b. *portret* *mamy*
 portrait-M.SG. Mama-GEN.SG.
 ‘Mama’s portrait.’

In these examples, both constructions can be used in describing the same range of cases; the possible relations of Petja to the chair or of Mama to the portrait are as various as with the English prenominal genitive. But the meanings do not “feel” identical. In the possessive construction in (21), we would like to claim (as did Schoorlemmer 1995) that the possessive *Petin*, *mamin* acts as a modifier of the head noun. We believe that the prototypical interpretation of the possessive modifier is indeed ‘possession’ (of the object denoted by the head noun, by the (animate) entity denoted by the noun in the possessive form.) To maintain such a claim, it seems that ‘possession’ must be understood in a broadly extended sense to apply to a diverse range of relations; see Heine (1997). Thus in example (21b), possession may be possession proper, ‘authorship’, or the relation of ‘being portrayed’. But the possibility of expanding the sense of ‘possession’ is evidently not unlimited. Thus ‘murderer of Petja’ can be expressed in Russian by (23a) but not by (23b).

¹⁰ The material in this section of the paper is drawn in large part from Partee and Borschev (in press a).

¹¹ Caveats must be put on the statement that genitive NPs cannot occur in predicate position in Russian; but the conditions under which they can occur are relatively special.

- (23) a. *ubijca* *Peti*
 murderer-M.SG. Petja-GEN.SG.
 ‘Petja’s murderer’ (murderer of Petja)
- b. *Petin* *ubijca*
 Petja-POSS-M.SG. murderer-M.SG.
 # ‘Petja’s murderer’ [ok only as e.g. ‘a murderer Petja has hired’]

In the genitive construction in (22a), we analyze *Peti* as an argument of the relation which connects it to *stul*. In the given case, the most salient relation could alternatively be seen as some kind of possession as well; but ‘possession proper’ is not the prototypical interpretation for the genitive construction. The range of possible relations expressed with a genitive is extremely broad (cf. Knorina 1985, 1988, 1990, 1996, Borschev and Knorina 1990, Partee and Borschev 1998, Borschev and Partee 1999a,b).

While this data is not completely conclusive, it supports the hypothesis that the Russian genitive construction is correctly analyzed as uniformly argumental, i.e. that Jensen and Vikner’s approach to English genitives is correct instead for Russian genitives. And we believe that the Russian prenominal “adjectival” possessives are basically modifiers, with the “free” *RPOSS* as the core of their meanings (see the analysis in (33) below). But the high overlap in possible interpretation of the two constructions, as illustrated in (21) and (22), is a puzzle.

5.1.3. German possessive pronouns

Tony Kroch (p.c.) suggested looking for languages that would give evidence from agreement behavior as to whether predicate genitives are more like simple (adjectival) predicates or more like full NPs. Sten Vikner (p.c.) observed that German is a language that gives some evidence: Predicate adjectives in German do not agree with subjects, but predicate possessives do, suggesting that predicate possessives are indeed more like elliptical NPs than like simple <e,t> predicates¹².

- (24) *Diese Bücher sind alt/ *alte.*
 These-N.PL books- N.PL are old/ *old- PL

- (25) *Diese Bücher sind meine/ *?mein.*
 These-N.PL books are mine- PL/ *mine

This would suggest that the “one genitive” approach may be correct for German, if all apparent predicate possessives give morphological evidence of being elliptical NPs.

But it was further observed by Hans Kamp (p.c.) and others that actually, the non-agreeing form can sometimes be used. It is used only in “standard” German, not in colloquial German, and it has an “archaic” flavor. Most interestingly, it seems that there are semantic differences between the agreeing and the non-agreeing predicate possessive, and if these data stand up, it is extremely interesting.

¹² Further evidence that these predicate possessives are elliptical NPs was provided by Sigrid Beck and Irene Heim (p.c.): the possessive pronoun in (25) can be followed by adjectives (i.e. there can be ellipsis of just the head noun), while the adjective in (24) and the adjective-like possessive pronoun in (26b) cannot be. Thanks to Claudia Maienborn for correcting the mistakes in our earlier rendition of these examples.

- (i) *Diese Bücher sind meine alten.*
 These-n.pl. book-n.pl are my-n.pl. old-n.pl.
 ‘These books are my old ones.’
- (ii) * *Diese Bücher sind teuer neu(en).*
 These-n.pl. book-n.pl. are expensive new
 ‘These books are expensive new ones.’

- (26) a. *Diese Bücher sind meine*: can be any relation.
 These- N.PL books- N.PL are mine- PL
 b. *Diese Bücher sind mein*: (archaic) “Possession” only.
 These- N.PL books- N.PL are mine (no agreement)

Further examples are given in (27) and (28). A newly naturalized citizen might say (27a), but (27b) suggests a conqueror is speaking. Any relation is possible in (28a), with the most likely possibility being the parent-child, but (28b) suggests a custody fight, i.e. a dispute about who is to be in ‘possession’ of the children.

- (27) a. *Das Land ist (jetzt) meins*.
 The-N.SG land-N.SG is (now) mine-N.SG
 b. *Das Land ist jetzt mein*.
 The-N.SG land- N.SG is now mine

- (28) a. *Die Kinder sind meine*.
 The children are mine-PL
 b. *Die Kinder sind mein*.
 The children are mine.

In all of (26b), (27b), (28b), the form which shows absence of agreement in the way a predicate adjective would be limited in its interpretation to “possession”. In other words, the form in which the possessive pronoun appears to be a simple predicate of type <e,t> is interpreted in terms of a relation that appears to be associated with the genitive construction itself rather than with the semantics of any governing noun.

In contrast, the forms which appear to be elliptical NPs have a range of interpretations including possession but also including relations typical of ‘argument’ genitives, where the relevant relation is determined principally by the noun to which the genitive supplies an argument. Typical choices for the ‘genitive relation’ for the ‘argument’ genitive interpretations in (26a), (27a), (28a) might be authorship, citizenship, and the parent-child relation, respectively.

Of course “possession” itself can have metaphorical extensions, so the “possession” cases do not always have to be about ownership in a literal sense. But if these distinctions are correct, this is important evidence for the idea of two distinct genitives.

5.1.4. Russian and Polish possessive pronouns

In Russian, in the past tense, predicate nominals may be in the Instrumental case, particularly when indicating temporary relations. Babby (1973), Siegel (1976) and others have used case and other agreement behavior to argue that some predicative adjectives are elliptical NPs and others are simple APs. The following data may provide a basis for distinguishing among predicate possessive pronouns that are and are not elliptical NPs.

- (29) a. *Éta strana byla kogda-to moej*
 That-F.NOM.SG country-F.NOM.SG was-F.SG once my-F.INSTR.SG
 ‘That country was once mine’ [‘possession’ or citizenship]
 b. *Éta strana byla kogda-to moej stranoj*
 That-F.NOM.SG country-F.NOM.SG was-F.SG once my-F.INSTR.SG country-F.INSTR.SG
 ‘That country was once my country’ [‘possession’ or citizenship]

- (30) a. *Éta strana byla kogda-to moja*
 That-F.NOM.SG country-F.NOM.SG was-F.SG once my-F.NOM.SG
 ‘That country was once mine’ [‘possession’ only]
- b. **Éta strana byla kogda-to moja strana*
 That-F.NOM.SG country-F.NOM.SG was-F.SG once my-F.NOM.SG country-F.NOM.SG
 ‘That country was once my country’

A full predicate nominal is impossible in the nominative in the context of (30b), and in the same context, a nominative predicate possessive pronoun can be interpreted only as a possessive, not as an ‘argument’ genitive (even with a seemingly ‘free’ relation.) Thus the predicate possessive in (30a) cannot reasonably be analyzed as an elliptical NP, but must be a simple <e,t> predicate, and it is this occurrence of the predicate possessive that unambiguously denotes “possession”. These data are similar to the German data, supporting the idea that there is a ‘possessive’ predicate of type <e,t> instantiated at least by some possessive pronouns in German and Russian and possibly also by some predicative “NP’s” forms in English, distinct from other cases of predicate possessives which are elliptical full NPs and in which the possessive may be an argument of an implicit relational noun.

Wayles Browne (p.c.) suggested that we should get data on Polish, because in Polish NP - be - NP requires Instrumental on the predicate NP, whereas in Russian the predicate NP may or may not be Instrumental. And in Polish NP - be - Adj requires Nominative on the Adjective, whereas in Russian the predicate AP may be 1) short-form Adjective, 2) long-form Nominative Adjective, or 3) long-form Instrumental Adjective.

The corresponding Polish data are as follows¹³.

- (31) a. *Ten kraj był kiedys' moim.*
 That-M.NOM.SG country-M.NOM.SG was-M.SG once my-M.INSTR.SG
 ‘That country was once mine’ [‘possession’ or citizenship]
- b. *Ten kraj był kiedys' moim krajem.*
 That-m.nom.sg country-m.nom.sg was-m.sg once my-m.instr.sg country-m.instr.sg
 ‘That country was once mine’ [‘possession’ or citizenship; citizenship preferred.]
- (32) a. *Ten kraj był kiedys' mo'j.*
 That-M.NOM.SG country-M.NOM.SG was-M.SG once my-M.NOM.SG
 ‘That country was once mine’ [‘possession’ only]
- b. **Ten kraj był kiedys' mo'j kraj.*
 That-M.NOM.SG country-M.NOM.SG was-M.SG once my-M.NOM.SG country-M.SG
 ‘That country was once my country’ [ungrammatical]
- c. *Ten kraj to był kiedys' mo'j kraj.*
 That-M.NOM.SG country-M.NOM.SG PRT was-M.SG once my-M.NOM.SG country-M.SG
 ‘That country was once my country’ [‘possession’ or citizenship]

The Polish data confirm the hypothesis that when a predicate possessive pronoun allows an “argumental” reading, it is the remnant of an elliptical NP, and when it doesn’t, it isn’t. The

¹³ Thanks to Ania Łubowicz and Anita Nowak for judgments. For (31a), Anita reports no preference for one reading or the other, while for (31b) she reports a preference for the ‘citizenship’ reading. Both rejected (32b) as ungrammatical; Ania suggested that it should be corrected to (32c), which she finds possibly ambiguous. Both agreed that (32a) is unambiguously “possession” only, whereas (31a) allows either reading. The basic judgments given above in the text for (31a,b) and (32a,b) were further confirmed by Janusz Bien, Bożena Cetnarowska (and by a substantial majority of a group of 12 students of hers), Bożena Rozwadowska, Piotr Banski, and Joanna Błaszczak, to all of whom we are grateful.

“possession” reading, which seems to be emerging as the clearest case of a non-argumental, or modifier, reading, can show up either in a remnant of an NP or as a bare $\langle e,t \rangle$ predicate. This reinforces the idea that a genitive inside an NP can be either an argument or a modifier. But a genitive which is an $\langle e,t \rangle$ predicate in a predicational construction cannot be an argument, presumably because it is not in construction with a head of which it could be the argument.

5.1.5. Conclusions about predicate genitives

So we are now inclined to believe that some predicate genitives really are plain $\langle e,t \rangle$ predicates, and that those have just a possession/control reading, which we take to be the semantics of the $\langle e,t \rangle$ genitive, as shown in (33) below. And other predicate genitives may be elliptical NPs, and their interpretation may have the full range of possibilities that would be displayed by a full NP with a prenominal genitive occurring in such a position. (Note that a full NP may itself have meanings of types e , $\langle e,t \rangle$, or $\langle \langle e,t \rangle, t \rangle$, depending on both its internal makeup and the position in which it occurs, so the study of the full range of meanings of bare genitives as elliptical NPs needs more study.)

(33) [*John's*]_{PRED}: $\lambda x[\mathbf{R}_{POSS}(\mathbf{John})(x)]$ type: $\langle e,t \rangle$

This conclusion supports the idea that in the case of argument genitives, the genitive relation comes principally from the relational noun, whereas in the case of the modifier genitive, whose prototypical interpretation is possession, the genitive relation comes from the genitive construction itself. The cases analyzed as “free \mathbf{R} ” in Partee 1983/1997 therefore should be split into two kinds. One kind should be assimilated to the \mathbf{R}_{POSS} of the “possessive” genitive, and the other treated as in Vikner and Jensen (ms. 1999) and Borschev and Partee (1999a,b), as incorporated into a coerced relational reading of the head noun.

5.2 Other problems for the unified argument-only approach

A second and related worry concerns acquisition. Children may acquire some kinds of genitives before they show clear mastery of relational nouns.

Mine! is one of the early expressions small children learn. And then it seems to mean “control” or possession, compatible with an $\langle e,t \rangle$ reading, although we don't know how one could completely rule out the possibility that it is elliptical for something like *My (mine) blanket!* (i) We believe that this usage antedates any evidence of children's understanding of relational nouns like *daddy*, *brother* as relational. (ii) We are not sure whether genitive NPs like *Bobby's* occur at this early stage; M. Tomasello (p.c.) suggests that it is only personal pronouns that are seen in early predicative uses.

If it is indeed the case that children acquire ‘possessive’ genitives before they acquire relational nouns with relational type $\langle e, \langle e,t \rangle \rangle$, then the uniform-genitive-as-arguments approach would have to posit later reanalysis, while a two-kinds-of-genitives approach would say that that earlier form persists and the argument genitive is added later. We assume that accretion is easier than reanalysis, so that would be an argument for two kinds of genitives.

Another problem for any uniform approach, either modifier-only or argument-only, comes from the complex patterns of constraints on multiple genitives found with many genitive constructions in various languages. While the data are complex and often controversial, at least some of the data suggest that the number of argument genitives that can occur with a given noun is rarely more than one, and that when two or more genitives are able to occur with a noun, at least one of them must be a ‘possessive’, something that would be easiest to explain if the possessive is a modifier rather than another argument. The typical pattern of constraints suggests that a noun can have at most one genitive argument (although *Babby*

(1997) and a few others have argued for two genitive argument positions in the Russian noun phrase). One would expect that a noun can have any number of modifiers, but if genitive modifiers are all of the same kind, “possessive”, then a restriction to just one genitive modifier would be similar to the blocking of multiple adverbials of the same semantic function on a single verb.

6. A possible “modifier-only” unified approach, and problems

In this section we suggest, tentatively, a possible “modifier-only” unified approach to the English genitive and other genitives which appear to have both ‘modifier’ and ‘argument’ uses. We believe this approach preserves the insights of Jensen and Vikner’s unified “inherent-R” approach. This approach is similar in some important respects to that of Hellan (1980), and appears to be subject to some of the same potential problems.

6.1. Steps toward a uniform modifier analysis.

Suppose we would like *team of Mary’s*, *teacher of Mary’s*, *brother of Mary’s*, *height of Mary(’s)*, *sky of Mary’s* all to look like instances of intersective modification by an $\langle e, t \rangle$ predicate¹⁴. Then we might represent them as in (34); but then more must be said about how the formulas in (34) are to be interpreted.

- (34) a. $\lambda x[\text{team}(x) \text{ and } \mathbf{R}_{\text{GEN}}(\text{Mary})(x)]$
 b. $\lambda x[\text{teacher}_1(x) \text{ and } \mathbf{R}_{\text{GEN}}(\text{Mary})(x)]$
 c. $\lambda x[\text{brother}_1(x) \text{ and } \mathbf{R}_{\text{GEN}}(\text{Mary})(x)]$
 d. $\lambda x[\text{height}_1(x) \text{ and } \mathbf{R}_{\text{GEN}}(\text{Mary})(x)]$
 e. $\lambda x[\text{sky}(x) \text{ and } \mathbf{R}_{\text{GEN}}(\text{Mary})(x)]$

In this case, the basic intersective meaning of *(of) Mary’s* would be as in (35).

- (35) $\lambda x_e[\mathbf{R}_{\text{GEN}}(\text{Mary})(x_e)]$

And suppose we want axioms such as (36) to tell us what sorts of relations can be ‘genitive relations’.

- (36) $\text{teacher}_2(\text{Mary})(x) \rightarrow \mathbf{R}_{\text{GEN}}(\text{Mary})(x)$

Then we have to answer several questions. One concerns the interpretation of the one-place predicates in the representations above; another is the nature of \mathbf{R}_{GEN} (is it a variable or a constant?) and its place in the grammar. A third is the question of compositionality: how are such meanings derived from the meanings of the parts? Let us try to answer these questions in several steps.

Step 1: Let’s reify the sortal part of the meaning of a relational noun. We can exploit the fact that every noun *has* a basic sortal part in its meaning. We can even define it, at least in some cases, as the projection onto the x_E -axis of the ‘whole’ meaning of the noun, where the x_E -

¹⁴ We use subscripts 1 and 2 to represent the 1-place predicate and 2-place relation versions of nouns. Thus teacher_1 is of type $\langle e, t \rangle$, while teacher_2 is of type $\langle e, \langle e, t \rangle \rangle$. We discuss the meanings of 1-place versions of normally 2-place nouns below.

argument is the “external” argument, the “referential” argument. Note that this can be done whether or not the noun can ever be used as a plain sortal noun (as *teacher*, *nose*, *portrait* easily can be, and *brother*, *favorite movie*, *edge* normally cannot be), since even those for which an internal argument is obligatory still have this sortal part of their meaning. For “plain” (sortal) nouns, the sortal part of the meaning is the whole meaning.

We will refer to this definable kind of sortal meaning as the *first projection* of the relation denoted by the relational noun:

(37) $\text{Sort}_{\text{brother}} = \lambda x . \exists y (\text{brother}_2(y)(x))$ = first projection of brother_2

Two important parameters of semantic differences among relational nouns are the following: (a) whether the noun has a “normal” independent use as a plain sortal noun, (of course in strong enough context, any noun can have a one-place use), and (b) if so, whether the sortal (one-place) variant of the noun has a meaning which amounts to more than just the first projection of the relational meaning (as *teacher*, *lawyer* does and *brother* does not).

Earlier examples suggested if the meaning of a relational noun’s one-place variant was “nothing more than” the first projection of its relational meaning, then that noun would not normally be usable as an independent one-place predicate. But further examples make it clear that even “mere” first projections can be used independently if that property has cultural importance. In our society, being a mother or a parent is important, being a brother or an uncle is not. It is not only for nouns like *teacher* that sentences like (38a) are good; (38b,c) are also fine, but (38d,e) are not¹⁵.

- (38) a. Many teachers voted for John.
 b. Many mothers voted for John.
 c. Many parents voted for John.
 d. # Many brothers voted for John.
 e. # Many uncles voted for John.

We suggest that the one-place predicates in (34) are related to the basic noun meanings as follows:

- (39) a. $\lambda x[\text{team}(x)]$, $\lambda x[\text{sky}(x)]$: the meanings of the plain CNs *team*, *sky*
 b. $\lambda x[\text{teacher}_1(x)]$: generic agentive noun, ‘one who teaches’.
 c. $\lambda x[\text{brother}_1(x)]$, $\lambda x[\text{height}_1(x)]$: first projections of the TCNs *brother*₂, *height*₂

The one-place predicate teacher_1 in its most basic use does not seem to be elliptical (as one-place friend_1 usually seems to be), and is not simply the first projection of the TCN *teacher*₂, but rather the name of a profession, much like *surgeon*, *actor*.

Step 2: We need to think about how to compositionally derive the sortal part of the meaning of a phrasal NP (CNP). In simple cases it will just be the sortal part of the meaning of its head noun, but more work is needed to identify the principles which specify the effects of non-subjective adjectives and of adjectives like *favorite*. Modifiers may also further specify sortal information by way of their selectional restrictions and/or their content. As a first approximation, but not an adequate general account, it is probably reasonable to assume (40).

¹⁵ We mark the “bad” examples here with the symbol “#”, indicating that they are normally anomalous, but not ungrammatical. And as usual, a strong enough context can make them fully felicitous.

(40) $\text{Sort}_{\text{CNP}} = \lambda x . \exists y (\text{CNP}'(y)(x)) = \text{first projection of CNP}'$

Step 3: In order to unify the combination of a genitive phrase with CN and TCN, we need to assume a natural kind of ‘polymorphism’, something we need for all sorts of noun-modifiers and verb-modifier. We want to be able to say that adnominal (*of*) *Mary’s* can take any kind of a CNP as argument, whether 1-place or 2-place or in principle n-place. The proposal just below does not generalize to 0-place without more work, i.e. does not immediately generalize to predicate genitives, but see below for a proposal for them. The essence of the analysis will then be as in (41-42) (using N as a cover variable for any lexical or phrasal CN(P) or TCN(P)):

(41) **The genitive modifier (*of*) *Mary’s* takes any N-type argument, keeps the sortal part of the N meaning and adds a free \mathbf{R}_{GEN} for the relation.**

(42) ***of* *Mary’s*: $\lambda N : N$ is a noun-meaning . $\lambda x . [\text{Sort}_N(x) \ \& \ \mathbf{R}_{\text{GEN}}(\text{Mary})(x)]$**

To further generalize this polymorphic operator to the 0-place case, we can follow the strategy of Montague (1970) and treat predicates as though they are modifiers of an empty noun *entity*. Since *entity* denotes a predicate true of everything in the domain, the predicative meaning given in (43) is reducible to that given in (44). This is one normal way for adjectives not originally of intersective type to shift to intersective modifiers. .

(43) $\lambda x . [\text{entity}'(x) \ \& \ \mathbf{R}_{\text{GEN}}(\text{Mary})(x)]$

(44) $\lambda x . \mathbf{R}_{\text{GEN}}(\text{Mary})(x)$

For a plain CN(P), the sortal part of the meaning is simply the meaning; for a TCN(P), it is the sortal “part” of the meaning as discussed above.

Step 4: In the fourth step we are influenced by our beginning acquaintance with optimality theory and by the work of Dölling (1992, 1997), Bierwisch (1989), and Hobbs et al (1993). What we need are principles that say that if the noun already had a relational part of its meaning, then that should normally be used, and the more ‘obligatorily relational’ the noun is, the more strongly that inherent relation is preferred. There should be such a principle in some very general terms, something about “using all the meaning” or at least using all the “relevant” parts of the meaning.

There are also principles like those proposed by Frosch (1999) about \mathbf{R}_{GEN} being salient, being ‘shared information’, having suitable uniqueness properties. And there are principles relating to the *content* of the Genitive relation, explored by Jensen and Vikner (1994, 1996), Vikner and Jensen (ms. 1999), and Partee and Borschev (in press b) – \mathbf{R}_{GEN} likes to be agentive, it likes to be part-whole, it doesn’t like to be telic in the sense of Pustejovsky 1995.

6.2. Compositionality issues.

If we put together the meaning of *brother of Mary’s* on this view, what is going on? Perhaps we are moving toward a view that blends unification with ordinary function-argument application. If the meanings of *brother* and *of Mary’s* are as in (45a,b), function-argument application would give (45c), and (i) an axiom analogous to that in (36) would tell us that an available value for the variable \mathbf{R}_{GEN} is $\mathbf{brother}_2$, and (ii) there should be a general principle

to the effect that if the sortal part of *brother* is not a salient property on its own, any value for \mathbf{R}_{GEN} other than $\mathbf{brother}_2$ will yield an anomalous (or at least very hard to interpret) reading.

- (45) a. *brother*: $\lambda y \lambda x [\mathbf{brother}_2(y)(x)]$
 b. *of Mary's*: $\lambda N : N \text{ is a noun-meaning} . \lambda x. [\mathbf{Sort}_N(x) \ \& \ \mathbf{R}_{\text{GEN}}(\mathbf{Mary})(x)]$
 c. *brother of Mary's*: $\lambda x. [\mathbf{Sort}_{\text{brother}}(x) \ \& \ \mathbf{R}_{\text{GEN}}(\mathbf{Mary})(x)]$

Note the contrast between the English *of* + NP_{ACC} construction (*portrait of John*), which is strictly argumental, and the postnominal genitive (*portrait of John's*), which allows any relational reading **except** that expressed by *portrait of John*. This contrast shows that there are evidently some “Blocking” principles: the reason that *portrait of John's* can't usually mean what *portrait of John* must mean is presumably the very existence of *portrait of John* with its more specific meaning. There is no inherent prohibition of such a meaning, or even a dis-preference for it, but it is blocked by the existence of the more specific alternative. One good argument for this approach to such examples is that there is no such effect in prenominal position (*John's portrait*), where there is no alternative expression.

Such blocking principles need to be explored further as a potentially important part of the explanation of the typological differences across languages in the range of relations expressed by the genitive and other constructions in connection with the existence of other “competing” constructions in the same language. For example, English genitives are not used for some of the relations expressed by genitives in Russian, apparently because of competition from the Noun-Noun compound construction in English (see the glosses of the examples in (7).)

6.3. Predicate genitives again.

Since the uniform meaning proposed above amounts to a type-raised “predicate-conjunction” meaning, it should be based on a simple predicative meaning (type $\langle e, t \rangle$) as shown below; this is equivalent to the meaning derived by the strategy of Montague (1970) given in (43).

- (46) $\mathbf{Mary}'_{\text{SPRED}} : \lambda x. \mathbf{R}_{\text{GEN}}(\mathbf{Mary})(x)$

But at this point we should probably bear in mind the “Janus-faced” nature of the genitives that we noted in section 5: for “pure” non-elliptical predicate genitives, it may not be right to call this a “genitive” relation at all; this is where the distinction between “genitive” and “possessive” may become important.

- (47) $\mathbf{Mary}'_{\text{SPRED}} : \lambda x. \mathbf{R}_{\text{POSS}}(\mathbf{Mary})(x)$

It is in our minds a question for further research how to argue for a distinction between two classes of potentially “free” relations; we suspect that the distinction will be one of prototypical preferences (cf. Dowty 1989) rather than an absolute one. Possibly, \mathbf{R}_{POSS} should just be thought of as one of the most salient relations (or family of relations) accessible when there is no salient sortal information in the construction: not only in the predicative case, but in cases like *anything of mine*, *all this stuff of John's*, where the head noun has minimal lexical content.

To say all these things, we need \mathbf{R}_{GEN} as a notion; the grammar (and universal grammar) has to be able to talk about it, has to be able to describe constraints and preferences. So it isn't just the bare logical notion of a two-place relation; it's a two-place relation “template” that is part of the interpretation of a particular construction.

The approach described here, while not fully worked out, can already be seen to differ in certain crucial ways from Partee 1983/97 as well as from Jensen and Vikner (1994) and Vikner and Jensen (ms. 1999) (and from Borschev and Partee 1999a,b insofar as we have been following Jensen and Vikner). We summarize the differences below:

- (48) a. Partee 1983/97: Two distinct constructions.
 (i) with inherent-R nouns, *Mary's* is $\lambda R\lambda x[R(\text{Mary})(x)]$ (a lifted argument).
 (ii) with sortal nouns *Mary's* is $\lambda P\lambda x[P(x) \ \& \ R_{\text{GEN}}(\text{Mary})(x)]$ (a predicate lifted to become an intersective modifier.)
 b. Jensen and Vikner (1994): All as lifted arguments, forcing plain nouns and NPs to shift to relational meanings. The genitive “wants” a relational TCN(P) to combine with, “wants” to give it an argument.
 c. This proposal: Related in part to Hellan 1980: Assimilate all to free-R case, by (a) splitting relational nouns into a “sortal part” plus a relation, (b) making *Mary's* a polymorphic function, and (c) having principles which help make sure that the ‘inherent R’ of an inherently relational noun can’t easily be ignored.

On the current proposal, all genitives could be viewed as modifiers. There are remaining conceptual problems, particularly for the “inherent *R*” case. The goal is to have enough general principles at work that one can simply say $R_{\text{GEN}}(\text{Mary})(x)$ and have all the rest follow.

But even if the conceptual problems can be solved, any unified approach will have to wrestle with the problem noted earlier of the limitations on the occurrence of more than one genitive with a single noun, limitations which may be better described in terms of co-occurrences of distinct genitive structures.

7. Speculative hypotheses and prospects for a unified account

7.1. Two competing prototypes?

It has often been pointed out that an “Argument” genitive is most like a direct object, an “internal argument”, most intrinsic to relational nouns. A “Possessor” genitive, on the other hand, is most subject-like, agent-like, less like an internal argument, more independent; Perhaps with more work it can be shown to follow that it is hence more easily a predicate.

We started from the idea that genitives with relational nouns are basic, and have been trying to figure out what adjustments take place when a genitive is used with a plain sortal noun.

Heine (1997) starts from the other end, so to speak, with *have* sentences as primary concern and predicate genitives as secondary, and adnominal genitives as a tertiary interest. Inherent relations have a subordinate place in the discussion; various notions of control and ‘possession’ are at the forefront.

This makes us see genitives as Janus-faced. From our perspective, the deverbal nouns are in a sense archetypal relational nouns, with genitives most clearly argument-like: *John's arrival, the city's destruction*. From Heine's perspective the use of a *have*-like construction or of a genitive construction with deverbal nouns is more like the grammaticization of a metaphorical extension of possession, and inalienables like *Mary's hand* are closer to the core. Perhaps the child's early *That's mine!* is even more core-like. For genitive constructions which include the kind of possessive predicative readings discussed in section 5, it seems clear that they are not to be treated as uniformly argument-like.

We have tried in section 6 to propose a version of the proposal of Hellan (1980) which preserves many of the properties of Jensen and Vikner's uniform argument approach within a

uniform modifier approach. It may in the end be preferable for genitive constructions like that in English to go back to an ambiguity approach, acknowledging that genitives may arise from either of two different prototypes, though with a wide overlap in the result.

7.2. Hypotheses and puzzles.

We summarize below some of our specific hypotheses about particular genitive and genitive-like constructions in English and Russian.

1. The English *of* + NP_{ACC} construction (*portrait of John*) is strictly argumental.
2. The English Saxon genitive (*John's*) can be used as a predicate, type <e,t>.
3. The English *of* + NP's construction (*portrait of John's*) is either uniformly non-argumental or ambiguously argumental/non-argumental (not sure yet). But in particular, it is not always argumental.
4. The English prenominal NP's neutralizes the distinction between postnominal *of* + NP_{ACC} and *of* + NP's. So it can be either argumental or non-argumental. [It's conceivable that 'structurally' it is never argumental, but we won't try to argue that.]
5. The Russian genitive (*Maši*), always postnominal, is always an argument. It can never be used as a predicate (caveats). (But it can be used with 'plain nouns' to express all kinds of relations including possession, as predicted by Jensen and Vikner's coercion analysis.)
6. The Russian prenominal possessive (*Mašin, -a*) can be used as a predicate, has certain limitations on its use as an argument, and is either sometimes or never structurally an argument, although it can certainly fill argument-like roles.

The puzzle that emerges is that there seem to be argumental genitive constructions and modifier 'possessive' constructions that have a very great overlap in what they can express; if this is correct, it means that we cannot use 'intuitions' of argumenthood as a good guide to whether something is 'really' an argument at a given level of structure. And Dowty (1997, 2000) has argued that the distinction between modifiers and arguments need not be inherently sharp. Fleshing out more specific proposals about the relevant structures is necessarily a theory-dependent matter and we do not intend to undertake it without the collaboration of syntacticians. There are many different proposals in the literature for different argument and non-argument positions/sources for genitives and other 'possessives' in English, Russian, and other languages.

The bottom line seems to be that type-shifting and lexical meaning shifts make many compositional routes available to very similar 'net outcomes'. The line between arguments and modifiers is not intrinsically sharp in terms of 'what is being expressed', and can only be investigated in theory-dependent ways. It will be hard to find sharp differences between a theory in which the genitive construction contributes a "possessive" relation and a theory in which the genitive construction causes the head N or N-bar to shift to a relational interpretation possibly involving a "possessive" relation as one of its "preferred" relations. At this point we see more hope for a unified approach which takes all genitives as modifiers than for one which analyzes all genitives as arguments. Genitives are a domain of great semantic flexibility, where we have to find detailed language-particular evidence to try to sort out how lexical semantics, compositional semantics, and type-shifting possibilities are interacting in each particular construction.

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Position and Interpretation of Adjuncts: Process, Event and *wieder* 'again'

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Abstract

This paper deals with restitutive and repetitive *wieder*. Proceeding from the assumption that adverbial adjuncts have base positions which reflect their semantic relations to the rest of the sentence, it is shown that repetitive *wieder* belongs to the class of event adverbs minimally c-commanding the base positions of all arguments whereas restitutive *wieder* has many properties in common with process adjuncts, minimally c-commanding the final verb.

1. Word order in German and adjuncts

Major constituents exhibit a great range of possible positions in the middle field of the German sentence.

- (1) a. weil Hans seiner Freundin (IO) ein Bild (DO) geschenkt hat
because Hans his girlfriend (IO) a picture (DO) given as present has
'because John gave his girlfriend a picture'
b. weil seiner Freundin Hans ein Bild geschenkt hat
c. weil ein Bild seiner Freundin Hans geschenkt hat

Word orders are not all equally normal or neutral, since some require special contexts. Within generative grammar, it has been established by now as the view of the majority, that verbal arguments have a normal or base order and derived orders.

The following tests can be employed to identify unmarked/neutral orders:

- focus projection
- theme-rheme condition (Lenerz 1977)
- scope of quantifiers (Frey 1993)
- complex frontings
- position of indefinite *w*-pronouns
- effects due to binding principle C

A more controversial question is whether there are base positions for adjuncts or whether they can be inserted freely into any position. In Frey & Pittner (1998) we have undertaken to show that the above mentioned tests can be also used to identify base positions of adverbial adjuncts.

By applying these tests to adjuncts we tried to establish that there are five classes of adverbial adjuncts as far as their base positions are concerned: (I) frame adverbials, (II) sentence adverbials, (III) event-related adverbials, (IV) event-internal adverbials and (V) process-related adverbials. Within these classes, there may be semantic preferences for a certain order

but this order is not syntactically determined. The base position of these classes and their c-command-relations reflect their semantic relations to the rest of the sentence.

(2) Base positions of adjuncts:

- (i) Frame and domain adjuncts: c-command the base positions of sentence adjuncts
- (ii) sentence adjuncts: c-command the finite verb and the base positions of event-related adjuncts
- (iii) event adjuncts: c-command the base position of the highest argument and the base positions of event-internal adjuncts (e.g. time, cause)
- (iv) event-internal adjuncts: they are minimally c-commanded by the argument they are related to, i.e. no other argument can intervene (e.g. instrument, comitative, agent-oriented/volitional)
- (v) process adjuncts: c-command minimally the verb or "verbal complex" (manner)

Our findings are evidence for a close connection of syntactic base position and semantic interpretation. They also suggest that adverbial modifiers do not uniformly relate to an event variable, but that they relate to very different kinds of semantic entities, e.g. processes (as parts of events), partial events, propositions and speech acts.

The question how adjunct positions can be explained has received a lot of attention in recent literature and has been very controversially discussed. There is hardly any view imaginable that has not been proposed by someone. On one extreme is the view that adverbs and more generally adjuncts can be placed virtually anywhere and that they are base generated wherever they appear. I will call this completely free positioning. The other extreme has recently been proposed by several authors working within a minimalistic framework who try to establish that adjuncts occur in the Spec-positions of functional projections (Alexiadou 1997, Cinque 1999). Since there is a suitable functional projection for every semantic type of adjunct imaginable, the result is that there is an enormous amount of functional projections. I will call this syntactically fixed positioning.

This is not the place to go into a detailed critique of this approach, since this has been done elsewhere (cf. Frey & Pittner 1998, Haider 1998, Pittner 1999). I only briefly would like to mention that the same ordering restrictions can be observed for the modifiers within a nominal phrase. This is naturally explained if there is a semantically determined hierarchy between operators, but under the assumption of syntactically fixed positioning, it leads to an enormous amount of functional projections. Moreover, the same ordering restrictions can be observed among arguments (*it is lucky for us that it is probable that it is easy for John* but not **it is probable that it is lucky that it is easy for John*). Here no functional projections can be postulated which shows that the observed ordering restrictions exist independently of functional projections.

A somewhat less extreme view close to completely free positioning is advocated by Haider (1998, 1999). He maintains that the syntax only provides potential slots for adverbial adjuncts and that these can be filled in by adjuncts, where their relative hierarchy has to be observed. This hierarchy is seen to be a reflex of a hierarchy of semantic types e.g. event-related > process-related. As long as this hierarchy is observed, the positioning of adjuncts is grammatical and there are no restrictions of adjunct positions relative to the arguments in the sentence.

It can be shown, however, that it is not sufficient to say that the syntax provides slots for adverbial adjuncts which are filled in in accordance with a hierarchy of adverb classes. The position of adjuncts and its c-command relations reflects the semantic relations to the sentence in intricate ways. Let us take as an example comitatives. A comitative is related to another argument it could (roughly equivalently) be coordinated with:

- (3) weil Hans mit seiner Freundin einen interessanten Film gesehen hat
because Hans with his friend an interesting film (DO) seen has
'since John saw an interesting film with his friend'
- (4) weil Hans das Fleisch mit der Suppe gekocht hat
because Hans the meat (DO) with the soup cooked has
'because John cooked the meat with the soup'

Both sentences have neutral word order since in each case the comitative is minimally c-commanded by the argument it is related to (the subject in 3, the direct object in 4), thus fulfilling (2iv).

2. Position and interpretation of ambiguous adverbs

Recent work has shown a close relation between the syntactic position and the interpretation of adverbial adjuncts (e.g. Maienborn 1996 and 1998, Ernst 1998, Frey & Pittner 1998, Pittner 1999).

An especially interesting phenomenon are adverbs that are ambiguous and hence can belong to several classes. A case in point is German *gerne* which has a frequency interpretation ('often') and a volitional interpretation ('willingly'). In its volitional interpretation it qualifies the attitude of the subject referent and is event internal. Hence, this interpretation is not available if the position of the adverb does not meet the requirements for event-internal adverbs as in (5):

- (5) weil hier gerne jemand arbeitet (only frequency interpretation)
since here often somebody works

This shows clearly that there are ordering restrictions relative to the arguments in a sentence, which is neglected in Haider's approach.

The question how this kind of ambiguity should be treated in the lexicon will not be a major concern in this paper. As far as *gerne* is concerned, we have an implicature that something that is done willingly is done often. If *gerne* is used in a context where there is no volitionally acting person, the meaning 'willingly' is suppressed and the meaning 'often' is the only one to survive.

The border line between polysemy and homonymy is often difficult to draw. Even if there is clearly a common etymological source, which is usually a reason to assume polysemy, there may be reasons to assume homonymy, i.e. two lexical entries.

In the case of *gerne*, although there is a common etymological source, it is reasonable to assume two lexical entries: only the adverb with the volitional interpretation can be negated by the prefix *un-*.

What is important for the goal of this paper is that not all interpretations are available in all positions thus showing that there is a close connection between the position and interpretation of adverbs and that their base positions are determined by their scope.¹ While scope and the

¹ That there are base positions for most types of adjuncts does not exclude the possibility that there are types of adjuncts for which no base position can be identified. Several authors show that frequency adverbs are variable in their position and there are no hints that one of the positions is a base position whereas the others are not. This allows for several interpretations: either frequency adverbs belong to several classes of adverbs (like ambiguous adverbs), for instance event and process adjuncts. Intuitively, however, it makes sense to count them among event adjuncts, since they express quantification over events. It can be assumed that their flexibility of positioning is due to their quantificational character.

syntactic position resulting from it are important, I will remain neutral on the question whether the different interpretations of *wieder* can be reduced entirely to a difference in scope.

3. Repetitive and restitutive *wieder*

While there are numerous studies paying their sole or main attention to *wieder*, the main goal of this paper will be to examine how *wieder* ('again') fits into the larger picture of adjunct positions in general. It is well known that *wieder* is ambiguous between a repetitive (repetition of an event) and a restitutive reading (restitution of an earlier state).

The presupposition generated by repetitive *wieder* is that an eventuality of the type described in the *wieder*-sentence happened before the one whose occurrence the sentence asserts. Here the emphasis is on the sameness of what is asserted to be the case and what is presupposed to have been the case earlier. With restitutive *wieder* the emphasis lies on the opposition between the state or process described by the *wieder*-sentence and the state/process which is presupposed to have preceded it (Kamp & Roßdeutscher 1994:196).

The two meanings of *wieder* can be traced back to the same root. *Wieder* is related to the preposition *wider* 'against'. The repetitive use is supposed to have developed later. From a diachronic point of view, restitutive *wieder* is the more basic one (cf. Grimm 1960:867ff., Fabricius-Hansen 1983:39f.).

Synchronically, the restitutive reading is the more restricted/marked one. While the repetitive reading is always possible, the restitutive reading heavily depends on certain positions, accents and types of verbs.

It can be speculated that the restitutive reading pointing to the restitution of an earlier state (and thereby implying a repetition of a state) could be interpreted to denote repetition in general once the conditions for a restitutive reading were not met.

- (6) a. Er hat die Patienten wieder geheilt. (restitutive/repetitive)
 he has the patients again healed
 b. Er hat wieder die Patienten geheilt. (repetitive)
 he has again the patients healed

Von Stechow (1997) explains these positions as relating to lexical decomposition of verbs. According to him, restitutive *wieder* occurs in the scope of a BECOME-predicate, whereas repetitive *wieder* does not. This is a reductionist view with a long tradition within generative semantics, reducing the different meanings of *wieder* to a difference in scope (cf. Dowty 1976, Dowty 1979). The observed ambiguity of sentences with *wieder/again* was in fact one of the reasons to introduce lexical decomposition at some abstract level of syntax. In von Stechow's approach, the atomic predicates BECOME and CAUSE are represented by lexical or functional heads. The predicate of the result state is represented in an XP which is the sister of the verb representing BECOME. If *wieder* is adjoined to this XP, we get the restitutive reading. The CAUSE-predicate corresponds to a VoiceP dominating the VP. If *wieder* is adjoined to this or a higher projection (AgrOP, TP, AgrSP), we get a repetitive reading. Since the surface order in (a) may result from an adjunction of the adverb to XP or to VoiceP, it is ambiguous between a restitutive and a repetitive reading. If *wieder* occurs to the left of the object, it has been adjoined to TP or AgrOP which is resulting in a repetitive reading.

So far, this approach is giving the right results. I want to briefly point out the problems pertinent to this approach.

One problem is that restitutive *wieder* can also occur with stative predicates which include no BECOME-predicate (cf. Fabricius-Hansen 1995).

- (7) An diesem Tag war der Kapitän wieder NÜCHtern. (restitutive/repetitive)
on that day was the captain again sober
'On that day the captain was sober again.'

Another problem is that objects do not always precede restitutive *wieder* but in certain cases may also follow it. I will deal with this in detail in section 4.

A scope paradox arising within this approach has been pointed out by Jäger (1999); cf. Jäger & Blutner (to appear): A puzzle to be solved is why restitutive *wieder* can occur even higher than subjects as in the following sentence:

- (8) Es siedeln sich wieder Delawaren in New Jersey an. (restitutive)
EXPL settle REFL again delawares in New Jersey
'Delawares are settling again in New Jersey.'

The meaning of *wieder* in this sentence is basically restitutive: The sentence does not necessarily denote the repetition of an event, but rather the restitution of an earlier state. Moreover, the *Delawaren* that are settling in New Jersey need not be the same as those that have been there before.

Since the subject position in Stechow's analysis is higher than the BECOME-predicate and *wieder* occurs higher than the subject, a restitutive reading should be excluded according to Stechow's analysis.

This "scope paradox" observed by Jäger leads him to the following proposal (cf. Jäger & Blutner to appear:14):

- (9) Jäger's conjecture:
Both repetitive and restitutive *again* take scope over the base position of the subject.

Contrary to this conclusion, it will be shown that there is a difference in scope resulting in different base positions for restitutive and repetitive *wieder*. But the syntax-semantics mapping assumed is more flexible than the one proposed by von Stechow. More specifically, it will be shown that restitutive *wieder* syntactically behaves in some respects as a process adjunct, whereas repetitive *wieder* behaves as an event adjunct.

4. Restitutive *wieder* and process adjuncts

In this section it will be shown that restitutive *wieder* has some properties in common with process adjuncts. Interestingly, Kamp & Roßdeutscher use the notion of process in their description of restitutive *wieder*:

»The central conception conveyed by restitutive *wieder* is that the process which is implicitly or explicitly asserted by the sentence in which it occurs was preceded by an opposite process whose effects the later process undoes, thereby restoring the state of affairs which obtained when first the process began.«

(Kamp & Roßdeutscher 1994:195)

Both process adjuncts and restitutive *wieder* take their position close to the (final) verb, as the position of the indefinite *w*-pronoun shows which cannot scramble and therefore is a good indicator of the base positions of adverbs:

- (10) er hat wen wieder geheilt
he has somebody again healed
'he healed somebody again'
- (11) sie hat was gründlich gelesen
she has something carefully read
'she read something carefully'

(10) is not compatible with the assumption by Jäger & Blutner (to appear), that restitutive *wieder* like the repetitive one has a base position higher than all verbal arguments, since the indefinite *w*-pronoun cannot scramble.

Process adjuncts and restitutive *wieder* have to appear after (i.e. to the right of) sentence negation:

- (12) a. Er hat das Geschirr nicht sorgfältig gespült.
he has the dishes not carefully done
'He didn't do the dishes carefully.'
- b. ??Er hat das Geschirr sorgfältig nicht gespült.
he has the dishes carefully not done
- (13) a. Er hat die Patienten nicht wieder geheilt. (restitutive)²
he has the patients not again healed
'He didn't heal the patients again.'
- b. Er hat die Patienten wieder nicht geheilt. (only repetitive)
he has the patients again not healed
'He again did not heal the patients.'

Process adjuncts can appear in front of certain objects however, as will be discussed to restitutive *wieder* below:

- (14) weil sie schüchtern einen Prinzen geküßt hat
because she shyly a prince kissed has
'because she kissed a prince shyly'

This is due to the "integration" of the object into the predicate in the sense of Jacobs (1993).³ The integrated object is not conceptualized as a separate entity, but merely as a part of a process. This is possible if the object exhibits proto-patient characteristics (Dowty 1990). Focus on an integrated object can be wide focus.

- (15) a. Sie hat ein BUCH gelesen. (wide focus possible)
She has a book read
'She read a book.'
- b. Sie hat einen KOLLEGEN verachtet. (only narrow focus)
she has a colleague despised
'She despised a colleague.'

² It can be neglected that with the proper intonation of *wieder nicht* can be a negation of *wieder* only with the result that the presupposition is negated (he did it not again, but for the first time).

³ For a more detailed discussion of this the reader is referred to Frey & Pittner (1998:498-501).

The patient object in (15a) can be integrated whereas this is not possible for the stimulus object in (15b).

It can also be observed that distributive quantification prevents integration:

- (16) a. Sie hat jedes HEMD gebügelt. (only narrow focus)
she has each shirt ironed
'She has ironed each shirt.'
- b. Sie hat alle HEMDen gebügelt. (wide focus possible)
she has all shirts ironed
'She ironed all shirts.'

Process adjuncts can occur in front of integrated objects:

- (17) a. *Ich habe abgrundtief den Mann verachtet.
I have deeply the man despised
'I despised the man deeply.'
- b. ??Er hat sorgfältig jedes Hemd gebügelt.
he has carefully each shirt ironed
'He ironed each shirt carefully'

Restitutive *wieder* can occur in front of integrated objects. The object is conceptualized as part of the resulting state:

- (18) a. Sie hat ihm wieder alle Bücher zurückgegeben.
she has him again all books back-given
'She gave him all books back again.'
- b. ??Sie hat ihm wieder jedes BUCH zurückgegeben.
she has him again each book back-given
'She gave him each book back again.'

Now we have to come back to the example with the Delawares, repeated here for convenience:

- (19) Es siedeln sich wieder Delawaren in New Jersey an. (restitutive)
EXPL settle REFL again delawares in New Jersey
'Delawares are settling again in New Jersey.'

Although the concept of integration is not explicitly applied to subjects by Jacobs (1993), there are some good reasons that something similar is taking place in this sentence. First of all, it can be observed that neutral sentence accent is placed on the subject, nuclear accent on other constituents inevitably results in a narrow focus (cf. Rochemont 1986:55 who observes this for verbs of appearing in general). Moreover, it can be argued that the Delawares have a proto-patient property, since they change their place. This means that the Delawares are conceptualized as part of the resulting state. As we have seen, objects have to occur in the scope of restitutive *wieder*, if they are part of the resulting state. This also extends to subjects of verbs of appearing.

Although there are some common properties of process adjuncts and restitutive *wieder*, there are also some differences. It can be observed that process adjuncts can appear in the preverbal

position ("Vorfeld") under certain conditions, whereas this position of *wieder* necessarily results in a repetitive reading.

- (20) a. *Langsam* hat sie das Buch gelesen.
 Slowly has she the book read
 'Slowly, she read the book.'
- b. *Wieder* ist sie krank geworden. (only repetitive)
 Again is she ill become
 'She became ill again.'

For process adverbs in the prefield it can be observed that there is a strong tendency to take an interpretation as an event-related adverb if it is possible (in the case of *langsam* it may be interpreted not as the way a process goes but the way an event takes place). A process interpretation is possible under two conditions: either if the process adjunct is narrowly focussed and thus bearing the nuclear accent (e.g. as an answer to 'How was she reading the book?') or, in rare contexts, it may have been mentioned before and thus be topic of the sentence. In this special context it may remain unaccented.

As far as *wieder* in the prefield is concerned, in principle the same conditions obtain. But, as will be discussed later, nuclear accent on *wieder* always excludes the restitutive reading, so the narrow focus context is not possible with restitutive *wieder*. And a topic status due to prementioning is far more unlikely than the already unlikely topic character of a process adjunct.

Both restitutive *wieder* and process adjuncts are sensitive to the semantics of the predicate, albeit in different ways: process adjuncts cannot combine with stative predicates whereas restitutive *wieder* requires a predicate containing a state. The interpretation of these adjuncts close to the verb is dependent on the semantics of the verb in various ways (cf. Bierwisch 2000 for *wieder*, Maienborn 1998 for verb-close locative modifiers).

That these adverbs are sensitive to verb semantics is a direct consequence of their narrow scope reflected in their verb-adjacent position.

5. Repetitive *wieder* as event adverb

Repetitive *wieder* has been claimed to be a sentence adverb (e.g. Dowty 1976, Fabricius-Hansen 1983). In this section it will be shown, however, that there is a separate class of event adverbs to which repetitive *wieder* belongs. It will be shown that event adverbs, dominating the base positions of all arguments, delimit the range of existential closure (cf. Frey 2000). Diesing (1992), on the contrary, assumed that sentence adverbs delimit the range of existential closure. It will be shown that sentence adverbs have a higher base position than event adverbs and more specifically, that they delimit the topic range of the sentence to their left.

From a semantic point of view, it makes sense to say that repetitive *wieder* is related to events. Kamp & Roßdeutscher make use of the notion of eventuality in their description of repetitive *wieder*:

»The presupposition generated by repetitive *wieder* is that an eventuality of the type described by the *wieder*-sentence happened before the one whose occurrence the sentence asserts.«
 (Kamp & Roßdeutscher 1994:196)

Event adjuncts, according to rule (2iii), c-command the base positions of all arguments. This can be shown by quantifier scope:

- (21) weil mindestens ein Kollege wieder protestiert hat (∃ WIEDER, WIEDER ∃)
because at least one colleague again protested has
'because at least one colleague protested again'

While the reading of the quantifier *ein* with wide scope is a reflection of the surface order, the reading with the wide scope of *wieder* can be attributed to a base position of the subject lower than *wieder* according to the scope principle by Frey (1993):

- (22) A quantified expression α can have scope over a quantified expression β if the head of the local chain of α c-commands the base position of β .

Note that the ambiguity observed in (21) does not occur with restitutive *wieder*.

- (23) weil mindestens ein Kollege wieder krank geworden ist
(only ∃ WIEDER with the restitutive reading)

Sentence adverbs c-command the finite verb and the base position of event adverbs according to (2ii). On the surface, sentence adverbs partition the sentence in topic and comment (cf. Frey/Pittner 1998, Pittner 1999, Frey 2000). Since only referring expressions can be topics (cf. Lambrecht 1994), this can be tested with expressions like *keiner* (*nobody*).

- (24) a. *weil keiner wahrscheinlich kommt
because nobody probably comes

Other types of adjuncts may precede sentence adjuncts, but this requires that they are topics:

- (25) a. Petra wird auf diese Weise anscheinend ihre Reise finanzieren.
Petra will in this way apparently her trip finance
'Petra apparently will finance her trip in this way'

Contrary to (24), *wieder* can occur to the right of *keiner*:

- (26) a. weil keiner wieder singt
because nobody again sings
'because nobody sings again'

The finite verb is c-commanded by sentence adverbs. Since German is OV, for sentence adverbs in the middle field this condition is always fulfilled. In German this condition can be observed in the following sentences, where it is violated and leads to ungrammaticality (judgement applies to non-focussing use of the sentence adverb).

- (27) *Leider geraucht hat er gestern.
Unfortunately smoked has he yesterday.
'He unfortunately smoked yesterday.'⁴

⁴ Cf. the English facts, which show that in English, the finite verb has to be c-commanded by the sentence adverb, (c) is due to a movement of the finite verb:

- (i) a. *George has been probably reading the book.
b. George probably has been reading the book.
George has probably been reading the book.

For repetitive *wieder* as event adverb this condition does not obtain:

- (28) Wieder geraucht hat er gestern.
 again smoked has he yesterday
 'he again smoked yesterday'

So far, it has been argued that repetitive has another base position than sentence adverbs and contrary to sentence adverbs does not delimit the topic range in the sentence. As was indicated at the beginning of this section, event adverbs, to which class repetitive *wieder* belongs, delimit the range of existential closure. This means that indefinite NPs occurring to its left get a "strong" interpretation. In the case of bare plurals this means that they do not get an existential but a generic interpretation (cf. Frey 2000).

- (29) a. weil Väter an Weihnachten mit der Eisenbahn spielen (only generic)
 because fathers at Christmas with the locomotive play
 'because fathers play at Christmas with the locomotive'
 a'. weil an Weihnachten Väter mit der Eisenbahn spielen (existential or generic)
 because at Christmas fathers with the locomotive play
 b. because fathers again with the locomotive play
 'because fathers play with the locomotive again'
 b'. weil wieder Väter mit der Eisenbahn spielen (existential or generic)⁵

Indefinite NPs to the left of *wieder* do not get a non-definite reading but only a specific one (according to Diesing 1992). This means that they are part of the assertion in sentences with repetitive *wieder*.

According to Kamp & Roßdeutscher (1994), *wieder* makes a partition between the assertoric and the presuppositional part of the sentence: »the presuppositional part is to the right of *wieder*. This also explains why restitutive *wieder* usually follows the object, since the object is usually part of the assertion with restitutive *wieder*: In particular, the presupposition must share the theme with the assertion that the sentence makes. This shared identity will be guaranteed only when the theme phrase is outside the scope of *wieder*.« (Kamp & Roßdeutscher (1994: 202)

The assumption that phrases to the left of *wieder* have the same referent in assertion and presupposition fits in well with so-called sloppy and strict reading: (cf. Fabricius-Hansen 1983, von Stechow 1997:119)

- (30) a. weil Anna wieder den Namen ihres Mannes annahm (strict/sloppy)
 because Anna again the name of her husband took on
 'because Anna took on the name of her husband again'
 b. weil Anna den Namen ihres Mannes wieder annahm (only strict)

(ii) George will read the book again/yesterday/*probably.

(ii) shows that event-related adverbs in English like repetitive *again* or *yesterday* do not pattern with sentence adverbs.

⁵ Frey (2000) shows that the generic interpretation is not due to a status as topic as is often assumed. Generic interpretation becomes necessary if the bare plural occurs to the left of an event adverb, but it can occur to the right of a sentence adverb, which means that it is not a topic.

However, it is not always the case that a constituent to the left of *wieder* has a fixed referent, allowing only a strict interpretation:

- (31) weil der Präsident wieder ein Frauenheld ist (same or another President)
because the President again a womanizer is
'because the president is a womanizer again'

Here we have an individual level-predicate and according to Diesing (1992), the subject of an individual level predicate has to leave the domain of existential closure and has to appear in front of *wieder*.

A similar example is the following:

- (32) weil Anna den Titel ihres Vortrags geändert hat und den Titel wieder angekündigt hat ⁶
because Anna the title of her talk changed has and the title again announced has
'because Anna changed the title of her talk and announced the title again'

It can be argued that the title in this sentence is topic (both according to a notion of topic based on pragmatic aboutness as well as to a notion based on familiarity). Since topics can only occur to the left of sentence adverbs which again c-command all other types of adverbs topics may only occur to the left of adverbs in the German middle field.

The position to the left of *wieder* in the two examples given above is due to the topic status of the respective constituents. Since topics must occur higher than sentence adverbs which again are higher than all other kinds of adverbs (except frame adverbials that are topics), it follows that topics can occur only higher than adverbs in the middle field, unless the adverb itself is a topic.

In this section, it was argued that repetitive *wieder* belongs to the class of event adverbs which are c-commanding the base positions of all arguments as well as of event-internal adjuncts. They delimit the domain of existential closure with the effect that indefinite NPs occurring to the left of repetitive *wieder* receive a definite interpretation. Sentence adverbs, however, which were assumed to delimit the range of existential closure by Diesing (1992), have a different base position: they delimit the topic range to their left in the sentence.

6. *Wieder* and nuclear accent assignment

As has been observed by several authors, a nuclear accent on *wieder* excludes the restitutive reading.

- (33) a. weil der Kapitän wieder NÜCHtern ist (restitutive, repetitive)
because the captain again sober is
'because the captain is sober again'
b. weil der Kapitän WIEder nüchtern ist (only repetitive)
- (34) a. weil das Barometer wieder FIEL (restitutive/counterdirectional, repetitive)
because the barometer again fell
b. weil das Barometer WIEder fiel (only repetitive)

⁶ I owe this example to B. Partee.

In this section, it shall be briefly shown how this pattern can be explained by the rules for focus assignment and the interpretation of focus according to an alternative semantics.

First of all, (a) shows that restitutive *wieder* requires that the predicate must be part of the focus.

The following rule for nuclear accent assignment can be assumed:

(35) Assignment of nuclear accent is free (i.e. it can be placed on any syllable)

As far as the interpretation of nuclear accent is concerned, I follow Rooth (1992) who explains the interpretation of focus with regard to alternatives:

(36) Nuclear accent indicates focus, which delimits the range of alternatives.

Moreover, focus is not restricted to the accented constituent but can spread according to certain rules, so that there is wide focus or "focus projection" as it is called in the German literature:

Focus can "project"

- to the word, if accent is assigned according to neutral word accent rules
- to the phrase, if accent is assigned according to neutral phrase accent rules
- to the sentence, if accent is assigned according to neutral sentence accent rules

The rules for neutral sentence accent can in a somewhat simplified version be formulated thus:

- (37) Nuclear accent is placed
- on the argument closest to the (final) verb
 - if it is non-pronominal
 - if no adjunct intervenes
 - if it has proto-patient characteristics
 - on the verb in all other cases

According to these rules, nuclear accent on *wieder* is not neutral, but indicates narrow focus on *wieder*, which means that the rest of the sentence is background. Background information can be taken to be presupposed in some sense. Since the rest of the sentence denotes an event, an event is presupposed and the reading of *wieder* is necessarily repetitive.

In view of the semantics of restitutive *wieder*, it makes sense to say that it presupposes an alternative **state**. Hence focus must include the predicate which expresses the state since it indicates the right set of alternatives for restitutive interpretation of *wieder*.

Sentence accent on the verb allows for either narrow focus on the verb or broad focus and therefore allows both a restitutive and a repetitive reading.

7. Results

The characteristics of repetitive vs. restitutive *wieder* support the assumption stated in the introductory part of the paper that adverbs have a base position which is determined by their semantic relations to the rest of the sentence. Repetitive *wieder* is an event adverb, c-commanding the base positions of all arguments. It delimits the domain of existential closure whereas sentence adverbs delimit the comment part of the sentence. Restitutive *wieder*, however, shares many properties with process adjuncts, minimally c-commanding the final verb. In the final section the influence of accentuation on the interpretation of *wieder* was explained by the rules for the assignment and interpretation of neutral sentence accent.

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Rethinking the Adjunct¹

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Abstract

The purpose of the present paper is twofold: first, to show that, when defining the *adjunct*, it is necessary to distinguish in a strict modular way between the syntactic level and the lexico-semantic level. Thus, the adjunct is a syntactic category on a par with the specifier and the complement, whereas the argument belongs to the same set as does (among others) the modifier. The consequence of this distinction is that there is no direct one-to-one opposition between adjuncts and arguments. Nor is there any direct one-to-one relation between adjuncts and modifiers.

The second and main purpose of the paper is to account for the well-known difference between the position of a specific set of modifiers (cause, time, place etc.) in, on the one hand, English and Swedish, on the other, German. In English and Swedish the default position of these modifiers is postverbal, whereas in German it is preverbal. Further, in English and Swedish, these modifiers occur in a mirror order compared with their German counterparts, an order which, from a semantic point of view, is not the expected one. I shall demonstrate that this difference is due to the different settings of the verbal head parameter, the former languages being VO-languages and the latter being OV-languages. I shall further argue that in English and Swedish these modifiers are base generated as adjuncts to an empty VP, which is a complement of the main verb of what I shall call the minimal VP (MVP), whereas in German they are adjuncts on top of the MVP. Finally, I shall argue that the postverbal modifiers move at the latest at LF to the top of the MVP, in order to take scope over it, the restriction being *Shortest move*. The movement results in the correct scope order of the postverbal modifiers.

The proposed structure also accounts for the binding data, in particular for the binding of a specific Swedish possessive anaphor *sin*. This pronoun, which may occur within the MVP, must not occur within the postverbal modifiers in the empty VP. This supports the assumption that there is a strict borderline between the MVP and the assumed empty VP. The account is also in accordance with the focus data, the specific set of modifiers being potential focus exponents in a wide focus reading in English and Swedish, but not in German.

1. Introduction

In GB-oriented literature the term *adjunct* is mostly used in the same way as is the term *adverbial* in traditionally oriented grammar descriptions. This means that the term is as vague as is the corresponding term *adverbial*, and it does not improve in clarity by as a rule being opposed to the argument.

The first purpose of this paper will be to show that it is necessary, in a strictly *modular* way, to distinguish between the syntactic level and the lexico-semantic level. The phrasal adjunct is a syntactic category, being daughter and sister (of a segment) of a maximal projection XP, in turn being a non-argument (see Chomsky 1986), whereas the argument is a lexico-semantic category, defined by its relation to a lexical head. At the syntactic level, the (phrasal) *adjunct* is a category in a set comprising also *specifiers* and *complements*, whereas at the lexico-semantic level the *argument* is a category in a set comprising (among others) also

¹ Preliminary versions of this paper have been presented at the conference on adjuncts in Oslo, "Approaching the grammar of adjuncts", at the seminars at the department of German and Nordic languages, and at Rutgers and Harvard. Thanks to the audiences for valuable comments and suggestions. Thanks also to Christer Platzack and Marga Reis for reading a preliminary version of the paper, and for many theoretical as well as empirical discussions and suggestions. An early version appeared in Working Papers in Scandinavian Syntax 64. This is an updated version.

modifiers. These two sets of categories are in turn systematically interrelated at the lexico-syntactic interface.²

The second purpose of the paper is to offer an explanation of the well-known fact that, for example, English and Swedish differ from German with respect to the *preferred* position of a specific set of modifiers, post-VP and pre-VP, respectively. Further, the English and Swedish modifiers occur in a mirror order compared with the German ones. The following example (borrowed and adapted from Quirk et al. (1986, 8.87)) illustrates this difference; the categories in brackets are partly mine; the nuclear accent (NA) is marked by capitals:

- (1) a. John was probably [speaker-related] working on his hobby [PP-object] with great intensity [manner] in the rose garden [place] for several days [time] because of the beginning CHILLiness [cause].
 b. Johannes hat vermutlich [speaker-related] wegen der einsetzenden Kälte [cause] mehrere Tage lang [time] im Rosengarten [place] mit großer Intensität [manner] an seinem HOBBY [object] gearbeitet.
 'John has probably because of the beginning chilliness for several days in the rose garden with great intensity on this hobby worked'

It is to be noticed, though, that in English as well as in German there are other possible positions for these modifiers besides the preferred ones (cf. Quirk et al. (1986), for a detailed description). At least one of them may turn up pre-verbally, too. For the purpose of this paper, however, these options are by and large neglectable.

I set out from the assumption that the difference in word order between English and German primarily follows from different settings of the basic head parameter (VO vs. OV). This presentation, therefore, may also be regarded as a rejection of the assumption that basically all languages are VO-languages (Kayne's LCA theory (1994)). For a detailed rejection of Kayne, see Haider (1999a), who proposes an alternative theory based on the Branching Constraint³ (the BC). Haider argues that the predictions made by Kayne's assumption do not hold in at least five areas: (a) particles (being VP-internal) do not occur in the same positions in English and German; (b) objects that should be moved out of the VP in German in order to result in the OV-order are not subject to the expected (opacity) restrictions in spec-positions; (c) obligatory VP-internal selected adverbials should turn up in postverbal positions in German, since they cannot move out of the clause. They do have their base position in front of the verbal head, however; (d) what is traditionally classified as VP-topicalization should be topicalization to a functional projection. Topicalized projections, however, cannot contain the trace of the finite verb in German because of a crossing violation; (e) the order of auxiliaries is a mirror order compared with English: in English, the modals appear in front of the main verb; in German, (as a rule) after the main verb. The result of Haider's argumentation is that "central implications of the LCA-system with respect to the analysis of OV-structures are not compatible with the full range of the empirical evidence".

The paper is organized in the following way. After a short description of the theoretical framework and the hypotheses in section 2, section 3 will be devoted to a discussion of the

² I shall, therefore, not use the term adverbial. As a rule, I shall instead use the term modifier, in order not to anticipate the syntactic analysis.

³ BC: "Projection-internal branching nodes on the (extended) projection line *follow* their sister node." "The linear aspect of the head-complement relation is determined by the parametric direction of structural licensing. Licensing to the left triggers the OV-structure, licensing to the right the VO-structure." Haider compares the two systems: "In both systems, movement to the right is blocked. The reason is straightforward: The structure presupposed or generated by movement to the right is characterized as illformed. In both systems, asymmetric c-command equals precedence. Since movement targets commanding positions, movement is to the left." The differences between the two systems are the following ones: In Kayne's system "OV is derivative of a basic VO-structure. In the BC-system, the OV-structure is a potential base structure /.../. A complex head-initial projection of a lexical head is a shell-structure with a head chain."

internal structure of what I shall call the minimal VP (MVP), demonstrating that the MVP in the two types of languages contain the same set of modifiers in the same order. In section 4 I shall discuss different proposals to come to grips with the post-VP order of the above-mentioned specific set of modifiers. In section 5, finally, I shall propose my own solution. Section 6 summarizes the results.

The languages used for the demonstration will be English, German and Swedish.

2. Theoretical framework and hypotheses

The syntactic framework of this paper will be the Minimalist Program, with some more or less important deviations from the main line, however. As for the lexicon, I shall assume that each lexical entry determines its lexical structure in terms of arguments and other selected categories and that the ranking of selected categories in lexicon will in turn determine their hierarchical positions in syntax.

In particular, the hypotheses will be the following ones:

1. As already mentioned, I assume a parametric difference between VO and OV languages. In its turn, this difference has consequences for the structure of the VP in these two types of languages, the former type having a VP organized as a Larsonian shell-structure (Larson (1988)), mostly with more than one head position⁴, the latter having a VP with only one head position, the head governing all constituents within the VP to the left (cf. Haider (1993, 1999a)). I will further assume (and argue for) a strict right branching clause structure, i.e. no right-adjunction, in accordance with the LCA as well as with the BC.
2. Another assumption will be that the only fixed base positions in syntax are the positions resulting from the discharge of the variables or θ -roles required by the main verb in lexicon, there being no principle from which we may derive other syntactic base positions, let alone movement of constituents (with resulting chains) (cf. Haider & Rosengren (1998)). Consequently, there cannot be any syntactically determined base positions reserved for "free" modifiers⁵. Their positions will be assumed to be scope positions determined by c-command and resulting from the interaction between their meaning and the meaning of the part of the clause which they c-command.
3. The above-mentioned modifiers in English and Swedish at the right edge of the clause will be assumed to be *adjuncts* to a VP with an empty head, below and to the right of the base position of the main verb. They are thus c-commanded by the main verb, whereas their counterparts in German are adjuncts to the MVP and c-command the main verb. As for the scope regularities of these modifiers, I will assume that, in English and Swedish, they are moved at LF, complying with the restrictions of *Shortest Move*.
4. It will finally be assumed that – irrespective of its semantic or syntactic category – the hierarchically deepest XP in a clause with basic word order will become the focus exponent (FE), carrying the nuclear accent (NA) in a wide focus reading⁶. If this is correct, the above-mentioned difference between OV- and VO-languages has consequences for the selection of which constituents may be FE in a wide focus reading in VO- and OV-languages, English and Swedish allowing, for example, time and place modifiers to have this function, whereas in German the same modifiers, occurring on top of the VP, cannot function in this way.

⁴ I will not make any commitments as to the question whether the empty V⁰s in the English and Swedish shell-structure are positions for light verbs, but I am not sure if this assumption is necessary, and it does not play any specific role for my own argumentation.

⁵ Cf. Frey & Pittner (1999) and Maienborn (1996, 1998), who propose syntactic base positions.

⁶ Note that this does not mean that there is only one pitch accent possible, namely, an accent on the FE. It only means that there must be a pitch accent on the FE.

I assumed above that modifiers which are not selected do not have a syntactically determined base position, neither in the MVP nor outside it. Their position is determined by their scope possibilities. From this follows that there cannot be any chains within or across the MVP except those arising from selected entities scrambling beyond other entities. In other words, non-selected modifiers do not scramble (see Haider & Rosengren (1998)). But, when narrowly focused, they may comply with the well-known tendency to place a narrowly focused constituent as far back in the clause as possible, although its expected scope position is further to the left. As for selected constituents, some of them (arguments and perhaps place- and time-modifiers) may scramble. Scrambling may, however, have other functions as well: thus scrambling out of the focus domain, in cases where the moved constituent is thematic, leads to a restriction of it. I shall assume that, whenever a selected constituent is not in its base position, it has scrambled.

Against the background of this focus theory, let us now look at the following examples. The focus reading is wide, when not otherwise indicated:

- (4) Was regt dich denn so auf / freut dich denn so?
 'what upsets you PRT so / makes happy you PRT so'
 What is upsetting you so / making you so happy?
- (5) a. daß Peter seine Zähne GRÜNDlich putzt
 'that Peter his teeth thoroughly cleans'
 that Peter thoroughly cleans his teeth
 b. daß Peter gründlich seine ZÄHne putzt (narrow?)
 c. daß Peter GRÜNDlich seine Zähne putzt (narrow)

We see that the modifier *gründlich* may occur to the left and to the right of the direct object (DO). More or less all informants seem to accept (5a) as a wide focus reading. As for (5b) they are much more uncertain in their judgment. This uncertainty may be due to the meaning of *gründlich*, which may be interpreted both as a subject-related and as a verb-related modifier. (I will henceforth use the following abbreviations: *s(subject)-related* and *v(erb)-related*, modifiers, when referring to MVP-internal modifiers, and *e(vent)-related* and *p(ropositional)-related* modifiers, when referring to assumed MVP-external modifiers.) Finally, the modifier in (5c) is narrowly focused, just as its position makes us expect.

The following modifiers are either s-related or v-related:

- (6) a. daß der Arzt gern einen Patienten GUT behandelt
 'that the doctor willingly a patient well treats'
 that the doctor willingly treats a patient well
 b. daß der Arzt gern einen PatiENTen behandelt
 c. daß der Arzt einen Patienten GERN behandelt (narrow)
 d. *daß der Arzt einen Patienten gut GERN behandelt
 e. *daß der Arzt gut/GUT einen PatiENTen/Patienten behandelt

Examples (6a/d) demonstrate that *gern* (s-related) and *gut* (v-related) cannot change their positions, presumably an effect of *gern* necessarily taking scope over *gut*. In (6b) the object, as expected, is the FE in a wide focus reading. But *gern* may also occur to the right of it (6c), however, only when narrowly focused. We may, therefore, assume that the DO has scrambled

in (6c) (cf. the Swedish data below), in order to place the narrowly focused constituent as far back in the clause as possible (see above). Contrary to this, the v-related modifier, irrespective of its being selected or not, cannot occur to the left of the DO, as (6e) and the following example demonstrate, where the modifier is non-selected:

- (7) a. daß Peter die Tür SCHIEF aufgehängt hat
 'that Peter the door awry hanged has'
 that Peter hanged the door awry
 b. ??daß Peter schief die TÜR aufgehängt hat

Cf. (5b) above and fn. 6: there, thus, may be more than one pitch accent in (7a), at least on the DO. As for (7b), the word order seems to be out.

We also find word orders, of course, where there is no real basic order:

- (8) a. Er hat seine Ferien in ITALien verbracht.
 'he has his leave in Italy spent'
 He has spent his leave in Italy.
 b. Er hat in Italien seine FERien verbracht.

 (9) a. Er hat eine phantastische Urlaubswoche auf einer INsel verbracht.
 'he has a phantastic week off on an island spent'
 He has spent a phantastic week off on an island.
 b. Er hat auf einer Insel eine phantastische URLaubswoche verbracht.
 'he has on an island a phantastic week off spent'

Although I think that (8a) and (9a) are somewhat more basic than (8b) and (9b), both variants may give rise to a wide focus reading, and in both cases the deepest XP is the focus exponent.

A somewhat more problematic modifier is *langsam*:

- (10) a. daß langsam Peter das ESSen kochen muß
 'that by and by Peter the food prepare must'
 that Peter by and by must prepare the food
 b. daß Peter langsam das ESSen kochen muß
 c. daß Peter das Essen LANGsam kochen muß
 'that Peter the food slowly prepare must'

As for (10) it has already been noticed by Frey & Pittner (1999) that *langsam* may have at least two positions: one in front of the direct object and one behind it. In (10a) the preferred reading is the one where *langsam* is interpreted as having the meaning 'allmählich', 'by and by', being a modifier taking the whole event in its scope (e-related). However, it may occur with this meaning to the right of the subject, too, (10b). This is unexpected, since the meaning of *langsam* cannot be s-related in this case. I will assume that *langsam* is outside the MVP in this case, too, and that the subject has moved to a position outside the MVP (see Rosengren 2000). Frey & Pittner give the following example, supporting this:

- (17) a. att Peter borstade sina tänder GRUNDligt
'that Peter brushed his teeth thoroughly'
b. att Peter grundligt borstade sina TÄNder (narrow)
c. att Peter GRUNDligt borstade sina tänder (narrow)

The behaviour of *grundlig* is the same as in German.

- (18) a. att läkaren gärna behandlar en patient VÄL
'that the doctor willingly treats a patient well'
b. att läkaren gärna behandlar en patiENT
c. *att läkaren behandlar en patient GÄRna
d. *att läkaren behandlar en patient väl GÄRna
e. *att läkaren väl/VÄL behandlar en patient/patiENT

Note the difference between (6c) and (18c). No scrambling in Swedish. No other differences compared with German.

- (19) a. *att Peter långsamt måste koka maten
'that Peter by and by must prepare the food'
b. att Peter måste koka maten LÅNGsamt
'that Peter must prepare the food slowly'

The e-related meaning of the modifier ('by and by') in (10a/b) is not possible in Swedish (19a).

- (20) a. att Peter bor mycket spartanskt i ett gammalt HUS
'that Peter lives very spartanly in an old house'
b. ??att Peter bor i ett gammalt hus mycket sparTANSKT (narrow)
c. att Peter bor mycket sparTANSKT / i ett gammalt HUS
d. att Peter äntligen BOR (narrow)

The difference between (20b) and (12c) may be due to the prohibition against scrambling in Swedish. For the rest, the word order is in principle the same as in German.

- (21) a. att Peter dansade på gräsmattan hela NATten
'that Peter danced on the lawn the whole night'
b. att Peter hela NATten dansade på gräsmattan (narrow)

We cannot directly compare (13a) with (21a), since the time-modifier is on top of the MPV in German and obviously (cf. also (1)), prototypically, is to the right of it in Swedish. I will return to this kind of difference below.

Finally the SPs:

- (22) a. att Peter torkade rent BORdet / torkade bordet RENT
'that Peter wiped clean the table / wiped the table clean'
b. *att Peter rent torkade bordet

- (23) a. att Peter åt köttet RÅTT
 'that Peter ate the meat raw'
 b. *att Peter rått åt köttet
- (24) a. att Peter lämnade rummet TRÖTT
 'that Peter left the room tired'
 b. ??att Peter trött lämnade RUMmet

The SPs (22)-(24) behave in principle as in German, the differences being due to the Swedish shell structure. As (22a) demonstrates, the last constituent will be the FE. Note, however, that the first variant with the modifier in front of the DO resembles the German counterpart (14a), the verb and the modifier forming a kind of verbal complex with the main verb. The unacceptability of the b-cases is probably due to the Swedish shell-structure. It is not possible to place MVP-internal material outside the MVP.

Summarizing, we may conclude that in Swedish the MVP contains the same set of arguments, modifiers and SPs as in German, with in principle the same positions and word orders, the differences being due to the different VP-structures and the prohibition against scrambling in Swedish. We may, therefore, expect that these modifiers will precede the post-verbal modifiers. This assumption is supported by the word order in (1). In the next section, we shall discuss the position of these modifiers in some detail.

4. MVP-external modifiers

As was already demonstrated in (1), MVP-external modifiers (for instance, cause-, time- and place-modifiers) differ as to their positions and relative order in English and Swedish compared to German. I shall discuss some proposed solutions to capture this difference.

4.1. Cinque's functional spec-theory

It is evident that Cinque's (1997) theory (as Cinque himself acknowledges, p. 40ff.) cannot satisfactorily explain the English and Swedish data. All the same, it is, of course, worth discussing whether it could explain the German data. As Haider demonstrates (1998, 1999b), however, this is not the case either. Haider takes as his starting point the well-known prohibition against extraction in English in the following cases (the examples are borrowed from Haider (1999b)):

- (25) a. Which house_i did you leave the car at e_i?
 b. the car e_i that he left his coat in e_i (Quirk et al. (1985:664))
 c. the day which_i/that she was born on e_i (Quirk et al. (1985:1254))
- (26) a. the constraint_i that it became difficult [to talk about e_i]
 b. *the constraint_i that [talking about e_i] became difficult
 c. *Which kind of constraints_i did [talking about e_i] become difficult?

These data show that it is impossible to extract out of subjects in spec-positions in English. This is well-known. The following example demonstrates extraction out of a PP-object, which is not possible either:

(27) *Who_i did [to e_j] she give it?

As Haider admits, however (p.c.), there may be problems with wh-movement and topicalization. He proposes instead the following examples with embedded clauses:

(28) I think that to Peter you would not give such a present.
*I wonder who_i [to e_j]_j you would not give such a present e_j.

(29) I think that a picture of Dix he would buy.
I wonder who_i he would buy a picture of e_j.
*I wonder who_i [a picture of e_j]_j he would buy e_j.

Contrary to English, German allows extraction out of what, according to Cinque's theory, should be spec-positions, since the positions are in front of other assumed spec-positions:

(30) a. Wen_i hat [e_j damit zu überzeugen]_j *schon jemals* wer versucht e_j?
'Who has [it-with to convince] already ever someone tried?'
Who has someone ever tried to convince with this?
b. Wen_i ist [e_j damit zu überzeugen]_j *leider kaum* wem gelungen e_j?
'Who has [it-with to convince] unfortunately hardly someone succeeded?'
Who did unfortunately hardly anyone succeed to convince with this?

Haider concludes that the expected spec-positions in German are VP-positions (in tree (3) above: adjuncts). He also emphasises that, in clear cases of spec-positions in German, the relevant opacity conditions operate as in English. Such clear cases are, for instance, positions preceding the finite verb in V2-clauses. In these cases extraction is not possible in German, cf. Haider (1998), example (14).

Haider mentions some more data which seem incompatible with Cinque's analysis. I shall not comment on all of them here, only point to two of them. Cinque's analysis requires that pre-VP-modifiers occur in a fixed order in all languages. This is not always the case. Thus, it is possible to arrange modifiers of this kind in different positions. Cinque is, of course, aware of this possibility and accounts for it by assuming that these modifiers have different meanings. But as Haider argues, not their meaning is different, their scope is different. The following German example demonstrates this clearly (the same holds, in principle, for its Swedish counterpart):

(31) a. Peter hat leider gestern aufgrund einer Erkältung kaum etwas essen können.
'Peter has unfortunately yesterday because of a cold hardly anything been able to eat'
Peter could unfortunately hardly eat anything yesterday because of a cold.
b. Peter hat gestern leider aufgrund einer Erkältung kaum etwas essen können.
c. Peter hat aufgrund einer Erkältung gestern leider kaum etwas essen können.

We would also expect a prohibition against stacking, of course, since the spec-positions do not form a constituent. But stacking is possible in German, as well as in English and Swedish. The following example is borrowed and adapted from Haider (1999b):

- (32) [Im Hörsaal als der Vortrag begann] hustete er wie verrückt.
'In the auditory when the lecture began coughed he like mad'
In the auditory when the lecture began, he coughed like mad.

I shall return to the stacking problem below, since it is a problem for an adjunct analysis, too.

As already mentioned above, Cinque (1997, 40ff.) is conscious of the specific problem connected with the post-VP-modifiers⁹. He first notices that these modifiers are typically realized in prepositional form or are bare NPs. Furthermore "they cannot appear in any of the pre-VP positions open to AdvPs proper". Finally, they do not have operator status. They are modifiers "predicated of an underlying event variable". It is necessary, therefore, to treat this type of modifiers in another way than the typical pre-VP-modifiers. One of his examples is the following one:

- (33) a. He attended classes every day of the week in a different university.
b. He attended classes in each university on a different day of the week.

He mentions that these adverbials are interchangeable, "depending on their mutual structural relation". Since he also changes the quantifier in (33), we had better keep to the above assumption that the prototypical post-VP-order (cf. example (1)) is place>time, i.e. the reverse order compared with the corresponding pre-VP-modifiers. It is this difference which we have to account for.

Cinque discusses two possible accounts for the postverbal positions of these circumstantials: one is the tentative proposal found in Chomsky (1995), namely, that "if a shell structure is relevant at all, the additional phrases might be supported by empty heads below the main verb" (p. 333). I shall propose a solution in this direction below.

Tentatively, Cinque proposes another solution (suggested to him by Øystein Nilsen), where the modifiers are predicates predicated of VP. As for the following variant of (33):

- (34) John attended classes at the university every day.

this would mean that *at the university* is predicated of the VP *John attended classes*, and *every day* is predicated of the larger VP *John attended classes at the university*. According to Cinque, a variant of this proposal would be to regard this structure as derived from a base structure where the adverbials are in VP-spec-positions on top of the VP containing the phrase *John attended classes*. Not telling how this derivation is brought about, he concludes that further work is necessary and leaves the topic.

Since none of these solutions are really elaborated, we have to conclude that Cinque does not solve the problem that we set out to solve. We may therefore leave his proposals and look for more adequate solutions.

4.2. Right-adjunction

The binding of anaphors plays an important role in the look-out for an adequate proposal. The following data, known as Pesetsky's paradox, demonstrate the problem (Pesetsky's data (1995)):

⁹ He calls them circumstantials, this type comprising (among others) place, time, reason, purpose and manner; note that I have tried to show above that manner modifiers are MVP-internal; they should therefore not be subsumed under circumstantials.

- (35) a. He photographed each_i one with greatest care on his_i birthday.
 b. He photographed them_i with greatest care on each other's_i birthday.
 c. and [give the book to them_i] he did in the garden on each other's_i birthday

The examples (35a/b) demonstrate the base position of the time-modifier and the expected binding of the anaphor. Example (35c), however, gives rise to the assumption that, on the one hand, there cannot be any c-command of the anaphor, since the topicalized constituent would not be able to topicalize, were it not a constituent to the right of the anaphor. On the other hand, the binding of the anaphor suggests that it is c-commanded by its antecedent. Hence the paradox. Pesetsky tries to solve this problem by assuming that each clause has dual structures, one left-branching and one right-branching. This is a very uneconomic solution, to say the least, and it does not have any theoretical back up either. There are also other problems connected with it (see Phillips 6.1.2.).

Ernst (1994) (cf. also (1998, 1999)), argues instead for a traditional right-adjunction analysis, i.e. right adjunction somewhere above the VP, based on m-command + precedence. It is under the ban of the LCA and the BC (see fn. 3), which I think is a severe shortcoming. By and large, it makes, however, the right predictions as to word order, right adjunction resulting in the overt word order with the place and time modifiers on top of the VP and hence to the right of the MVP. As argued by Ernst, it may also account for the above binding data.

But what about the following Swedish binding data? It is well-known that the subject may bind the possessive anaphor *sin* in Swedish (see Teleman et al. (1999, 2, 326ff.)). As for the object, however, there are restrictions¹⁰. Cf. the following examples:

- (36) a. Jag la tillbaka fläsk_i i dess_i/sin_i förpackning.
 'I laid back the bacon in its wrapping'
 I returned the bacon to its wrapping.
 b. Jag la barn_i i dess_i/sin_i säng därför att det skrek så.
 'I laid the child in its bed because it screamed so'
 I put the child to bed because it yelled.

In (36) we have a directional modifier, which, according to the theory proposed above, has its position within the MVP, c-commanded by the DO, this in turn binding the anaphor *sin*. The following example, in which the anaphor is ungrammatical, is not easily accounted for by Ernst's analysis:

- (37) a. Jag fotograferade var och en_i med stor omsorg framför hans_i/*sin_i port på hans_i/*sin_i födelsedag.
 'I photographed each one with great care in front of his doorway on his birthday'
 b. Jag fotograferade vännerna_i med stor omsorg på deras_i/?varandras_i/*sin_i födelsedag.
 'I photographed the friends with great care on each other's birthday'

What we see here is that *sin* is quite ungrammatical when occurring in a place and time modifier at the end of the clause (there is also some doubt about the reciprocal anaphor, which seems to be acceptable in English). Cf. also:

¹⁰ These data were pointed out to me by Cecilia Falk. Thanks for discussing them with me.

- (38) a. Jag hörde henne_j sjunga sina_j egna låtar på sin_j födelsedag.
 'I heard her sing her own songs on her birthday'
 b. *Jag hörde henne_j på hennes_j/*sin_j födelsedag.
 'I heard her on her birthday'

The object in the ECM-construction (38a) is the "subject" of the embedded construction and therefore binds the anaphor, whereas in (38b) the object is a complement itself and, obviously, cannot bind the anaphor.

The following unselected place modifier is v-related (within the MVP) and allows *sin*:

- (39) a. Jag planterade blommorna_j i deras_j/sina_j gamla krukor.
 'I planted the flowers in their old pots'

Cf. also the following examples, where *sin* is blocked in the PP in (40b), being a post-verbal modifier, but not in (40a), where the PP is an object within the MVP:

- (40) a. Vi eggade upp barnen_j mot deras_j/sina_j föräldrar.
 'we roused the children against their parents'
 b. Vi fick med oss studenterna_j trots deras_j/*sina_j protester.
 'we made the students come along in spite of their protests'

The rather sharp borderline in Swedish between binding of possessive *sin* within the assumed MVP and blocking it within the assumed post-VP-modifiers seems to call for another account than the one proposed by Ernst, there being no borderline in his VP, which could account for these differences.

One more question may be mentioned with regard to Ernst's account. How does focusing work in Ernst's model? I have maintained (Rosengren (1993, 1997)) – as have most linguists working in this field – that focusing is hierarchically based in the syntactic tree (see above). In a wide focus reading, the focus feature is assigned to the VP, and the FE should be at the bottom of the focus domain (cf. above). PF is assumed to operate on the syntactic structure, assigning the NA to the FE. As is correctly argued by Mörnjö (1999), the post-VP-modifiers in Swedish are FEs in wide focus readings. If we accept right-adjunction, this must mean that the FE will be as high up in the tree as is the last post-VP-modifier. This proposal requires, therefore, another kind of focus theory, where the focus feature is assigned to a constituent as far right as possible in the linear structure. From this position it may result in a wide as well as narrow focus reading. Such a focus theory may be developed, but it does not exist yet, and I do not think that it will be able to account for all focus data. I will just mention some data which may be difficult to account for against this background. With a linear account, we have to explain why the verb in the embedded German clause (being the last constituent) cannot be FE (see Mörnjö's (1999) discussion of Zubizarreta's (1998) proposal), and, also, why the manner and time modifier in (6c), (12c), (13c), being overtly the last XP, cannot be FE in a wide focus reading. As far as I understand, a linear account would not be able to identify hierarchical differences responsible for these restrictions.

Summarizing: it seems difficult to accept a right-adjunction analysis. There are theoretical as well as empirical objections against it.

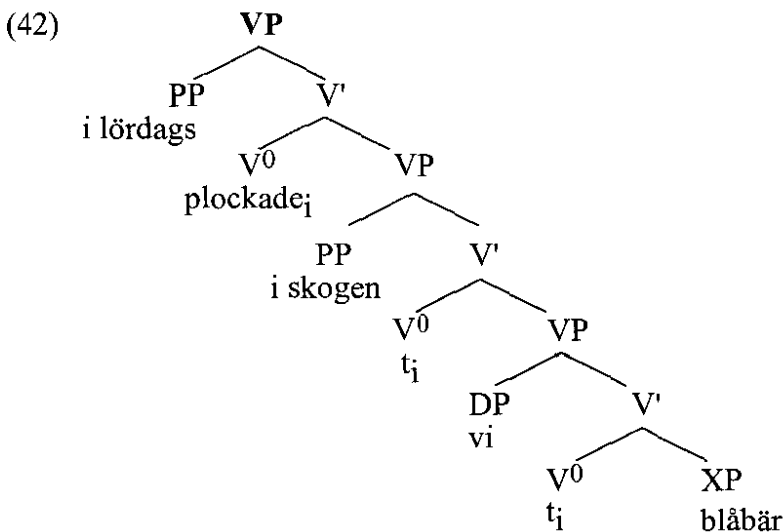
4.3. Short raising of V and N in Scandinavian

Josefsson & Platzack (1998) propose another account of the right position of the modifiers, starting with the following examples:

- (41) a. att vi inte plockade blåbär i skogen i lördags
 'that we not picked blueberries in wood-the in Saturday'
 that we did not pick blueberries in the wood last Saturday.
 b. att vi inte hade plockat blåbär i skogen i lördags
 'that we not had picked blueberries in wood-the last Saturday'

First, they reject a solution in which the modifiers are merged in VP-shells below the direct object. One of the reasons for rejecting this solution is that the DO would be generated in different positions, depending on the existence of modifiers. This would, of course, be an unwanted result, the head-complement relation being "fundamental and 'typically, associated with thematic θ -relations' (Chomsky (1995:172))". Another objection, related to this objection, is a conceptual one: the external and internal θ -roles should have distinct positions in order to guarantee that they are assigned to the right chains.

They, thus, assume that the modifiers at the right edge of the clause are base generated on top of the VP and that the material to the right is moved out of the VP to the left. The following tree represents the basic hierarchy:



The relevant features are strong but hosted below the negation, which is evident from (41); since the examples are subordinate clauses, the verb is not raised to the V2-position.

This account is somewhat *ad hoc*, however. First, we may notice that the assumed position of the relevant modifiers in (42) are in spec-positions within the shell structure of the VP. They, thus, have the same status as have the subject and the DO. This assumption needs some more theoretical support to be convincing. Second, even if we would assume that they are *adjoined* to the whole MVP, there is no empirical evidence supporting this idea, since there is no overt order corresponding to the word order in (42). Third, the proposal does not account for the above discussed behaviour of Swedish *sin*.

In support of their account, J & P notice, however, that DP-objects but not PPs seem to move past the modifiers, which follows from their account that case movement is triggered by ϕ -feature attraction. Further they assume free scrambling within lexical shells. Their example is the following one:

- (43) a. Han kan tänka på sådana problem koncentrerat i flera timmar.
 'he may think about such problems attentively for several hours'
 He may think about such problems attentively for several hours.
 b. ??Han kan tänka på sådana problem i flera timmar koncentrerat.
 c. Han kan tänka koncentrerat på sådana problem i flera timmar.
 d. Han kan tänka koncentrerat i flera timmar på sådana problem.
 e. Han kan tänka i flera timmar koncentrerat på sådana problem.
 f. ??Han kan tänka i flera timmar på sådana problem koncentrerat.

There are some problems with this argument, though. First, *koncentrerat* 'attentively' is an s-related manner modifier. As already mentioned above, there are reasons to assume that such a modifier has its scope position within what I have called the MVP, directly after the position of the finite verb (giving rise to (43c)), although it may occur after the DO, too (giving rise to (43a)), which is somewhat more marked, however. Second: as (44b) demonstrates, the DO does not easily move to the left of the manner modifier. Why is this so, if the DO moves out of the VP? Third: much the same holds for the PP-object (44c), also being part of the MVP. It does not like scrambling past the manner modifier.

- (44) a. Han skrev snabbt ett brev till sin väninna på hennes födelsedag.
 ' he wrote quickly a letter to his friend on her birthday'
 b. *Han skrev *ett brev* snabbt till sin väninna på hennes födelsedag.
 c. *Han skrev ett brev *till sin väninna* snabbt på hennes födelsedag.

Data such as (43) and (44), therefore, do not seem to support the account of J & P rightaway. (Cf. also Haider & Rosengren (1998), who maintain that scrambling is only possible in OV-languages.)

The second main argument provided by J & P for their account of the position of modifiers is the compulsive position of CP-objects:

- (45) a. Han hade avslöjat för henne på bussen att de var gifta.
 'he had revealed for her on bus-the that they were married'
 He had revealed to her on the bus that they were married.
 b. ??Han hade avslöjat [att de var gifta] för henne på bussen.

German, too, places its CP-object to the right of the clause, in German, obviously, due to extraposition. (For a detailed discussion of extraposition in German, see Buring & Hartmann (1995); Haider (1995, 1997); Rosengren in preparation):

- (46) a. Er hatte ihr im Bus anvertraut, daß sie verheiratet seien.
 'he had her in the bus revealed that they were married'
 He had revealed to her on the bus that they were married.
 b. ??Er hat ihr, daß sie verheiratet seien, im Bus anvertraut.

If it is extraposition in German, it may be extraposition in Swedish, too, in spite of the fact that extraction out of the CP-clause but no out of an extraposed DO is possible:

- (47) a. Han hade sett i affären idag en lampa med guldfot.
 'he had seen in shop-the today a lamp with golden foot'
 Today he had seen a lamp with a golden foot in the shop.
 b. ??Vad hade han sett i affären idag en lampa med _ ?

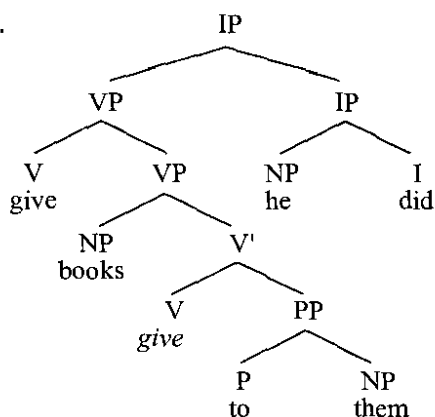
The most problematic drawback, however, is that J & P do not account for the mirror order of the relevant modifiers at the right edge of the clause. Nor do they discuss focus data.

4.4. The incremental derivation theory

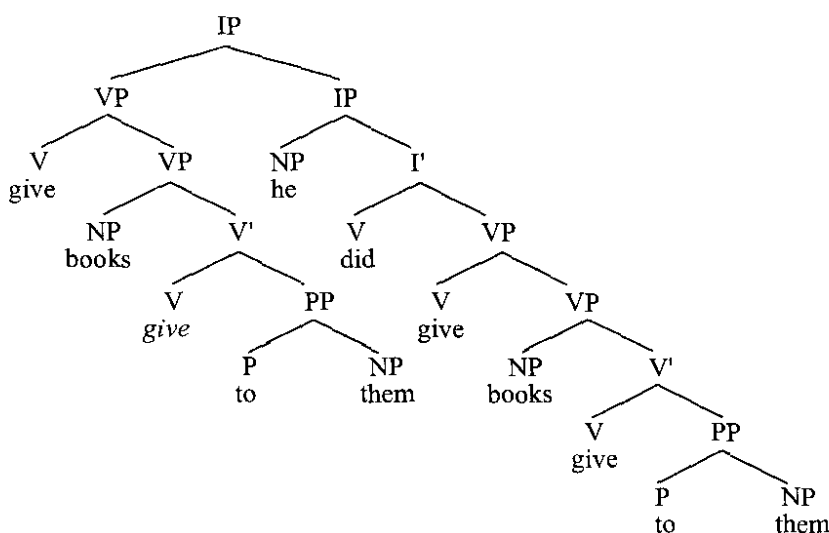
Still another proposal is found in Phillips (1998). Phillips starts out from the assumption that tree structures are formed incrementally from smaller segments, from left to right. This means that parts of the final structure may move (e.g. topicalize) before the rest of the structure is added. This solves the problem connected with Pesetsky's paradox. Phillips demonstrates the procedure by the following tree structures, constituting (48):

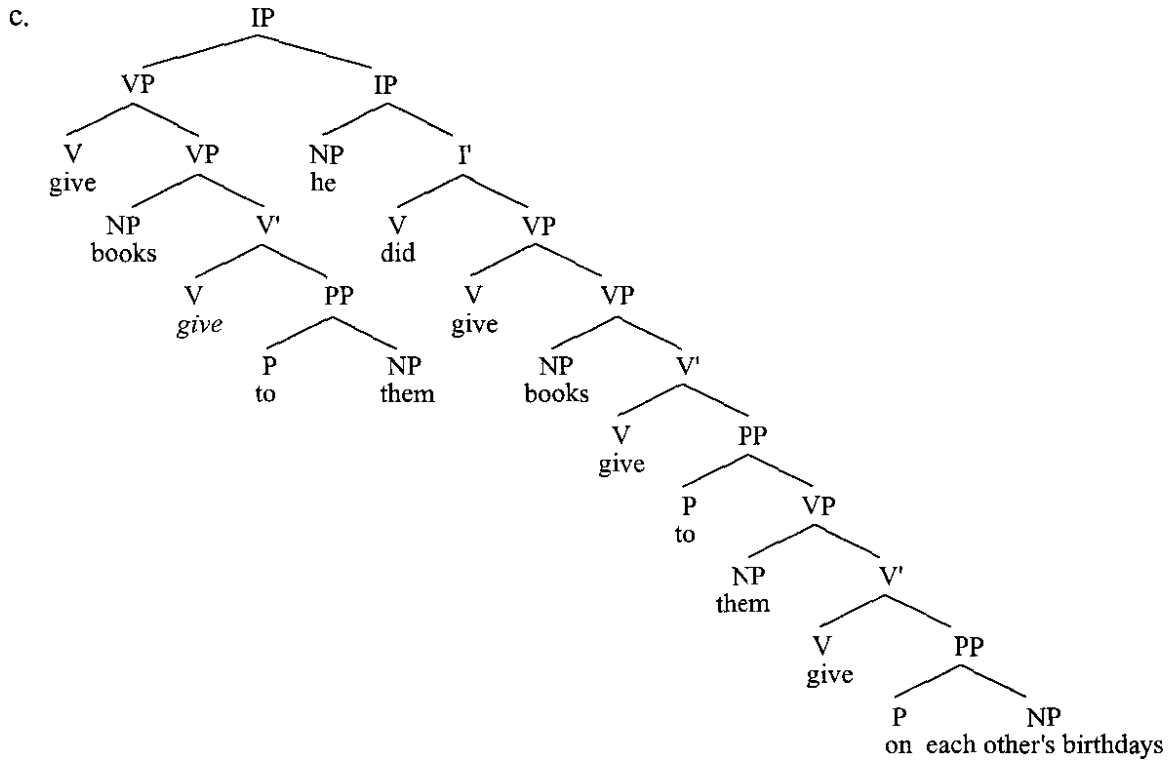
- (48) Give the books to them he did on each other's birthdays.

(49) a.



b.



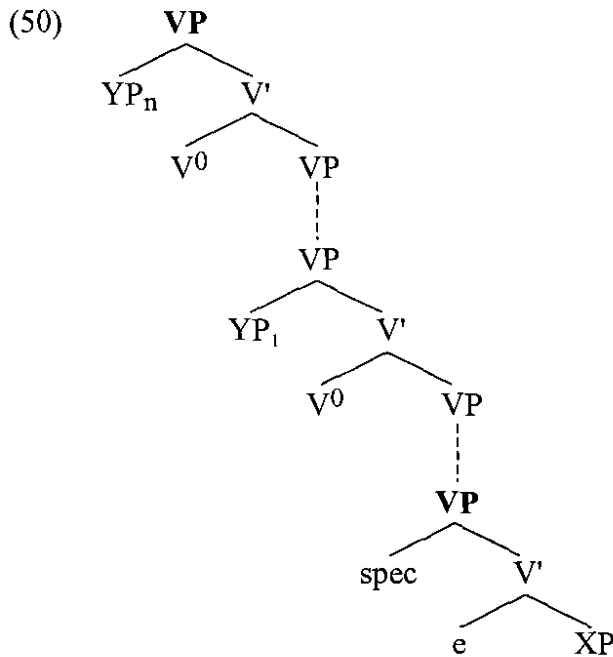


The three structures show how the final structure is built up by first copying the fronted VP-material (49a) into its underlying position in (49b), in which θ -assignment is possible. In (49c), then, "the stranded PP containing the anaphor *each other* is added to the right of the reconstructed VP, at the bottom of the right-branching VP" (Phillips, 15). The created structure allows appropriate c-command and hence binding of the anaphor. Note that the procedure has the effect of destroying the constituency of the copied VP. The consequences are most evident in (49c), where *them* appears in the spec-position of the added VP, whereas in (49b) it is the complement of P. This model is interesting but stipulative, and in its present shape neither capable of accounting for the fact that the modifiers occur at the bottom of the tree, nor capable of accounting for the mirror order between them. Finally, it does not account for the above mentioned binding differences with regard to the possessive anaphor *sin* in Swedish (section 4.2.). However, what is worth speculating about is Phillips' general assumption that the tree structure may be built incrementally. I shall return to this below, when discussing my own solution.

Summarizing, this section has shown that none of the proposed accounts of modifiers at the right edge of the clause satisfactorily covers the relevant data concerning binding, focus and word order.

5. A solution for English and Swedish?

The account of the modifiers that I shall present here, is based on a proposal made by Haider (1995, 1997, 1999b), who, in turn, bases his proposal on Phillips (1998): syntactic structures are built incrementally. Haider further assumes that the postverbal modifiers in, for example, English are base generated in an position outside and below the VP, in a VP with an empty head:

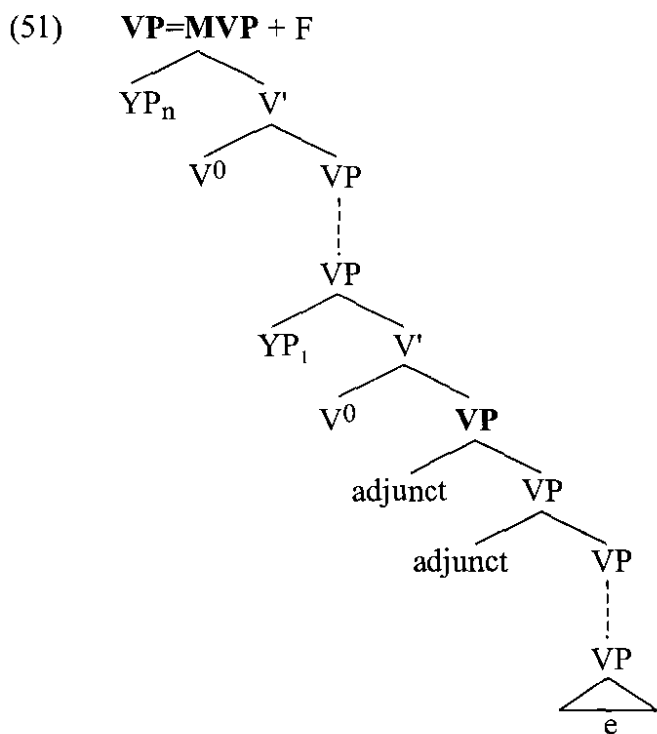


According to Haider (1999b), the empty head differs from a lexical head (being a licenser and an identifier) in being only a structural licenser: "it guarantees endocentricity plus binary branching, and it must be structurally licensed by a lexical head itself". The differences between English and German are due to the modifiers in an OV-language being integrated in an incomplete VP, whereas, in the VO-language they are incrementally added to a complete VP. This also accounts, of course, for Pesetsky's paradox. Further, the mirror order is a result of the extraposition of the modifiers, the VP-closer modifier preceding the more remote modifier. "Being unselected, they are semantically integrated in a linearly incremental fashion." As far as I can see, this proposal does not explain, however, how the semantic integration (i.e. the composition of the meaning of the clause) is brought about.

Yet another thing is not quite understandable in this proposal: the modifiers (say, a time modifier and a place modifier), being adjuncts in German on top of the VP, are, in the English version, in a spec-position and a complement-position respectively. Since they are assumed to take scope over the whole VP, this is an unwanted result. They should be adjuncts.

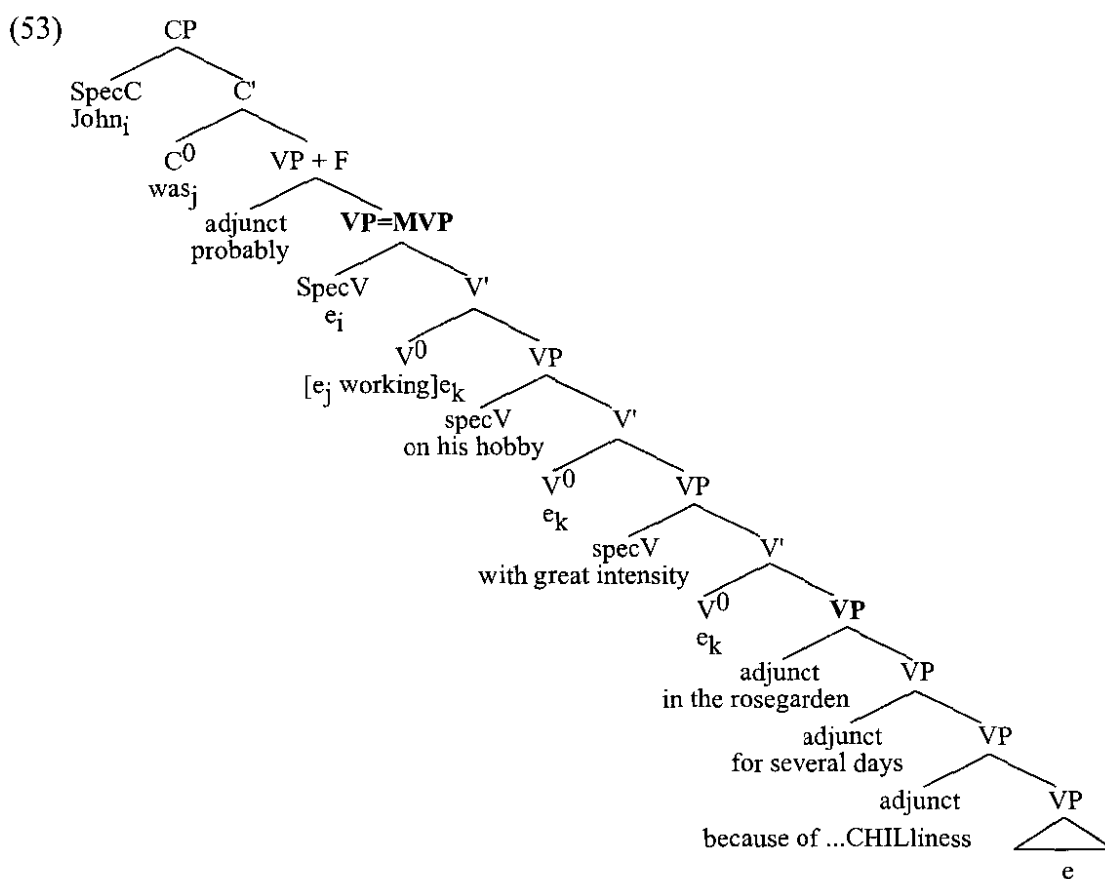
Concluding this discussion, it could be said that Haider's assumption that the postverbal modifiers are in a kind of extraposition domain, being structurally licensed by an empty head, is probably the best proposal hitherto. I believe, however, that the structure of this VP cannot be the one proposed by Haider.

My own solution, therefore, differs somewhat from the one proposed by Haider. It seems more adequate to assume that the extraposed complement-VP is a VP with an empty head, to which place, time and cause modifiers (and perhaps some other types as well) are *adjoined*. The only function of the empty head is to project to a VP, and (being a kind of expletive head) it will be deleted at the latest at LF. This assumption would result in the following structure:



Example (1), here repeated for convenience, will result in (53):

(52) John was probably [speaker-related] working on his hobby [PP-object] with great intensity [manner] in the rose garden [place] for several days [time] because of the beginning CHILLiness [cause].



In line with Phillips and Haider, we may assume that the completed VP is produced before the postverbal modifiers are added. If the extraposed VP further has its own (empty) head and only as a whole is a complement of the main verb, without having any other link to the MVP than being in the c-command-domain of the main verb, we will, of course not expect it to react as part of the MVP. This accounts for the quite sharp borderline between MVP-internal and MVP-external modifiers with regard to binding of Swedish *sin*. There is no link from the closed VP to the postverbal VP which would allow binding of possessive *sin* in postverbal modifiers.

The problematic stacking mentioned above is, of course, not easy to explain. Remember that in V2-clauses, the initial field normally does not allow topicalization of more than one constituent. How, then, is stacking possible at all? Interestingly enough, the stacked constituents turn up in the reverse order *place>time>cause*, where *place* does not take scope over *time*; *time* not over *cause*. The modifiers rather seem to be at the same level, taking scope over the clause separately. They, thus, just as in English, do not seem to form a constituent:

- (54) Framför hans/*sin port på hansj/*sinj födelsedag fotograferade jag honomj med stor omsorg.
 'In front of his door on his birthday photographed I him with great care'
 In front of his door on his birthday, I photographed him with great care.

The reverse order gives rise to the assumption that the modifiers have moved from a postverbal position (much the same may hold for stacking in German (cf. above (32))). In this position they are adjuncts to an empty VP. In some way or other, they manage to topicalize separately. If the above assumption that they are adjuncts to a VP with an empty head, is correct, the only possibility to topicalize as one constituent would be that the VP with the empty head topicalizes, too. The following example supports, however, the assumption that the VP does not topicalize:

- (55) a. Vi meddelade Peter via e-mail på hans födelsedag att vi skulle besöka honom en annan gång.
 'we informed Peter via e-mail on his birthday that we would visit him another time'
 b. *På hans födelsedag att vi skulle besöka honom en annan gång, meddelade vi honom via e-mail.

If our assumption that what is extraposed in German is extraposed in Swedish is correct, we may assume that the constituent-clause in (55a) is extraposed. We may further assume that it is located within the empty VP, since it obviously is a complement. But why can it not stack together with the time modifier in (55b)? The reason seems to be that the modifiers (being adjuncts) and the object-clause (being a complement of the empty V^0) cannot stack in the initial field together because of their different status. They are not three separate constituents at the same level and the VP itself cannot move. The following set of examples supports this account:

- (56) a. Peter sa till henne utanför restaurangen direkt efter middagen trött och ledsen över alla diskussioner att han inte tänkte följa henne hem.
 'Peter said to her outside the restaurant directly after the dinner tired and sad about all discussions that he did not intend to accompany her home'
 b. Utanför restaurangen direkt efter middagen trött och ledsen över alla diskussioner sa Peter till henne att han inte tänkte följa henne hem.

- c. *Utanför restaurangen direkt efter middagen trött och ledsen över alla diskussioner att han inte tänkte följa henne hem sa Peter till henne.
- d. Att han inte tänkt följa med henne hem sa Peter till henne utanför restaurangen direkt efter middagen trött och ledsen över alla diskussioner.

Leaving the object-clause behind makes the topicalization in (56b) acceptable (cf. (56c)). (Note that the s-related depictive may occur together with the modifiers in the initial field; cf. also (16) and (24)). What is topicalized in (56a), hence, is a separate place and time modifier (together with an SP) without the empty head (and the constituent-clause). As expected, the constituent clause may topicalize alone, cf. (56d).

The most intriguing question has, however, not been answered yet. Why do we have this double VP at all, it being much easier to understand a structure like the German one with pre-MVP modifiers. I will assume that the reason is to be looked for in the difference between German as a left-governing language and English and Swedish as right-governing languages (see also Haider 1998, 1999b). It goes without saying that if the verb governs to the left, it may govern the whole verbal extension within the VP. It is obvious that this cannot be the case in English and Swedish. Adjuncts on top of the MVP will not be in the licensing domain of the head (see Haider, who distinguishes between a direct and an indirect licensing domain). Since this is the case, they prefer the position to the right of the closed VP¹¹. But in this position, they cannot take scope over the MVP. The only way out of this dilemma is, I believe, to assume that they will be moved to an adjunct position on top of the MVP, the restriction being *Shortest move*, operating on the modifiers in the order in which they occur. In this pre-MVP-position, they then get the correct position for scope-taking: in (1) *cause>time>place*. Modifiers like *probably*, *actually* etc (p-related modifiers) – also taking the whole VP in their scope, but, since they are operators, not needing this type of licensing – will, of course, not turn up post-verbally. This does not prevent them from being adjuncts, however.

Finally, the focus behaviour may get an explanation, too. If focusing is the result of +F being assigned to the syntactic structure before spell-out, +F, assigned to the top of the VP, will automatically define a focus domain comprising the whole clause below it. If, further, the word order is basic, a FE far back in the clause will automatically give rise to a possible wide focus reading. This is the reason why a time-modifier in Swedish may be FE in a wide focus reading, whereas the same modifier in German cannot, since it is adjoined on top of the MVP.

6. Summary

In this paper I have argued that it is necessary, in a strictly modular way, to distinguish between the syntactic and the lexico-semantic level. The *adjunct* is a syntactic category in a set comprising also the *complement* and the *specifier*, whereas the *argument* is a category in a set comprising among others also *modifiers*. I have furthermore tried to provide an explanation, based on different settings of the verbal head parameter (VO vs. OV), of the positions (postverbal vs. preverbal) as well as of the reverse order of a set of modifiers (cause, time, place etc), taking scope over the whole VP. I first demonstrated that these languages have the same order, with regard to arguments and modifiers within what I called the MVP. I then reviewed some recently suggested proposals, trying to capture the difference with regard to the VP-external modifiers, all of which, however, were shown to have certain shortcomings,

¹¹ Note that I assumed above that it would be possible to adjoin at least one of these modifiers to the left of the MVP in English and Swedish, too. As a rule, however, this word order then is slightly marked. There may be focus differences as well.

preventing them from accounting for all data. My own solution is based on a proposal by Haider (1998, 1999b), who assumes that the postverbal modifiers are complement and specifier in a VP with an empty head. Also this solution has some shortcomings, however, and I, therefore, suggested that in English and Swedish the MVP-external modifiers are generated as adjuncts to an empty VP, the head of which is not coindexed with the head of the MVP. It is deleted at the latest at LF. The remaining modifiers, being in the mirror order compared with the preverbal modifiers, are moved to the top of the lexical MVP, the restriction being *Shortest Move*, operating on the modifiers in the order in which they occur. This solution does not only explain the position and mirror order of the modifiers in English and Swedish, compared with German. It is also in accordance with the binding data of the possessive anaphor *sin* in Swedish, and, in addition, it may contribute to account for specific properties of stacking. Finally, it also accounts for the focus data in English and Swedish, these modifiers (contrary to their counterparts in German) being potential focus exponents in a wide focus reading. The consequence of this proposal is that the overt syntactic difference between, on the one hand, English and Swedish, on the other, German, will vanish at LF, both types of languages at LF having the same preverbal modifiers in the same order.

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Secondary Predication and Aspectual Structure

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Abstract

This paper presents an analysis of secondary predicates as aspectual modifiers and secondary predication as a summing operation which sums the denotation of the matrix verb and the secondary predicate. I argue that, as opposed to the summing operation involved in simple conjunction, there is a constraint on secondary predication; in the case of depictives, the event introduced by the matrix verb must be PART-OF the event introduced by the secondary predicate, where e_1 is PART-OF e_2 if the running time of e_1 is contained in the running time of e_2 , and if e_1 and e_2 share a grammatical argument. I argue resultative predication differs from depictive predication in that the PART-OF constraint holds in resultative constructions between the event which is the culmination of e_1 and e_2 ; formally, while depictive predication introduces the statement PART-OF(e_1, e_2), resultative predication introduces the statement PART-OF(cul(e_1), e_2). I show that this is all that is necessary to explain the well-known properties of resultative predication.

1. Introduction

This paper presents a discussion of the semantic function of secondary predication. I argue that secondary predicates are aspectual modifiers in the sense that they introduce a new event and define a relation between it and the event introduced by the main predicate. I consider this aspectual modification since it presents the main event in the context of its relation with another event, and this may have the effect of explicitly changing the aspectual character of the matrix, or main, event. I begin by presenting some of the properties of secondary predication which any account has to explain. I go on to distinguish explicitly between secondary predicates and nominal modifiers, on the one hand, and between secondary predicates and adverbials on the other, and I argue that secondary predicates are related to the matrix eventuality via a relation of event summing, which is essentially the same as the summing operation which Lasnik (1992) argues is the core of the conjunction relation. In the second part of the paper, I show that there are constraints on the secondary predication relation; specifically, there is a temporal 'part-of' relation and a constraint that the matrix verb and secondary predicate share a grammatical argument, and I show how this explains some of the most characteristic properties of both depictive and resultative predication. Although this paper is self-contained, it is part of a bigger project on the nature of incrementality and the structure of accomplishments, and space constraints mean that I won't be able to go into all the detail that I'd like.

The basic data that we have to deal with are as follows:

- (1) a. John painted the house_i red_i.
b. Mary drank the coffee_i hot_i.
- (2) John_i drove the car drunk_i.

The examples in (1) are object-oriented predicates. (1a) is a resultative: the sentence means roughly "John painted the house and as a result the house was red, and (1b) is a depictive, and

- d. *What Mary did hot was drink the coffee.
- e. What Mary did was paint the house red.
- f. *What Mary did red was paint the house.

Second, secondary predicates may stack, as shown in (8):

- (8) a. Bill_j [[drove the car_i broken_i]_{V'} drunk_j]_{VP}
- b. Jane_j [[painted the car_i red_i]_{V'} drunk_j]_{VP}
- c. ?Jane_j [[painted the car_i red_i broken_i]_{V'} drunk_j]_{VP}
- d. *Jane_j [[painted the car_i broken_i red_i]_{V'} drunk_j]_{VP}

Third, secondary predicates do not form a constituent with their subject. This is obvious for subject-oriented depictives, as the stranding facts in (7) show. It also holds for object-oriented predicates, and this can be shown via contrasts with small clause predicates. If an object-oriented predicate and its subject formed a constituent, then that constituent would be the direct object of the matrix verb, and this is exactly what happens with small clause predicates such as those in (9) (see Rothstein (in press) for a detailed discussion).

- (9) a. Mary considers [John intelligent]_{SC}
- b. Mary made [it seem that John was on time]_{SC}

But in these constructions, the entailments are very different from those in secondary predicate constructions, as the following data show. (10a/11a) do not entail (10b/11b), while (12a/13a/14a) do entail the b examples, and the contrast between the examples in (15) demonstrate the same point.

- (10) a. Mary believes/considers John foolish.
- b. Mary believes/considers John

- (11) a. Mary saw the president leave.
- b. Mary saw the president.

- (12) a. Mary drank her coffee hot.
- b. Mary drank her coffee.

- (13) a. Mary painted the house red.
- b. Mary painted the house.

- (14) a. Mary drove the car drunk.
- b. Mary drove the car.

- (15) a. #Mary drank her coffee hot though she never drank her coffee.
- b. John believes Bill a liar, and he doesn't believe Bill.

Fourth, secondary predicates are optional (and again the contrast is with small clause predicates):

- (16) a. *I thought/believed that problem.
 b. Mary drank her coffee/drove the car/painted the house.

Fifth, secondary predicates assign a thematic role to their arguments (subjects). There is no morphological difference between secondary predicates and small clause predicates and they are subject to the same structural condition on predication (see Rothstein, in press), and we assume that this indicates that in both constructions they have the same thematic properties. I assume also, following Higginbotham (1983), Parsons (1990), Kratzer (1995), Greenberg (1998) and Rothstein (1999, in press) that adjectival predicates introduce some kind of eventuality argument into the representation. (For simplicity, I will assume that this is an e variable, and not introduce the distinction between mass- eventualities denoted by adjectives and count eventualities denoted by verbs which I argue for in Rothstein (1999).)

Assuming, then a neo-Davidsonian framework in which verbs and adjectives denote sets of events, and thematic roles introduce functions from events to participants (Parsons 1990, Landman, in press), the predicate drunk, as it occurs in both (17a) and (17b) will translate as an expression like (18):

- (17) a. I consider Mary drunk.
 b. I met Mary drunk.
- (18) drunk: $\rightarrow \lambda x \lambda e. DRUNK(e) \wedge Arg(e)=x$

3. What secondary predicates are not

3.1. Secondary Predicate are not nominal modifiers

That secondary predicates are not nominal modifiers is shown through pronominalisation tests and through testing entailments. First, entailments. When an AP is used as a secondary predicate then the property that it expresses must hold of the denotation of its subject for the whole time that the matrix event is going on (for depictives) or for the whole time that the culmination of the matrix event is going on (for resultatives). With nominal modifiers this is not so.

- (19) a. I met the drunk man again, but this time he was sober.
 b. #I met the man drunk again, but this time he was sober.
- (20) a. The drunk man drove the car home, after he had sobered up.
 b. #The man drove the car drunk, after he had sobered up.
- (21) a. They paint the red house once every year. Last year they painted it white and this year they painted it green.
 b. #They paint the house only once a year, and they always paint it red. Last year they painted it white and this year they painted it green.

Nominal modifiers are part of the NP combining with N to form a Common Noun expression, and they are not temporally related to the matrix verb at all. The fact that they are syntactically part of the nominal argument expression, while secondary predicates are not, is shown

by the fact that pronominalisation replaces the expression containing the nominal modifier, while it does not affect the secondary predicate at all.

- (22) a. I met the drunk man today → I met him today/*I met drunk him today.
b. I met the man drunk today → I met him drunk today.

3.2. Secondary predicates are not adverbs

We can show that secondary predicates are to be distinguished from adverbs again via comparing entailments. (23a) entails that John was drunk, (23b) is compatible with no-one being drunk. And as a correlate, as (24) shows, the secondary predicate, but not the adverb, needs a lexically expressed subject.

- (23) a. John drove the car drunk.
a'. #John drove the car drunk, although he was sober.
b. John drove the car drunkenly.
b'. John drove the car drunkenly, although he was sober.

- (24) a. The car went (drunkenly) round the corner (drunkenly).
b. #The car went round the corner drunk.

I conclude that secondary predicates must be predicated of a subject, and that they assign a thematic role to that subject, whereas adverbs do not do so. If we make this the litmus test for distinguishing between adverbs and secondary predicates, then an obvious question is what about subject-oriented adverbs, such as enthusiastically or reluctantly, as illustrated in (25), which appear also to assign some sort of thematic role to the subject:

- (25) John greeted Mary enthusiastically/reluctantly.

But it seems to me that, although these adverbs are subject-oriented (or more properly, agent-oriented), and must introduce a relation between the denotation of the subject and the event, this orientation is not equivalent to predication. The function of these adverbs is to add the information that the agent of the matrix verb performed the action in a certain way, i.e. in an enthusiastic or reluctant way, but they do not entail that this agent had the property of being himself enthusiastic or reluctant. Thus (26a) entails that John was reluctant about something, but not that he was enthusiastic about anything, and the converse is true of (26b). Similarly, (26c) is not a contradiction, and neither is (26d), where the AP is used as a secondary predicate:

- (26) a. John greeted Mary enthusiastically, although he was secretly very reluctant to meet her.
b. John greeted Mary reluctantly, although he was secretly very enthusiastic about meeting her.
c. John welcomed Mary enthusiastically although he was not enthusiastic about welcoming her.
d. John greeted Mary drunkenly, although he did not, in fact, greet her drunk.

intersection is not the right way to treat predicate conjunction; alternately entails that the instances of being hot and the instances of being cold are temporally distinguishable, and are thus distinguishable events. Since secondary predicates are not temporally modified or located independently of the main verb, this kind of evidence is not available for our structures. However, we can still argue that the event introduced by the matrix verb and the secondary predicate must be distinguished using the arguments from finegrainedness presented in Parsons (1990), from which it follows that the representation in (31) cannot be correct. Parsons argues that different event predicates which hold of an argument at the same run time can be modified by contradictory modifiers. So suppose with one stroke of the broom I sweep away both a pile of dirt and an earring, then it can be true that I intentionally swept away the pile of dirt and accidentally swept away an earring. But since an event cannot be both intentional and accidental at the same time, Parsons argues that the two expressions swept away the pile of dirt and swept away an earring must be descriptions of different sweeping events, distinguished by the fact that they have different participants, and which hold at the same time. We have just shown in the previous section that AP predicates, unlike adverbs, introduce thematic roles; this means that they denote entities which have participants, which means that they denote events which can be identified via their participants. So, while an event of driving is an event which must have two participants, an agent and a theme, an event of being drunk must have one participant, which we have called for convenience the experiencer, but which crucially is not an agent, and cannot be therefore 'borrowed' from the matrix verb. We can make the argument even stronger by looking at examples like (32) where the adjectival head of AP introduces two thematic roles:

(32) John drove the car drunk from the cognac.

Here we can clearly distinguish the event introduced by drive, which has John as the agent and the car as the theme, and thus denotes an event with John and the car as participants, and the event introduced by drunk, which has John as its external argument and the cognac as the internal argument, and thus denotes an eventuality with John and the cognac as participants. At this point we can see that the two events belong to two aspectual classes too: JOHN DRIVE THE CAR is an activity while JOHN DRUNK ON THE COGNAC is a state. But if these are the appropriate distinctions to make, then the reading in (31), which asserts that there was one event of which both these predicates can be predicated, will just be false.

I therefore assume, following Lasersohn (1992), Krifka (1992, 1998), Landman (in press), that the domain of events has a part structure: i.e. it forms a Boolean semilattice, with the sum operation, \sqcup , and the part of relation, \sqsubseteq , defined in the usual way, such that $x \sqsubseteq y$ iff $x \sqcup y = y$. Secondary predication will involve a generalised summing operation, which we can call 'S' (for summing) which sums the denotation of two event expressions to yield a singular event in the following way:

$$(33) S(\alpha(e_1), \beta(e_2)) = \lambda e. \exists e_1 \exists e_2 [e = {}^S(e_1 \sqcup e_2) \wedge \alpha(e_1) \wedge \beta(e_2)]$$

This gives (34) as the translation of (30):

$$(34) \exists e \exists e_1 \exists e_2 [e = {}^S(e_1 \sqcup e_2) \wedge \text{DROVE}(e_1) \wedge \text{Ag}(e_1) = \text{JOHN} \wedge \text{Th}(e_1) = \text{THE CAR} \\ \wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2) = \text{JOHN}]$$

(34) is true if there is an event which has both an event of John driving the car as part and an event of John being drunk as a part.

5. Constraints on the secondary predication operation

I assume, then that (34) represents the basic machinery involved in introducing a secondary predicate into a sentence. However, as it stands it is clearly not enough. There are presumably constraints on the summing relation, otherwise secondary predication would not be distinguishable semantically from predication conjunction with *and*. Furthermore, there are a series of questions about the nature of secondary predication, and we would like the answers to fall out from the properties of the operation. Here is a list of some of the issues.

1. What are the constraints on the summing relation which distinguish secondary predication from event conjunction?
2. Why are there no intransitive depictives? i.e. why does "I sang the baby asleep" not have the reading "I sang while the baby was asleep"?
3. Why are the two kinds of secondary predicates depictive and resultative (e.g. why are there no 'inceptives')?
4. Why are resultatives not predicated of subjects?
5. What are the effects on aspectual class of adding a secondary predicate?
6. How can we account for the restricted set of examples discussed in Wechsler (1997) and Rappaport Hovav (1999) which are purported to be subject-oriented resultatives?

In what follows, I will give the outline of an analysis of the secondary predication relation which answers these questions, although the space limitations prevent me from giving a very detailed account. I'll start with a discussion of depictive secondary predication.

We begin with the crucial difference between secondary predication and event conjunction. As the contrast between (35a/b) shows, there is a temporal dependence between the matrix event and the event introduced by the AP. I compare secondary predication with simple conjunction of VPs and conjunction in small clause complements so as to show that the difference does not follow from independent constraints that conjoined matrix sentential predicates must each be independently marked for tense. (The necessity for *be* in (35b/c) will be discussed below. Crucially, the *be* is untensed, and cannot introduce a temporal dependency.)

- (35) a. Mary made John drive the car to Tel Aviv drunk.
 b. Mary made John drive to Tel Aviv and be drunk.
 c. Mary made John drive to Tel Aviv and John be drunk.

(35b/c) are true if Mary made there be a sum of events which had an event of John driving and an event of John being drunk as a parts, but there is no indication of a temporal relation between these events; the first can precede the second or vice versa, or the first can be contained in the second or vice versa, or one can overlap the other. However, in (35a), the event introduced by the verb must be temporally contained within the event introduced by the secondary predicate; in other words, the John must be drunk all the time that the event of his driving to Tel Aviv is going on. Assuming a temporal trace function ' τ ', which maps an event e onto its running time such that the $\tau(e_1 \sqcup e_2) = \tau(e_1) \sqcup \tau(e_2)$ (the run time of the sum of e_1 and e_2 is the sum of the run time of e_1 and the run time of e_2 , with sum defined as above), the summing operation which introduces a depictive secondary predicate must be as in (36):

$$(36) S^D(\alpha(e_1), \beta(e_2)) = \lambda e. \exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge \alpha(e_1) \wedge \beta(e_2) \wedge \alpha(e_1) \sqsubseteq \beta(e_2)]$$

This gives (37) as the translation of (30):

$$(37) \exists e \exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge \text{DROVE}(e_1) \wedge \text{Ag}(e_1) = \text{JOHN} \wedge \text{Th}(e_1) = \text{THE CAR} \\ \wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2) = \text{JOHN} \wedge \tau(e_1) \sqsubseteq \tau(e_2)]$$

In addition to the constraint of temporal dependency, there is a well known constraint that the secondary predicate and the matrix verb must share a thematic argument (Williams 1980, Rothstein 1983). It is this constraint which rules out intransitive depictives such as (38), with the reading "John drove while Mary was drunk".

(38) John drove Mary drunk

Under this reading, John is the single argument of drove, while Mary is the single argument of drunk, and the two predicates do not share an argument.

I suggest that the two constraints, the constraint of temporal dependency and the constraint that e_1 and e_2 share an argument, combine to form the content of a PART-OF relation which holds between two events when the first is PART-OF the second. The PART-OF relation that I have in mind is not the standard part-of relation, defined in terms of the sum operation, which forms a partial order, (such as the temporal 'part-of relation used in (36)). Instead, PART-OF is a non-transitive relation which identifies one atomic eventuality as part of another analogous to the way in which, in the domain of individuals, John's hand is part of John, although both are singularities with respect to the plurality part-of relation. It is clear that while John's hand is part of John in a very fundamental way, the relation between these two elements is not the standard part-of relation since it is obviously non-transitive; if John's hand is part of him and John is part of the class, it does not mean that John's hand is part of the class. John's hand is part of John in the sense that they both share 'stuff'. You cannot take away a part of John's hand without taking away part of John. But despite this relation between them, John and his hand both remain atomic individuals, and the grammar treats them as such; for example they can be conjoined in the appropriate circumstances. Imagine that John is visiting a holistic doctor who says (39) to him:

(39) I can't just treat your hand. I have to treat your hand and you.

It is this kind of non-transitive part of relation that I claim holds between the eventualities involved in secondary predication. When we assert that "John drove the car drunk" we assert that there is a sum of two events, the driving the car event and the being drunk event which do not just overlap temporally, but which are inextricably attached to each other since they share a participant which is involved in both these events at the same time.

We define the PART-OF relation as in (40):

$$(40) \text{PART-OF}(e_1, e_2) \quad \text{iff} \quad \begin{array}{l} \text{(i) } \tau(e_1) \sqsubseteq \tau(e_2) \text{ (i.e. } e_1 \text{ is temporally contained in } e_2 \text{);} \\ \text{and (ii) } e_1 \text{ and } e_2 \text{ share a participant.} \end{array}$$

It is the sharing a participant which makes the PART-OF relation for events non-transitive. If John drives the car while he is angry with Mary, then the event of John driving the car is PART-OF the event of John being angry with Mary since the first is temporally contained in

the second and they share a participant. The event of John being angry at Mary may well be PART-OF another event such as the event of Mary being at a party without John. But we would not want to say that the event of John driving the car was PART-OF the event of Mary being at a party without him. (41) gives the secondary predication rule modified to include the PART-OF condition, where PART-OF is defined as in (40) above.

$$(41) S^D(\alpha(e_1), \beta(e_2)) = \lambda e. \exists e_1 \exists e_2 [e = {}^S(e_1 \sqcup e_2) \wedge \alpha(e_1) \wedge \beta(e_2) \wedge \text{PART-OF}(e_1, e_2)]$$

' ${}^S(e_1 \sqcup e_2)$ ', then, is a sum of events with the constraint that e_1 is PART-OF e_2 in the sense given in (40). The interpretation of "John drove the car drunk" is then as in (42):

$$(42) \exists e \exists e_1 \exists e_2 [e = {}^S(e_1 \sqcup e_2) \wedge \text{DROVE}(e_1) \wedge \text{Ag}(e_1) = \text{JOHN} \wedge \text{Th}(e_1) = \text{THE CAR} \\ \wedge \text{DRUNK}(e_2) \wedge \text{Exp}(e_2) = \text{JOHN} \wedge \text{PART-OF}(e_1, e_2)]$$

"There was a singular event e , formed out of the sum of e_1 and e_2 and which is located in the past, where e_1 is an event of the police arresting John and e_2 is an event of John being drunk, and e_1 is PART- OF e_2 ."

The PART-OF condition as formalised in (40) needs one crucial modification. As it stands, condition (ii) is stated in semantic terms, as a constraint on shared participants. But while this is adequate to rule out (39), the ungrammatical status of 'false reflexive' depictives, such as (43), show that it has to be stated as a grammatical condition. (43) is ungrammatical, even though the two events involved, the event of John singing and the event of John being asleep, do have a shared participant.

$$(43) * \text{John sang himself asleep. (cannot mean "John sang while he was asleep")}$$

This means that the PART-OF condition cannot be constrained in terms of shared participants, but must be constrained in terms of a grammatical correlate, and stated as a condition on thematic arguments. It is not enough that the two events involved must share a participant, but the event predicates involved must also share a thematic argument. The grammatical reflex of (40) is given in (44):

$$(44) \text{ If a grammatical operation } \Delta \text{ affecting } e_1 \text{ and } e_2 \text{ introduces PART-OF } (e_1, e_2), \text{ then } \Delta \\ \text{ must involve applying } e_1 \text{ and } e_2 \text{ simultaneously to a single thematic argument.}$$

Alternatively, we define PART-OF as in (45), where I assume that the value of a thematic role is given as the denotation of a particular DP. (45) requires the m^{th} θ -role of e_1 and the n^{th} θ -role of e_2 to be assigned to the same DP argument:

$$(45) \text{ If PART-OF}(e_1, e_2), \text{ then } \tau(e_1) \sqsubseteq \tau(e_2) \wedge \theta_m(e_1) = \theta_n(e_2)$$

This guarantees that e_1 and e_2 share a thematic argument without forcing the application to a shared argument to be part of the summing operation itself. We will see below, when we look at the details of the derivations of subject-oriented depictives, that this is the better option. That the shared argument is always the external argument of the secondary predicate follows independently from locality conditions on thematic role assignment.

Let us see exactly how the derivations work for object-oriented and subject-oriented depictives respectively. I use the ambiguous (46) to show how both readings are derived:

(46) The police arrested John drunk

The object-oriented reading of (46) involves applying the sum operation in (41) to the predicates denoted by arrest and drunk and applying them to the shared argument John, as in line 4 of the derivation below. Following Rothstein (in press), I assume a theory of predication in which VPs and APs denote sets of events (i.e. are of type $\langle e, t \rangle$), and in which a predication operation shifts VP and AP meanings into type $\langle d, \langle e, t \rangle \rangle$ (where d is the type of individuals) by taking $\alpha \rightarrow \lambda x. \alpha$. In such a theory, a lexical head which assigns n theta-roles will thus normally denote an expression of type $\langle d_{n-1}, \dots, d_1, \langle e, t \rangle \rangle$, and, after applying to all its internal arguments will result in an XP expression of type $\langle e, t \rangle$ of the form $\lambda e. \varphi$, where φ contains an expression of the form $\theta(e)=x$. Predication then maps this expression into $\lambda x \lambda e. \varphi$, where the λx binds the free variable contained in φ , at which point the whole expression can be applied to an external argument. (See Rothstein (in press) for details.) In this framework, the S operation applies to predicates of type $\langle d, \langle e, t \rangle \rangle$, namely $\lambda y \lambda e. \text{ARREST}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=y$ and $\lambda x \lambda e. \text{DRUNK}(e) \wedge \text{Arg}(e)=x$, as shown below.

Here is the derivation for the object-oriented reading of (46):

1. $[\text{arrest}]_V \rightarrow \lambda y \lambda e. \text{ARREST}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=y$
2. $[\text{drunk}]_A \rightarrow \lambda e. \text{DRUNK}(e) \wedge \text{Arg}_1(e)=x$
3. $[\text{drunk}]_{AP} \rightarrow \lambda x \lambda e. \text{DRUNK}(e) \wedge \text{Arg}_1(e)=x$ (by predicate formation)
4. $[\text{arrest John drunk}]_{V'} \rightarrow$
 $S^D(\lambda y \lambda e. \text{ARREST}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=y, \lambda x \lambda e. \text{DRUNK}(e) \wedge \text{Arg}_1(e)=x) (\text{JOHN})$
 $= \lambda e. \exists e_1 \exists e_2 [e =^S (e_1 \sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=y \wedge \text{DRUNK}(e_2)$
 $\wedge \text{Arg}_1(e_2)=y \wedge \text{PART-OF}(e_1, e_2)] (\text{JOHN})$ (by the summing operation)
 $= \lambda e. \exists e_1 \exists e_2 [e =^S (e_1 \sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=\text{JOHN} \wedge \text{PART-OF}(e_1, e_2)]$
5. $[\text{arrest John drunk}]_{VP} \rightarrow$
 $\lambda x \lambda e. \exists e_1 \exists e_2 [e =^S (e_1 \sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{JOHN} \wedge \text{DRUNK}(e_2)$
 $\wedge \text{Arg}_1(e_2)=\text{JOHN} \wedge \text{PART-OF}(e_1, e_2)]$ (by predicate formation)
6. $[\text{the police arrested John drunk}] \rightarrow$
 $\lambda x \lambda e. \exists e_1 \exists e_2 [e =^S (e_1 \sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{JOHN} \wedge \text{DRUNK}(e_2)$
 $\wedge \text{Arg}_1(e_2)=\text{JOHN} \wedge \text{PART-OF}(e_1, e_2)] \wedge \text{PAST}(e) (\text{THE POLICE})$
 $= \lambda e. \exists e_1 \exists e_2 [e =^S (e_1 \sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=\text{THE POLICE} \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=\text{JOHN} \wedge \text{PART-OF}(e_1, e_2)] \wedge \text{PAST}(e)$
7. $\exists e [\exists e_1 \exists e_2 [e =^S (e_1 \sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=\text{THE POLICE} \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=\text{JOHN} \wedge \text{PART-OF}(e_1, e_2)] \wedge \text{PAST}(e)]$
 (by existential quantification)

i.e. "There was an event which was the sum of an event of the police arresting John and an event of John being drunk which took place in the past and the event of the police arresting John was PART-OF the event of John being drunk."

The subject-oriented reading of (46) is slightly more complicated to derive, since at the point at which the summing operation is to apply, the expressions to be conjoined are of different types, as we see in line 5 below. The operation we use is a modified version of the summing operation in (41), which guarantees that the expressions will be of the right type to be conjoined. (Details of the analysis are given in Rothstein (in press), where the operation is called predicate absorption).

$$(47) \quad S^*(\lambda e_1.\alpha(e_1), \lambda x\lambda e_2.\beta(e_2)(x)) = \\ \lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge \alpha(e_1) \wedge \beta(e_2) \wedge \text{PART-OF}(e_1,e_2)]$$

Here is the derivation for the subject-oriented reading of (46):

1. $[\text{arrest}]_V \rightarrow \lambda y\lambda e.\text{ARREST}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=y$
2. $[\text{arrest John}]_{V'} \rightarrow \lambda y\lambda e.\text{ARREST}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=y \text{ (JOHN)}$
 $= \lambda e.\text{ARREST}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=\text{JOHN}$
3. $[\text{drunk}]_A \rightarrow \lambda e.\text{DRUNK}(e) \wedge \text{Arg}_1(e)=x$
4. $[\text{drunk}]_{AP} \rightarrow \lambda x\lambda e.\text{DRUNK}(e) \wedge \text{Arg}_1(e)=x$ (by predicate formation)
5. $[\text{arrest John drunk}]_{VP} \rightarrow$
 $S^*(\lambda e.\text{ARREST}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=\text{JOHN}, \lambda x\lambda e.\text{DRUNK}(e) \wedge \text{Arg}_1(e)=x (x))$
 $= \lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=x \wedge \text{PART-OF}(e_1,e_2)]$ (by the summing* operation)
6. $[\text{arrest John drunk}]_{VP} \rightarrow$
 $\lambda x\lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=x \wedge \text{PART-OF}(e_1,e_2)]$ (by predicate formation)
7. $[\text{the police arrested John drunk}] \rightarrow$
 $\lambda x\lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=x \wedge \text{PART-OF}(e_1,e_2) \wedge \text{PAST}(e)]$ (THE POLICE)
 $= \lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=\text{THE POLICE} \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=\text{THE POLICE} \wedge \text{PART-OF}(e_1,e_2)] \wedge \text{PAST}(e)$
8. $\exists e[\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge \text{ARREST}(e_1) \wedge \text{Ag}(e_1)=\text{THE POLICE} \wedge \text{Th}(e_1)=\text{JOHN}$
 $\wedge \text{DRUNK}(e_2) \wedge \text{Arg}_1(e_2)=\text{THE POLICE} \wedge \text{PART-OF}(e_1,e_2)] \wedge \text{PAST}(e)]$
 (by existential quantification)

i.e. "There was an event which was the sum of an event of the police arresting John and an event of the police being drunk which took place in the past and the event of the police arresting John was PART-OF the event of the police being drunk."

Lines 5-7 in this derivation show that defining the condition on shared arguments as in (45) rather than as (44) is preferable. The summing operation S^* used here requires the secondary predicate to be applied to a distinguished variable, which has the effect of guaranteeing that (45) is met, and crucially, the derivation of subject-oriented predicates shows that the summing operation and application of its output to an argument are two distinct operations, which are separated from each other in the derivation by predicate formation, which means that the condition as stated in (44) cannot be met.

6. The semantics of resultatives

6.1. The interpretation of simple resultatives

This account given above is sufficient to get us the essential semantics of depictive predicates. The next stage is to extend the account to explain how resultatives work. I assume Dowty's (1979) analysis of aspectual classes, reformulated in an event style framework, which gives the basic structure of the aspectual classes as follows:

- (47) a. States: $\lambda e.P(e)$
 b. Activities: $\lambda e.(DO(P))(e)$
 c. Achievements: $\lambda e.(BECOME(P))(e)$
 d. Accomplishments: $\lambda e.\exists f_1\exists f_2[e=S(f_1\sqcup f_2) \wedge (DO(P))(f_1) \wedge (BECOME(P'))(f_2) \wedge Cul(e)=f_2]$

Deriving simple resultatives such as (48) is straightforward.

- (48) Mary painted the house red.

We assume that the summing operation can apply to any pair of predicates. The difference between depictives and resultatives is in the location of the PART-OF condition on complex event formation via summing. With depictives, the PART-OF relation relates the event argument of the matrix verb and the event argument of the adjectival predicate. With resultatives, the PART-OF relation relates the culmination of the matrix verb, e_1 , and the event argument of the adjectival predicate, as summed up in (49):

- (49) depictives: $\lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge PART-OF(e_1,e_2)]$
 resultatives: $\lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge PART-OF(cul(e_1),e_2)]$

Resultative conjunction is object-oriented, and thus the process conjoins expressions at type $\langle d, \langle e, t \rangle \rangle$:

- (50) Resultative conjunction: $S^R(\alpha(e_1,y), \beta(e_2,y)) =$
 $\lambda y\lambda e.\exists e_1\exists e_2[e=S(e_1\sqcup e_2) \wedge \alpha(e_1,y) \wedge \beta(e_2,y) \wedge PART-OF(cul(e_1),e_2)]$

In the derivation of (48), resultative conjunction will conjoin the two expressions in (51):

- (51) $\alpha = \lambda y\lambda e.PAINT(e) \wedge Ag(e)=x \wedge Th(e)=y$
 $\beta = \lambda x\lambda e.RED(e) \wedge Arg_1(e)=x$

The derivation will be as follows:

1. $[Paint]_V \rightarrow \lambda y\lambda e.PAINT(e) \wedge Ag(e)=x \wedge Th(e)=y$
2. $[Red]_A \rightarrow \lambda e.RED(e) \wedge Arg_1(e)=x$
3. $[Red]_{AP} \rightarrow \lambda x\lambda e.RED(e) \wedge Arg_1(e)=x$ (by predicate formation)

4. $[\text{Paint the house red}]_V \rightarrow$
 $S^R(\lambda y \lambda e. \text{PAINT}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=y, \lambda x \lambda e. \text{RED}(e) \wedge \text{Arg}_1(e)=x) (\text{THE HOUSE})$
 $= \lambda e. \exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge \text{PAINT}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{THE HOUSE} \wedge \text{RED}(e_2)$
 $\wedge \text{Arg}_1(e_2)=\text{THE HOUSE} \wedge \text{PART-OF}(\text{cul}(e_1), e_2)]$ (by resultative summing)
5. $[\text{Paint the house red}]_{VP} \rightarrow$
 $\lambda x \lambda e. \exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge \text{PAINT}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{THE HOUSE} \wedge \text{RED}(e_2)$
 $\wedge \text{Arg}_1(e_2)=\text{THE HOUSE} \wedge \text{PART-OF}(\text{cul}(e_1), e_2)]$ (by predicate formation)
6. $[\text{Mary painted the house red}] \rightarrow$
 $\lambda x \lambda e. \exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge \text{PAINT}(e_1) \wedge \text{Ag}(e_1)=x \wedge \text{Th}(e_1)=\text{THE HOUSE}$
 $\wedge \text{RED}(e_2) \wedge \text{Arg}_1(e_2)=\text{THE HOUSE} \wedge \text{PART-OF}(\text{cul}(e_1), e_2)] \wedge \text{PAST}(e)]$ (MARY)
 $= \lambda e. \exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge \text{PAINT}(e_1) \wedge \text{Ag}(e_1)=\text{MARY} \wedge \text{Th}(e_1)=\text{THE HOUSE}$
 $\wedge \text{RED}(e_2) \wedge \text{Arg}_1(e_2)=\text{THE HOUSE} \wedge \text{PART-OF}(\text{cul}(e_1), e_2)] \wedge \text{PAST}(e)$
7. $\exists e [\exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge \text{PAINT}(e_1) \wedge \text{Ag}(e_1)=\text{MARY} \wedge \text{Th}(e_1)=\text{THE HOUSE}$
 $\wedge \text{RED}(e_2) \wedge \text{Arg}_1(e_2)=\text{THE HOUSE} \wedge \text{PART-OF}(\text{cul}(e_1), e_2)] \wedge \text{PAST}(e)]$
 (by existential quantification)

"There was an event which was the sum of an event of Mary painting the house and an event of the house being red, and the culmination point of the event of Mary painting the house was PART-OF the event of the house being red."

In other words, there was an event which was the sum of an event of Mary painting the house and an event of the house being red, and the house was red at the culmination of the painting event. This is equivalent to the paraphrases usually associated with resultative predication.

Note that we can make the structure of the resultative more explicit by applying resultative conjunction to the decomposed accomplishment. If we analyse paint as in line 1' below, we will get 4' and 7' instead of 4 and 7 in the derivation above:

- 1'. $[\text{paint}]_V \rightarrow \lambda y \lambda e. \exists f_1 \exists f_2 [e =^S(f_1 \sqcup f_2) \wedge \lambda f_1. (\text{PAINT})(f_1) \wedge \text{Ag}(f_1)=x \wedge \text{Th}(f_1)=y$
 $\wedge (\text{BECOME-PAINTED})(f_2) \wedge \text{Th}(f_2)=y \wedge \text{Cul}(e)=f_2]$
- 4'. $S^R(\lambda y \lambda e. \exists f_1 \exists f_2 [e =^S(f_1 \sqcup f_2) \wedge \lambda f_1. (\text{PAINT})(f_1) \wedge \text{Ag}(f_1)=x \wedge \text{Th}(f_1)=y$
 $\wedge (\text{BECOME-PAINTED})(f_2) \wedge \text{Th}(f_2)=y \wedge \text{Cul}(e)=f_2],$
 $\lambda x \lambda e. \text{RED}(e) \wedge \text{Arg}_1(e)=x) (\text{THE HOUSE})$
- 7'. $\exists e [\exists e_1 \exists e_2 [e =^S(e_1 \sqcup e_2) \wedge e_1 =^S(f_1 \sqcup f_2) \wedge \lambda f_1. (\text{PAINT})(f_1) \wedge \text{Ag}(f_1)=\text{MARY}$
 $\wedge \text{Th}(f_1)=\text{THE HOUSE} \wedge (\text{BECOME-PAINTED})(f_2) \wedge \text{Th}(f_2)=\text{THE HOUSE}$
 $\wedge \text{Cul}(e_1)=f_2] \wedge \text{RED}(e_2) \wedge \text{Arg}_1(e_2)=\text{THE HOUSE} \wedge \text{PART-OF}(\text{cul}(e_1), e_2)] \wedge \text{PAST}(e)]$

6.2. Some answers to some questions

We are now in a position to answer questions 3 and 4 asked above. First, the two kinds of secondary predicates available are depictive and resultative because of the range of distinct events which aspectual structure makes reference to and thus makes available as the first argument of the PART-OF relation. Dowty's verb classification in (47) makes reference to a

matrix verb e , in all four verb classes, and a subevent of e , namely $\text{cul}(e)$, in definition of accomplishments. The two available PART-OF relations are therefore $\text{PART-OF}(e, e_2)$ and $\text{PART-OF}(\text{cul}(e_1), e_2)$. The first gives the depictive reading, since the matrix verb is PART-OF the event introduced by the adjectival predicate, giving the effect of an assertion that the matrix event is carrying on while the event introduced by the secondary predicate is going on. This leads to the common paraphrase of "John drove the car drunk" as "John drove the car when/while he was drunk". The second gives the resultative reading, since the culminative point of the matrix event is asserted to be carrying on while the event introduced by the secondary predicate is occurring. "Mary painted the house red" could then be paraphrased as "Mary painted the house and the culminating point of this event was when/while the house was red". There are no inceptives, for example, because aspectual structure relevant for linguistic classification makes no reference to the beginnings of events, and therefore these event beginnings cannot be arguments of the PART-OF relation.

It is not strictly true that only the matrix verb e or the $\text{cul}(e)$ are the only possible first arguments of PART-OF. The structure for accomplishments makes it possible that the $\text{DO}(e)$ subpart of an accomplishment should also be a possible first argument for PART-OF. However, if $\text{cul}(e)$ in (47d) is instantaneous, then $\text{DO}(e)$ is not a proper temporal part of the accomplishment. Using the whole accomplishment or its activity subpart $\text{DO}(e)$ as the first argument of the PART-OF relation will then be equivalent.

The second question that we are now in a position to answer is why resultative predicates are apparently object-oriented. It has been clear for some time (see, e.g. Tenny 1987, and much work since then) that this is because the resultative is predicated of the incremental theme, and incremental themes appear in direct object position, but we now can give a precise statement of what this follows from. The resultative occurs when the first argument of the PART-OF relation is $\text{cul}(e_1)$, i.e. the culmination of the matrix verb e_1 . We assume, following Dowty (1979, 1991), Tenny (1987, 1994), Krifka (1992, 1998) and others, that the culmination point of e_1 is essentially an achievement event in which a change of state occurs to the theme of e_1 . This is given by the representation in (47d), and also by Dowty's formalisation of the structure of accomplishments in Dowty (1979). Crucially, in both representations, $\text{cul}(e_1)$ has a single argument, the entity to which the change of state happens. When $\text{cul}(e_1)$ occurs is determined intuitively by the point at which the incremental theme is 'used up'; more precisely, following the direction taken in Krifka (1998), proper parts of an accomplishment e_1 with the same initial point arranged in increasing size have proper parts of the incremental theme as arguments. The culmination point of e_1 is reached at the first point at which the entire object denoted by the incremental theme is the argument of e_1 . The culmination of Mary painted the house is thus the moment at which the house becomes painted, the culmination of John read the book is the point at which the whole book becomes the object of read, etc. It is a condition on the PART-OF relation that the two events involved in the relation share an argument. In this case the relevant PART-OF relation is $\text{PART-OF}(\text{cul}(e_1), e_2)$, and since the single argument of $\text{cul}(e_1)$ is the incremental theme of e_1 , it will be by necessity the argument of e_2 also. It thus follows from the condition $\text{PART-OF}(\text{cul}(e_1), e_2)$ that the resultative will have to be predicated of the incremental theme of the matrix event. And if the incremental theme is realised in the direct object position, then resultative predicate will be predicated of the direct object also. Hence the apparent direct object restriction on resultative predicates.

The correct formalisation of the 'direct object restriction' is thus that resultatives must be predicated of incremental themes. Crucially, it does not need to be stated independently, but will follow from the constraints on the PART-OF condition. Formulated like this, we can see that there is a clear prediction that if there are incremental themes which occur in subject position, then it should be possible to predicate resultatives of the surface subject, and this is what we see in (52):

- (52) a. The river froze solid.
b. The soup cooled to a jelly.
c. *John laughed sick.

We can see that the subject is an incremental theme in (52a/b) but not (52c) since in the first two cases, but not the third, the imperfective paradox occurs:

- (53) a. The river was freezing (solid), but it hadn't frozen yet.
b. The soup was cooling (to a jelly), but it hadn't cooled yet.
c. #John was laughing, but he hadn't laughed yet.

This shows, of course, that it is not possible to use the resultative construction as an argument for syntactic unaccusativity in English; we don't need to posit movement to explain subject-oriented resultatives in these cases. Raising to subject is of course compatible with the analysis presented here, and there may still be other reasons to want to continue to assume such an analysis.

6.3. Non-thematic resultatives and fake reflexives

As it stands, our theory has not yet answered question 5 above; in other words, it does not explain what makes possible non-thematic resultatives and the so-called 'fake reflexive' examples exemplified in (54a/b) and (54c/d) respectively:

- (54) a. John sang the baby asleep.
b. The audience laughed the clown off the stage.
c. He laughed himself sick.
d. The baby cried himself asleep.

Superficially, our theory should find these problematic, since the condition on adding a secondary predicate is that the event denoted by the secondary predicate shares an argument with the matrix verb, and this is exactly the condition which seems not to be met. In other words, the condition on the PART-OF relation, which rules out a depictive reading of "John drove Mary drunk" (discussed in (39)) should also rule these out.

Intuitively, it is more or less clear what is going on. As discussed in Dowty (1979), Tenny (1987,1994,) Levin and Rappaport Hovav (1995), the resultative is added to an activity verb and the effect is to get an accomplishment reading of the achievement. The resultative is in some sense adding a terminal point or culmination to the activity given by the main verb, and thus allowing the V + AP to be understood as an complex verb of the accomplishment class. The question is how exactly does this work? More specifically, the question is how to find a way to 'add' a culmination point to the activity verbs in (54). On the assumption that there is a single resultative rule which applies both to transitive examples like (48) and the examples in (54), we cannot analyse the resultative as itself adding a culmination. This is because it follows from the nature of telicity and the properties of culminations that each event can have only one culmination point. Since resultative predication adds a resultative predicate to sentences where the matrix verb is a lexical accomplishment, for which the culmination is lexically defined within the meaning of the verb, resultatives cannot in general introduce culmination points. In (48), the accomplishment VP paint the house defines when its culmination occurs, namely when the house is or becomes painted, and the resultative adds a property of the culmination, namely that it is part of the event of the house being red. On the assumption that there is only one resultative rule, then even in (54) the resultative will only be

able to give a property of the culmination and not add the culmination itself. A second point is that, as is well known, accomplishments can have a non-telic reading if their direct object is a bare plural or a mass noun. We note that non-thematic resultatives can be atelic if the subject of the resultative is a bare plural or a mass noun. (54a/c) have atelic counterparts in (55):

- (55) a. John sang babies asleep for hours last night.
 b. The audience was very cruel and laughed performers of the stage as fast as they could come on.

Since the matrix events here do not have a single culmination point, it is implausible to analyse the resultative predicate as introducing such a culmination.

The simplest assumption is that the same rule which interpreted (48) is used here, and that the resultative rule forces the aspectual class of the matrix verb to shift in order to allow the resultative to be interpreted. This will have the effect of allowing the PART-OF condition to be satisfied. It will work in the following way. What the PART-OF condition in the resultative predication operation does is look for the culmination point of the matrix predicate. If the matrix predicate is an activity which does not have a culmination point, the resultative rule provokes a SHIFT operation on the matrix verb. (I will argue below why this applies only to activity matrix predicates and not states or achievements.) Shifting SING from its natural activity reading means fitting it into an accomplishment template as below:

- (56) $\text{SHIFT } (\lambda e.(\text{DO}(\text{SING}))(e) \wedge \text{Ag}(e)=x) =$
 $\lambda y \lambda e. \exists f_1 \exists f_2 [e = \text{S}(f_1 \sqcup f_2) \wedge (\text{DO}(\text{SING}))(f_1) \wedge \text{Ag}(f_1)=x \wedge \text{Th}(f_1)=y \wedge$
 $(\text{BECOME}(\text{SUNG}))(f_2) \wedge \text{Th}(f_2)=y \wedge \text{cul}(e)=f_2]$

Or more simply:

- (57) $\text{SHIFT } (\lambda e.(\text{DO}(\text{SING}))(e) \wedge \text{Ag}(e)=x) = \lambda y \lambda e. \text{SING}(e) \wedge \text{Ag}(e)=x \wedge \text{Th}(e)=y$

Of course, out of context, the forms in (56/57) do not contain enough information for them to be usable. They don't add the lexical information about what the role of the incremental theme in the singing event could be, nor what it means for the theme to 'become sung' (unless the theme is a song, of course). But, in the context of the resultative predicate, the constraints on resultative predication force information to be filled in in a particular way, and thus the derived accomplishment in (56) becomes usable. Let us see how this works with (54a).

It has been argued (Rothstein 1992, in press), Levin and Rappaport Hovav (1995), that non-thematic resultatives have a small clause structure. This means that (54a) has the syntactic structure in (58):

- (54) a. John sang the baby asleep.

- (58) John sang [the baby asleep]

Resultative conjunction applies at type $\langle e, t \rangle$ and will conjoin the following two expressions:

- $\lambda e. \text{SANG}(e) \wedge \text{Ag}(e)=x$
 $\lambda e. \text{ASLEEP}(e) \wedge \text{Arg}_1(e)= \text{THE BABY}$

Applying the resultative conjunction at type $\langle e,t \rangle$ we get:

$$\begin{aligned} & S^R(\lambda e.SANG(e) \wedge Ag(e)=x, \lambda e.ASLEEP(e) \wedge Arg_1(e)=THE\ BABY) = \\ & \lambda e.\exists e_1\exists e_2[e=^S(e_1 \sqcup e_2) \wedge SANG(e_1) \wedge Ag(e_1)=x \wedge ASLEEP(e_2) \wedge Arg_1(e_2)=THE\ BABY \\ & \wedge PART-OF(cul(e_1), e_2)] \end{aligned}$$

In order for this expression to be interpretable, resultative predication will force a shift in the aspectual class of sing, using the SHIFT operation in (56), and we will get a representation as follows:

$$\begin{aligned} & \lambda e.\exists e_1\exists e_2[e=^S(e_1 \sqcup e_2) \wedge SANG(e_1) \wedge Ag(e_1)=x \wedge Th(e_1)=THE\ BABY \\ & \wedge ASLEEP(e_2) \wedge Arg_1(e_2)=THE\ BABY \wedge PART-OF(cul(e_1), e_2)] \end{aligned}$$

The constraints on the PART-OF relation will guarantee that there is only one way to fill in the information in the output of the SHIFT relation. There is a condition that $cul(e_1)$ is PART-OF e_2 . This means that $cul(e_1)$ and e_2 must share an argument. The argument of e_2 is the baby, which must thus also be the argument of $cul(e_1)$. And since the argument of $cul(e_1)$ is always the incremental theme of e_1 , we can supply a value for the newly introduced theme of $sing^*$. If we use the decomposed form of $sing^*$ we will get the following more complex, but more explicit, representation:

$$\begin{aligned} & \lambda e.\exists e_1\exists e_2[\exists f_1\exists f_2[e=^S(e_1 \sqcup e_2) \wedge e_1=^S(f_1 \sqcup f_2) \wedge (DO(SING))(f_1) \wedge Ag(f_1)=x \\ & \wedge Th(f_1)=THE\ BABY \wedge (BECOME(SUNG))(f_2) \wedge Th(f_2)=THE\ BABY \wedge cul(e_1)=f_2] \\ & \wedge ASLEEP(e_2) \wedge Arg_1(e_2)=THE\ BABY \wedge PART-OF(cul(e_1), e_2)] \end{aligned}$$

Abstraction over the x variable, application to the subject argument and existential closure will give us:

$$\begin{aligned} & \exists e[\exists e_1\exists e_2[\exists f_1\exists f_2[e=^S(e_1 \sqcup e_2) \wedge e_1=^S(f_1 \sqcup f_2) \wedge (DO(SING))(f_1) \wedge Ag(f_1)=JOHN \\ & \wedge Th(f_1)=THE\ BABY \wedge (BECOME(SUNG))(f_2) \wedge Th(f_2)=THE\ BABY \wedge cul(e_1)=f_2] \\ & \wedge ASLEEP(e_2) \wedge Arg_1(e_2)=THE\ BABY \wedge PART-OF(cul(e_1), e_2)]] \end{aligned}$$

"There was an event which was the sum of a singing event and an event of the baby being asleep, and the agent of the singing event was John, and the culmination of the singing event was part of the baby being asleep."

So, resultative predication (i) forces us to assign a culmination point to the event of singing and (ii), since the culmination of e_1 and the event of the baby being asleep must share an argument (by the constraint on the PART-OF condition) it forces us to assume that the baby is the argument of the culmination of e_1 . This means that, since culminations are defined in terms of what happens to the incremental theme of an event, the baby must be interpreted as denoting the incremental theme of the singing event.

What we see is that while, out of context the result of SHIFT(SING) in (57), is uninterpretable, in the context of a resultative we can interpret it. The accomplishment template requires the verb to assign a theme role, where the V appears to be intransitive, and it requires a culmination to be determined in terms of 'what happens' to the theme, without there being

any lexical information about how the culmination is to be calculated. In the normal case, the meaning of the accomplishment includes information about what happens to the theme, and about what constitutes the culmination and how it is defined in terms of the theme. All this information is missing in the shifted form of SING. However, when there is a resultative predicate, we can calculate how to fill in the missing information which will make the result of SHIFT(SING) interpretable. The PART-OF condition requires the subject of the resultative to be interpreted as the incremental theme of SHIFT(SING), and the culmination will then be defined in terms of measuring the progress of the singing event in terms of what happens to the baby. Since the resultative tells us that a property of the culmination is that the baby is asleep at $\text{cul}(e_1)$, it is appropriate to use as the scale of measuring the singing event the baby's progress along the path to sleep. This is the reading we got for (54a), given above. Thus we see that the same resultative rule can be used for non-thematic resultatives, as is used for ordinary transitive resultatives. Note that the examples in (55) are independent evidence that the apparently non-theta-marked DP is in fact the incremental theme of the matrix verb. They show that it is the apparently non-thematic DP which determines whether the VP is telic or atelic. When this DP is a singular count nominal, (or a nominal modified by a numerical) the VP is telic, and when it is plural (but without a numerical modifier), the VP is atelic. As Krifka (1998), as well as others, have shown, it must be the incremental theme which determines the telic/atelic status of the VP; thus (55) provides evidence that the subject of the resultative is indeed the incremental theme of the matrix verb.

The use of the reflexive pronoun in (54c/d) follows naturally from this analysis together with standard assumptions about the theta-criterion and the use of reflexives. In simple sentences like (59), the reflexive is used to indicate that the value of the second thematic role is identical to the value of the first. *Paint* assigns both agent and a theme, and although the values of the two roles are identified, they must nonetheless be syntactically realised by two separate nominal expressions (DPs).

(59) John painted himself with woad.

The same is true in (54c/d), repeated here:

- (54) c. He laughed himself sick.
d. The baby cried himself asleep.

The subject of the resultative must be the incremental theme of the matrix verb. The basic form of the matrix verb assigns only one argument, an agent, to its external position. When it shifts, via (57) to an accomplishment form, it assigns an extra argument, and this argument is distinct from the agent. This means that the external subject cannot be both agent and theme, and consequently, another lexical DP must be added which can be both the argument of the resultative and the theme of the matrix verb.

On the assumption that the apparently non-thematic DP is in fact the incremental theme argument of the verb, we should perhaps revise our original assumption that non-thematic resultatives have a small clause complement (despite the arguments in favour of such a structure: see Rothstein (1992, in press), Levin and Rappaport Hovav (1995)). If the subject of the resultative is a theta-marked argument of the matrix verb, it should be a sister of the verb. If this is the case, then we should give the derivation of non-thematic resultatives slightly differently from above. We would have to assume that the SHIFT operation occurs to the intransitive before resultative conjunction applies. This means that resultative conjunction applies at the $\langle d, \langle e, t \rangle \rangle$ level. It conjoins the following two predicates and applies them jointly to their shared argument the baby:

$$\lambda x \lambda e. \text{ASLEEP}(e) \wedge \text{Arg}_1(e) = x$$

$$\lambda y \lambda e. \exists f_1 \exists f_2 [e = {}^S(f_1 \sqcup f_2) \wedge (\text{DO}(\text{SING}))(f_1) \wedge \text{Ag}(f_1) = x \wedge \text{Th}(f_1) = y \\ \wedge (\text{BECOME}(\text{SUNG}))(f_2) \wedge \text{Th}(f_2) = y \wedge \text{cul}(e) = f_2]$$

This gives the following expression:

$$\lambda y \lambda e. \exists e_1 \exists e_2 [\exists f_1 \exists f_2 [e = {}^S(e_1 \sqcup e_2) \wedge e_1 = {}^S(f_1 \sqcup f_2) \wedge (\text{DO}(\text{SING}))(f_1) \wedge \text{Ag}(f_1) = x \wedge \text{Th}(f_1) = y \\ \wedge (\text{BECOME}(\text{SUNG}))(f_2) \wedge \text{Th}(f_2) = y \wedge \text{cul}(e_1) = f_2] \wedge \text{ASLEEP}(e_2) \wedge \text{Arg}_1(e_2) = y \\ \wedge \text{PART-OF}(\text{cul}(e_1), e_2)] (\text{THE BABY})$$

The same representation will result whichever way the derivation is done, and I will not adjudicate between the two possibilities here.

7. Secondary predicates and aspectual structure

In this section, I will compare depictive and resultative predicates with respect to their effect on aspectual structure. I call secondary predicates aspectual modifiers relying on the sense in which 'aspect' refers to the perspective from which the event is presented. Secondary predicates are aspectual elements in the sense that they do not directly give a property of the event denoted by the matrix verb in the way that adverbial modifiers do, but they allow this event to be presented in the context of its relation to another eventuality, via, crucially, the PART-OF relation. This makes the assertion, not just that the matrix event is temporally part of the eventuality introduced by the secondary predicate, but they are closely connected via a shared participant, and that there is a corresponding grammatical constraint that they share a syntactic argument. Depictive and resultative predicates work in essentially the same way, in this respect, except that depictives relate the eventuality introduced by the matrix verb to the eventuality of the secondary predicate, while resultatives relate the culmination of the matrix event to the eventuality of the secondary predicate.

This has the effect of making resultative predication more restrictive in a number of ways. We have already seen that it produces a 'direct-object' restriction, or more properly an 'incremental theme restriction' since the resultative must share an argument with the culmination event of the matrix verb, and culminations are events which occur to incremental theme arguments. We have also seen that resultative predication can force an aspectual shift in an activity verb producing an accomplishment. What about the other classes? Depictive predicates may occur with matrix verbs from all four aspectual classes, without affecting the aspectual class of the verb:

- (60) a. John_i was happy drunk_i. (stative)
 b. John_i ran drunk_i. (activity)
 c. John_i painted the picture drunk_i. (accomplishment)
 d. John_i reached the top of the mountain drunk_i. (achievement)

With resultatives this is not the case. They occur with accomplishments and activities, and in the latter case they cause a shift in the aspectual class of the matrix verb. But as (61) shows, they do not occur with stative or achievements; the examples in (61a/d) are not ungrammatical, they just have a depictive reading.

- (61) a. John loved Mary_i crazy_i (stative: no resultative reading).
b. John ran the soles of his shoes_i thin_i (activity→accomplishment)
c. John painted the house_i red_i (accomplishment)
d. John noticed Mary_i upset_i (achievement: no resultative reading)

The explanation follows from the analysis we have given. Statives have no culminations, and thus cannot take a resultative. In principle we might expect that they too can undergo a 'shift' in aspectual class into accomplishments, and in the right context, I suppose that it is possible to 'push' a reading in which (61a) means "John loved Mary and as a result she was crazy". However, there is an obvious reason why the shift operation can occur easily with activities but not states. Activities consist of a predicate which can be decomposed into DO(α), and a component of this kind is a part of an accomplishment predicate. In other words, shifting an activity into an accomplishment does not require changing the nature of the activity involved, it requires only the addition of a method of measuring the progress of the activity in relation to a participant. States are not activities, and furthermore, they are naturally homogenous; if a state holds as an interval i , it holds at all instants of i ; the effect of this is to make them static. Shifting a state into an activity doesn't just require adding a measure function, but requires changing the nature of the eventuality denoted by the original predicate, and this is much harder to do.

With achievements, we have the converse problem and the same result. Achievements are eventualities which consist solely of a culmination. Since the culmination is the whole eventuality denoted by the matrix verb and not a proper part of it, the effect of resultative predication will be identical to depictive predication.

8. Subject-oriented resultatives

There have been a number of works recently which have argued that the direct object restriction, whether it is phrased in terms of direct objects or incremental themes, is not correct, and that there exists a class of subject-oriented resultatives which are not predicated of incremental themes. Most prominent among these are Wechsler (1997), who offers (62a-c) as evidence, Verspoor (1997) who offers examples (62d/e) and Rappaport Hovav and Levin (1999).

- (62) a. The wise men followed the star out of Bethlehem.
b. The sailors caught a breeze and rode it clear of the rocks.
c. He followed Lassie free of his captors.
d. The children played leapfrog across the park.
e. John walked the dog to the store.
f. John danced mazurkas across the room.

Hoekstra (1988) and Levin and Rappaport Hovav (1995) argue also that verbs of manner of motion and verbs of sound emission occur both in intransitive, object-oriented resultatives and as apparent subject-oriented intransitives (these examples are taken from Rappaport Hovav and Levin (1999)):

- (63) a. Dan ran/hopped/jogged/danced to the station.
b. She started to run the hangover out of her system.
c. The elevator creaked to the ground floor.
d. The alarm clock buzzed them awake.

They point out that sometimes minimal pairs are possible, although not always:

- (64) a. One of the race cars wiggled loose inside the transporter.
b. The snake wiggled itself loose...
c. She danced across the room.
d. She danced herself across the room.
e. She wiggled herself comfortable in the chair.
f. *She wiggled comfortable in the chair.

Rappaport Hovav and Levin and Wechsler give competing analyses of how to explain when and why subject-oriented resultatives are possible, and I discuss their accounts in detail in Rothstein (in progress). There is no space to go into the details of the discussion here, but since it is an obvious and crucial prediction of my analysis that subject-oriented resultatives are not possible except where the subject is an incremental theme, I do want to say something about how the apparently subject-oriented examples above should be analysed.

The most pertinent observation about the apparently subject-oriented resultatives is that the XP which are supposed to be result predicates are restricted to expressions of location, and more precisely of direction. Rappaport Hovav and Levin point this out, commenting that subject-oriented resultatives are restricted to expressions which denote 'result locations' rather than states. The PPs which occur include across the room, out of Bethlehem, and to the store, and the APs too are expressions which can express a direction with respect to a fixed point such as clear of the rocks, free of his captors, and loose. Crucially, a non-directional expression such as comfortable cannot be a subject-oriented resultative. I suggest that apparently subject-oriented result predicates are not resultative predicates at all, but are internal path arguments of the verb, in the sense of Krifka (1998). A path argument can be, and usually is the incremental theme, and Krifka shows that what defines path arguments is precisely that as the matrix event grows temporally, the portion of the path which is the argument of the event grows too. Thus in an example like "John danced across the room", the verb dance is supplied with an incremental path argument across the room. The effect is analogous to a resultative predicate because the event denoted by dance across the room reaches its telic point when the path is 'used up' and that of course will be when John is across the room. This is of course the same situation as the one that occurs at the telic point of "John danced himself across the room", which asserts that there is an event of dancing whose culmination point is part of the event of John being across the room.

There are various questions that are answered by this account of the examples in (62/62) which makes it convincing. First, we explain Rappaport Hovav and Levin's observation that (so-called) subject-oriented resultatives denote result locations and not states. Since they are in fact path arguments, the telic point of the event will be when the subject is at the location designated by the end of the path - and this will be a 'result location'. Second, we explain why subject-oriented resultatives are temporally dependent; in Rappaport Hovav and Levin's words the result event unfolds at the same rate as the matrix event. If the locational expression denotes a path which is the incremental argument of the verb, and which is 'used up' gradually as the event unfolds, then of course progress along the path will be temporally dependent on the progress of the matrix event. Third, although there are minimal pairs such as (65a/b) we see that when the PP is directional but non-telic, the object-oriented version is not as good, as in (65c/d):

- (65) a. John danced out of the room.
b. John danced himself out of the room.

- c. John danced round and round the room.
- d. ??John danced himself round and round the room.

This is because the non-telic directional phrases do not easily denote result states.

Clearly, there is a lot more to say about this topic, and the formal details of the analysis of so-called subject-oriented resultatives still have to be worked out. There is no space for this here, but I hope I have shown the direction in which I think an analysis of these putative counterexamples should go.

9. The next set of questions

The analysis presented here raises a number of larger questions I want to mention, and which I hope to discuss in future work. These centre round the nature of the incremental theme role, and the question of how incrementality is to be calculated. The first is raised by examples like (66), pointed out to me by David Dowty (p.c.):

(66) John drank himself/ his friends under the table.

Here the 'non-thematic' resultative is based, not on an intransitive verb, but on a transitive accomplishment verb drink, which normally assigns the incremental theme role to the entity which is consumed, as in "John drank three glasses of beer". The standard analysis of intransitivised drink (see e.g. Dowty 1982) is that the internal thematic argument (which I will call Patient) has been bound by an existential quantifier via a lexical rule, giving a lexical form like (67):

(67) $\lambda e.\exists y[\text{DRINK}(e) \wedge \text{Ag}(e)=x \wedge \text{Pat}(e)=y]$

The patient argument is usually the incremental theme, but the fact that this form can be used in (66) indicates that existential quantification over this argument has changed its status and it is no longer the incremental argument of the verb. This allows intransitivised drink to be used in (66). In Rothstein (in progress) I discuss how this occurs, and what it means for how we should understand the incremental theme role.

The second obvious question is how exactly we add an incremental theme to an intransitive verb. In other words, what available measures are there for calculating the progress of a event. If the culminating point of (66) is that John (or his friends) are under the table, how can we use this information to derive a scale for measuring the progress of the accomplishment. Similarly, we predict that in (65a/b) the progress of the dancing event is measured differently in each case. In (65a) it is measured straightforwardly by which parts of the path denoted by out of the room are used by which parts of the event. In (65b), the incremental argument is not given by the PP, but by John, and thus the progress of the event should be calculated by measuring what happened to John. Presumably there are restrictions on the kinds of ways in which in entity like John can be involved in the measuring of the progress of an event, and these may account for restrictions on what APs can be used as resultative predicates, as demonstrated, for example in the contrast sing himself hoarse vs *sing himself famous, or in the minimal contrasts wipe the table clean/*wipe the table dirty. I would hope that a more detailed study of the nature of incrementality and the functions which allow us to measure event progress will allow us to gain more understanding of these issues.

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Syntactic Position and the Readings of ‘Manner’ Adverbs*

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Abstract

In this study, I investigate the positions and interpretations available to ‘manner’ adverbs in English. My central claim, contra Wyner (1994, 1998), is that an association does exist between ‘manner’ adverb positions and interpretations, which is best characterized in terms of Peterson’s (1997) distinction between ‘restrictive’ and ‘non-restrictive’ modification. I also claim, however, that the association in question is not as general as commonly claimed; and, in particular, does not apply directly to ‘manner’ adverbs in ‘fronted’ and ‘parenthetical’ positions, which require special syntactic description.

1. Introduction

A good deal of linguistic research has been devoted to ‘manner’ adverbs in English - a class of adverbs that may be characterized informally as those that occur (at least) in sentence-final position without preceding pause, and in this position describe some manner in which the situation designated by the VP occurs or is performed. What has been of especial interest here is that adverbs in this class occur not only in the ‘lower’, VP-internal position just mentioned but also in a ‘higher’, VP-external position, and receive different readings in these respective positions. This observation, as offered in McConnell-Ginet (1982) and elsewhere, is illustrated in 1:

- (1) a. Louisa departed rudely.
b. Louisa rudely departed. (ibid., 160, (37b, a))

The adverb *rudely* in the ‘lower’ position, as in the (a) sentence, receives a reading whereby Louisa departed in a rude manner; whereas the adverb in the ‘higher’ position, as in the (b) sentence, receives a reading whereby her act of departing was itself rude. The basic claim from which these two kinds of interpretations follow is that ‘VP-internal adverbs “restrict” the range of events referred to, whereas VP-external adverbs take verbal reference for granted and say something about the event or situation (partially) designated by the VP’ (ibid., 159).

What makes this claim intriguing is that it is far-ranging but, in many cases, difficult to assess. Widely accepted in the literature and extended in various directions, it has given rise to what Wyner (1999) has called the ‘association theory’, according to which ‘distinct semantic and/or syntactic properties are associated with distinct positions in the sentences’, and ‘adverbs are sensitive to and dependent on the properties of the positions.’ Because there are many conspicuous gaps in the ‘association’ pattern, however, it remains unclear whether we have a truly general ‘interface’ pattern on our hands, or something more lexically driven. Wyner’s own response to the ‘association’ claim is to reject it, arguing instead that the source

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of the two readings just sketched is the properties of particular adverbs themselves rather than particular adverb positions, a given reading being preserved for a given adverb across different positions (see e.g. Wyner 1994: 197–98).

Wyner's claim is worth investigating not least because of its 'devil's advocate' response to the 'syntactization' of adverb meaning advanced in much recent research, which reached a kind of apogee with Cinque's (1996)¹ claim for a universal hierarchy of adverb positions, each specific to a particular class of adverbs (see e.g. Ernst 1998, Shaer 1998 for a critique). But it is also worth investigating because it calls attention to the fact that an adverb's syntactic position is often not the well-charted map to its interpretation that most 'association' accounts suggest that it is. This is brought home by two adverb positions that Wyner draws attention to: 'fronted' and 'parenthetical' positions. As I shall be suggesting, the interpretation of adverbs in these positions casts doubt on rigid 'association' accounts like those of Cinque and others, according to which each semantic class of adverbs can be distinguished from each other class solely by its position in a syntactic tree.

While granting Wyner's insights, I shall nevertheless be showing that robust evidence does exist for the claim that the positions of 'manner' adverbs guide the kinds of readings that they receive. The key to reconciling Wyner's observations with the 'association' claim will be to rethink the nature of the contribution that 'higher' and 'lower' adverbs make to the interpretation of VPs and sentences; and to recognize how certain lexical properties of adverbs and certain adverb positions 'distort' this general association in predictable ways. Such considerations will permit an 'association' analysis that is far more sensitive to the adverb data and to the concerns that Wyner has raised.

The basic ingredients of this analysis consist in one main and three ancillary claims. My main claim is that an association does indeed exist between the positions and readings of 'manner' adverbs, and that contrasts in the readings of 'higher' and 'lower' adverbs are best captured in terms of a distinction between 'restrictive' and 'non-restrictive' modification, as proposed by Peterson (1997). My three ancillary claims follow from an examination of data that appear to be problematic for my main claim, which are related to (i) 'fronted' and 'parenthetical' occurrences of 'manner' adverbs, for which differences in position do not correlate directly with differences in interpretation; (ii) adverb positions in the auxiliary verb projections, for which differences in position likewise do not correlate directly with differences in interpretation; and (iii) particular adverbs that evince no contrast between 'higher' and 'lower' readings even in the 'higher' and 'lower' positions just described. These claims are as follows. First, 'fronted' and 'parenthetical' adverbs do not display the expected pattern because they do not have a fully determined syntactic (or, therefore, semantic) relation to the sentences to which they are attached. Next, the readings of 'manner' adverbs in different auxiliary positions appear to be synonymous because of the minor rôle that auxiliary verbs play compared to the main verb in designating a situation. However, as many studies have argued, they do play a key rôle in the creation of various 'derived' situations from 'basic' ones; and very subtle aspectual contrasts do emerge from the differential placement of 'manner' adverbs in otherwise synonymous sentences. Finally, and in a related vein, the synonymy claimed of 'higher' and 'lower' occurrences of various 'manner' adverbs is only apparent, two readings being more readily distinguishable on the basis of the 'Petersonian' distinction described above and in the context of VPs that make one or the other reading more salient.

The rest of this paper will be organized as follows. In section 2, I shall lay out the basic pattern of 'manner' adverbs in 'higher' and 'lower' positions as described by McConnell-

¹ Eventually published as Cinque (1999).

Ginet (1982), and offer additional data to support her generalization. In section 3, I shall address the three complications to the 'association' claim just described: (i) 'fronted' and 'parenthetical' adverb data; (ii) adverb positions in auxiliary verb projections; and (iii) particular adverbs in 'higher' and 'lower' positions that do not support a distinction between 'higher' and 'lower' readings. In section 4, I shall show that the very subtle contrasts that do emerge in this last class of adverbs have a natural characterization in terms of Peterson's (1997) distinction between 'restrictive' and 'non-restrictive' modification. Finally, in section 5, I shall offer some concluding remarks.

2. 'Higher' and 'Lower' Adverb Positions

As noted above, a good deal of discussion has been devoted in the adverb literature to two basic positions: (i) one that is external to the main VP and appears between the main verb and the subject; and (ii) one that is internal to the main VP and appears sentence-finally. Although matters become somewhat more complicated once we consider a broader range of adverb positions, the patterns related to these two positions, which are the heart of the 'association' claim, are both robust and puzzling enough to warrant serious attention.

2.1. McConnell-Ginet's (1982) Observations

If we examine the interpretative contrasts between 'higher' and 'lower' positions that motivated McConnell-Ginet's (1982) 'association' claim, we find that the contrasts adduced by her, which include those in the following pairs of sentences, are indeed striking:

- (2) a. Louisa rudely answered Patricia.
b. Louisa answered Patricia rudely. (ibid., 159, (35))
- (3) a. Minnie carelessly forgot her mother's birthday.
b. #Minnie forgot her mother's birthday carelessly. (ibid., 159, (32))
- (4) a. Josie has furnished the house lavishly.
b. #Josie lavishly has furnished the house.
c. Josie lavishly has installed 14K gold faucets. (ibid., 159, (33), (34))

Each of these pairs clearly illustrates the generalization given above that 'lower' adverbs "restrict" the range of events referred to, while 'higher' ones 'take verbal reference for granted and say something about the event or situation (partially) designated by the VP' (ibid., 159). Accordingly, (2a) 'can be construed as saying that Louisa's rudeness consisted in her having answered Patricia' at all, whereas [2b] locates the flaw in the manner of answering.' The sentences in (3) and (4) illustrate another possible consequence of adverb placement: namely, infelicity for a sentence when a 'lower' or a 'higher' adverb cannot be construed as respectively indicating a manner of acting or a comment on the situation being described. Thus, (3a), with a 'higher' adverb, asserts felicitously that Minnie was careless in having forgotten her mother's birthday; whereas (3b), with a 'lower' adverb, 'implicates that there is a special kind of forgetting which is careless', and is thus very odd. Contrariwise, (4a), with a 'lower' adverb, asserts felicitously that Josie has furnished her house in a lavish manner; whereas (4b), with a 'higher' adverb, asserts infelicitously 'that furnishing the house consti-

What we find is a significant divergence from the pattern that we observed with VPs. This involves the loss of a correlation between ‘higher’ and ‘lower’ positions and readings, even though the single modifier in the AdjP and NP structures is structurally either higher or lower than the head that it modifies, and thus might be predicted to share the properties of its VP counterpart. Instead, the structurally ‘high’ adverb in (16a) receives a reading that is the counterpart of the ‘lower’ adverb in (6b); and the structurally ‘low’ adjective in (17a) receives both ‘higher’ and ‘lower’ readings. The availability of one or the other reading cannot be structurally conditioned, since there is no structural distinction here that could underwrite such a condition; and is presumably determined by context. In other words, the readings available to the adverbs and adjectives in these examples indicate that the modifier positions in AdjP and NP structures reflect a collapsing of the two positions available in corresponding VP structures. As such, they provide indirect support for the existence of a structural distinction underlying ‘higher’ and ‘lower’ readings of ‘manner’ adverbs in the VP.

3. Complications to the Higher/Lower Pattern

In the preceding sections, we have seen compelling evidence for a tight relation between ‘manner’ adverb positions and interpretations — at least insofar as this applies to the two positions that we have been considering. Unfortunately, the clear picture that has emerged is obscured by the presence of various adverb data that are at odds with such a claim. Three sorts of data might be distinguished here: (i) those pertaining to ‘fronted’ and ‘parenthetical’ adverbs, whose positions in a syntactic tree are not related neatly to the readings that they receive; (ii) those pertaining to the various ‘manner’ adverb positions within auxiliary verb projections, which display no obvious interpretative contrasts amongst themselves; and finally, (iii) those pertaining to ‘manner’ adverbs that display no obvious interpretative contrasts even in the ‘higher’ and ‘lower’ positions described above. Let us consider each of these cases in turn.

3.1. ‘Fronted’ and ‘Parenthetical’ Adverbs: Wyner (1994, 1998)

As noted above, Wyner presents various adverb data that he takes as evidence against the ‘association’ claim, and in favour of an analysis on which the ‘higher’ and ‘lower’ readings that we have been discussing are available to ‘manner’ adverbs in any position that they may occupy in a syntactic tree (Wyner 1994: 197–98). The data that Wyner presents might be seen to fall into two categories: (i) those involving ‘manner’ adverbs that, according to him, can occupy VP-internal or -external positions with no shift in meaning; and (ii) those involving ‘parenthetical’ and ‘fronted’ ‘manner’ adverbs, which similarly involve no shift in meaning compared to their ‘undislocated’ counterparts. These are illustrated in (18) and in (19)–(20), respectively:²

- (18) a. Kim passionately had kissed Sandy.
b. Kim had passionately kissed Sandy.
c. Kim had kissed Sandy passionately. (Wyner 1998: §1.3, (12b–d))

² Note that the judgements are Wyner’s — speakers whom I consulted found many of the sentences in (19) – (20), in particular, rather awkward. (See the following note.)

- (19) a. Kim had kissed every man, rudely, on his birthday.
 b. Kim congratulated no one, rudely, on anyone's birthday.
 c. Kim kissed, stupidly, the tall, blonde woman who wore one black shoe.
 d. Kim, rudely, had kissed Sandy.
 e. Kim had, rudely, kissed Sandy.
 f. Kim had kissed Sandy, rudely. (ibid., (13))
- (20) a. Passionately, Kim had kissed Sandy. (ibid., (12a))
 b. Rudely, Kim had kissed Sandy.

Let us first consider Wyner's examples of 'higher' and 'lower' adverbs, as given in (18b–c), since his claim that they exhibit no contrast is at odds with what we have observed for such pairs so far. (The further complications associated with the adverb position in (18a) will be addressed in §3.2 below.) Wyner's specific claim about the availability of 'higher' and 'lower' readings for 'manner' adverbs is that each reading is always available, although one will be 'prominent' and one 'secondary' in a given instance (see Wyner 1994: 197–98). The basic difficulty with this claim, as revealed by the data in §§2.1–2.2, is that there are many cases in which a 'higher' or 'lower' occurrence of a 'manner' adverb actually leads to unacceptability — a result that Wyner's account simply does not predict. However, even when a 'higher' or 'lower' occurrence does not lead to acceptability, it appears (pace Wyner) to be associated with only one reading, and not with 'primary' and 'secondary' readings.

This can be brought out by the sentences in (18b–c), which (as just noted) Wyner takes to be synonymous. What is crucial here is that the descriptions of kissing events with which Wyner illustrates his claim make the possibility of discerning 'higher' and 'lower' readings rather small in any case. This is because kissing can both be done in a passionate manner and be a sign of someone's being passionate; and it is difficult to disentangle, linguistically or otherwise, passionate kissing from kissing that (say) bespeaks passion. For this reason, the distinction between 'higher' and 'lower' readings for such sentences will be largely neutralized. However, it is straightforward enough to find sentences that both distinguish these two readings and demonstrate their association with two different positions. These include the ones given below:

- (21) a. Kim had passionately chosen love over happiness.
 b. #Kim had chosen love over happiness passionately.
- (22) a. Kim had done his work passionately.
 b. #Kim had passionately done his work.

The existence of such examples, many more of which were already adduced above, casts serious doubt on Wyner's synonymy claim. However, because his claim also draws its support from another set of adverb data — namely, that involving 'parenthetical' and 'fronted' adverbs —, and because these data pose a much greater challenge to the 'association' claim, we need to consider them carefully before we can properly assess his claim.

Let us turn, then, to the examples in (19) – (20). Here, interestingly, we find 'higher' readings strongly favoured for all occurrences of both *rudely* and *passionately*. This pattern

loses some of its sharpness when we test these adverbs against a broader range of VPs,³ in which case we discover a strong favouring of ‘lower’ readings for some VPs and the availability of both readings for others. ‘Higher’ readings nevertheless predominate, particularly for ‘fronted’ cases and for ‘parentheticals’ that occur early in the sentence:

- (23) a. Kim had done his work, passionately. (‘lower’ reading strongly favoured)
 b. Kim had, passionately, done his work. (‘higher’ reading strongly favoured)
 c. Kim had chosen love over happiness, passionately.
 (‘higher’ reading strongly favoured)
 d. Kim had, passionately, chosen love over happiness.
 (‘higher’ reading strongly favoured)
- (24) a. Your son spoke to my wife, rudely. (‘lower’ reading strongly favoured)
 b. Your son spoke, rudely, to my wife. (both readings possible)
 c. Your son, rudely, spoke to my wife. (‘higher’ reading strongly favoured)
 d. Yesterday, you left the meeting at noon — rather rudely, I might add.
 i. You had no business leaving then. (‘higher’ reading)
 ii. You interrupted the chairman with you noisy departure. (‘lower’ reading)
- (25) a. Rudely, you left the meeting at noon. (‘higher’ reading strongly favoured)
 b. Rather rudely, I must say, your son spoke to my wife. (same)
 c. Passionately, Kim had chosen love over happiness. (same)
 d. Passionately, Kim had done his work. (same)

These data are, of course, consistent with Wyner’s claim that ‘higher’ and ‘lower’ readings are available up and down the syntactic tree, and with his (1994: 198) remark that sentences read ‘without comma intonation [...] seem more clearly to have the manner interpretation’ whereas those ‘read [...] with comma intonation [...] more clearly have the event interpretation.’ From this remark, it appears that Wyner takes ‘parenthetical’ and ‘non-parenthetical’ occurrences of adverbs to have essentially the same syntactic status, differing from each other only in superficial intonational features. However, such a view not only makes the connection between ‘comma intonation’ and the ‘eventive’ reading completely arbitrary — as far as Wyner’s analysis goes, the opposite pattern, in which comma intonation made ‘manner’ readings salient, is just as possible — but fails to acknowledge the distinct possibility that adverbs read with ‘comma intonation’ are indeed ‘parenthetical’.⁴ As such, they would have an exceptional phrase-structural status (see e.g. McCawley (1988: 39ff.)), which might be the true source of the patterns just given.

An account of the sentences in (23)–(24) that invokes the ‘parenthetical’ status of the adverbs contained in them might start with the assumption that parenthetical expressions serve, generally speaking, to qualify or comment on the statements with they are associated.

³ Note that embedding these adverbs in more elaborate parenthetical expressions, as illustrated below, makes their ‘parenthetical’ use more natural:

- (i) a. Your son spoke — rather rudely I might add — to my wife.
 b. Your son — rather rudely I might add — spoke to my wife.

⁴ Or otherwise ‘dislocated’, as I shall be suggesting below for the ‘fronted’ cases.

On this view, the more salient reading of 'parenthetical' instances of 'manner' adverbs would be the 'higher' one, since it is on this reading that, by hypothesis, these adverbs serve to comment on the situation designated by the VP. Since 'lower' readings, by hypothesis, help to establish the actual situation being referred to in the first place, the availability of this reading for 'parenthetical' occurrences should be much rarer, arguably serving only to express an afterthought. In certain cases, however, both readings are available, as suggested by the sentence in (24d). The key here is that both readings should, in principle, be available. However, this is not for the reasons suggested by Wyner, but because these elements are not fully integrated into phrase structure, and as such do not stand in any direct hierarchical relation to the elements to their left and right in a sentence. It follows that 'parenthetical' adverbs do constitute an important exception to the 'association' claim, but one which points more clearly to their exceptional syntactic status than to a shortcoming in the 'association' claim itself.

The 'fronted' adverb data in (25) point us in the same direction. Notwithstanding recent analyses of 'fronted' elements as occupying positions that are fully integrated into phrase structure (see e.g. Rizzi 1997), such elements seem to bear a close resemblance to 'parenthetical' adverbs, displaying many properties that suggest a looser connection to the sentences with which they are construed. Most relevant here is the range of readings that 'fronting' permits for 'manner' adverbs, as demonstrated in (26). These include, in addition to the various 'sentential' readings described by Bellert (1977) and others ((26a–c)), both 'eventive' and 'manner' readings ((26d–f) and (26g), respectively):⁵

- (26) a. Frankly, Joe is a fool.
 b. Happily, Sam sucks lemons. (cf. Sam sucks lemons happily.)
 (Thomason & Stalnaker 1973: 205, in McConnell-Ginet 1982: 148, (9a))
 c. Quite simply, life cannot be the same. (Biber et al. 1999: 558)
 d. Slowly, everyone left. (McConnell-Ginet 1982: 175, (70b))
 e. Reluctantly, Mary was instructed by Joan. (ibid., 145, (1b))
 f. Automatically she backed away. (Biber et al. 1999: 553)
 g. Sternly, the headmaster lowered his spectacles from the bridge of his nose.
 (Ernst 1984: 293, (193a))

While the 'sentential' readings of the adverbs in (26a–c) — in particular, the speaker-oriented reading of *frankly* — might be lexicalized, the readings of the adverbs in (26d–g) are very unlikely to be: brief inspection of these cases reveals them to be our familiar 'higher' and 'lower' readings, now associated with a new position.

This last observation suggests that these adverbs have simply been moved from positions internal or external to the VP. Such a possibility loses its plausibility, however, in the face of the clear contrast in acceptability between these adverbs and uncontroversially moved adverbial elements, as demonstrated in (27):

- (27) a. How quickly did John say that he ran home?
 b. Never had John run so quickly.
 c. *Quickly, John said that he ran home. (Shaer 1998: §4, (36))

⁵ The 'VP-internal modifier' behaviour in question was, in fact, noted by McConnell-Ginet (1982: 156, n.13).

In Shaer (1998), I suggested on the basis of these and other data that ‘fronted’ adverbs were base-generated sentence-initially as ‘hanging topic left dislocation’ structures (e.g. Anagnostopoulou 1997), and most resembled structures like the following ones:

- (28) a. I said that my father, he was tight as a hoot-owl.
(Ross 1967; in Anagnostopoulou 1997: 167, (40b))
b. And your appointment, did you arrive on time? (Isard 1974: 246)

As such, their interpretation was highly dependent on their own lexical properties and on their grammatical and situational context.⁶

One question that such a ‘dislocation’ claim does not address, however, is why the interpretation of elements in this position should be so dependent on context simply because these elements are ‘dislocated’ from their usual positions. One promising answer to this question has been offered by Kempson & Meyer-Viol (1998), who describe ‘dislocation’ structures in terms of ‘a model of language understanding in which interpretation is defined as a process of progressively building up a logical form on a left-right basis’ for a given string (*ibid.*, §5). This involves the creation of nodes in a tree representation corresponding to the logical form for that string, ‘each node com[ing] into being with some set of *requirements* (for annotations on that node), which must then be progressively satisfied by annotations supplied by that string.’ As such, a well-formed logical form for a string must have ‘the requirements associated with all nodes [...] satisfied the moment the string has been completely traversed’ (*ibid.*, §1).

On this model, the intuition that ‘dislocated’ constituents are not fully integrated syntactically into a sentence yet express the same proposition as their ‘undislocated’ counterparts can be captured through the assignment of ‘initially weak tree descriptions’ to the former constituents, ‘which are subsequently updated’ (*ibid.*, §5). Thus, ‘left dislocation’ constructions like that in (29) will have tree descriptions in which the ‘dislocated’ constituent projects a logical term on a node whose position in the tree has not yet been defined — this ‘reflect[ing] the fact that that term does not yet have a definite role in the (partial) logical form’:

- (29) The woman I met in London, John interviewed at length. (*ibid.*, (1))

Once the tree position of this ‘dislocated’ constituent is fixed, the sentence containing it will end up ‘project[ing] a propositional structure identical to that projected by the “basic” string without dislocated constituents’ (*ibid.*).

Kempson & Meyer-Viol implement this proposal in terms of inference rules that apply to descriptions of partial trees — that is, ‘structure[s] that can be embedded in complete binary tree[s]’ (*ibid.*, §2.1). Nodes in these trees are represented by ordered pairs of lists of ‘requirements’, ‘the *TODO* list’, and ‘annotations’, ‘the *DONE* list’. Processing involves a set of transitions from a single root node with a *TODO* list containing only the type *t* and the first word of a string to a root node with type *t* on its *DONE* list, nothing left on its *TODO* list, and no words remaining (*ibid.*). The authors elaborate on these basic components in order to provide an account of various attested ‘dislocation’ structures, which differ from each other, for example, in containing or not containing a resumptive element in the host sentence and in displaying a ‘tighter’ or ‘looser’ connection between the ‘dislocated’ constituent and the host sentence. These differences are captured by three different means: (i) by having nodes project

⁶ See Maienborn (1998) for similar remarks regarding the interpretation of ‘fronted’ locative modifiers.

information on *TODO* lists or *DONE* lists; (ii) by having one tree linked or not linked to another, where in the former case information is transferred from one tree to another and thereby 'constrain[s] subsequent tree development'; and (iii) by having the determination of a location for unfixed nodes restricted to the 'local tree' (that is, the tree in which this node has been created) or 'somewhere in the subsequent global tree' (ibid., §3). The differences between, for example, *wh*-movement and 'clitic left dislocation' accordingly involve differences in the kind of information that 'unfixed' nodes project and the kind of tree structures that are a consequence of this difference. More specifically, the former case involves only 'the projection within a tree structure of a node annotated with a formula and lacking only a fixed tree position'; whereas the latter involves both 'the linkage of a tree to (the representation of) the dislocated constituent', and the dislocated constituent's projection of a formula as a requirement on some [as] yet unfixed node' within this tree (ibid., §3).

'Fronted' adverb constructions appear to resemble the former structures in that they, too, involve only an unidentified internal tree relation, with no linking of a 'dislocated' node to a tree that must contain a resumptive element. On the other hand, given the unacceptability of sentences like that in (27c), 'fronted' adverbs clearly do not tolerate 'long-distance' dependencies of the kind that we find with *wh*-movement structures. An analysis of 'fronted' adverbs would thus have to capture the very tight locality requirement imposed by 'fronted' adverbs on the clauses with which they are construed.

At this stage I cannot offer an explicit application of Kempson & Meyer-Viol's model to 'fronted' adverbs, and must leave the development of such an analysis for future research. However, the various features of this model that I have sketched suggest that such an analysis would be a promising one. Unlike either Wyner's approach or those couched in terms of 'discourse-related' functional projections, this one has the means to capture directly the syntactically and semantically loose connection between 'fronted' adverbs and their host sentences. At the same time, it is able to assign the same propositional structure to sentences with 'fronted' and 'non-fronted' adverbs, and thus to account for the synonymy facts that we observed above. Moreover, because it models interpretation as a process of building up logical forms, it assigns a key rôle to inference in the assignment of an interpretation to a string, and is thus naturally suited to the description of a phenomenon in which context and word meanings figure so prominently in the fixing of interpretations. Finally, such a model would appear to lend itself to a treatment of 'parenthetical' adverbs (among other 'parenthetical' elements), with which 'fronted' adverbs, as suggested above, have a good deal in common, thereby permitting a unified analysis of two kinds of syntactically 'exceptional' adverb positions.

What we have found in this section, then, is that the range of 'manner' adverb data with which Wyner launches his challenge to the 'association' claim turn out to have plausible analyses that are broadly consistent with this claim, and thus cannot be seen to support his alternative. Wyner is certainly correct in asserting that the readings associated with 'parenthetical' and 'fronted' adverbs are incompatible with rigid 'association' claims, according to which every adverb in every sentence can be associated with a unique base position in a syntactic tree. Yet he overlooks compelling reasons for treating these occurrences of 'manner' adverbs as syntactically exceptional, and thus as falling outside the purview of a more plausible 'association' claim. Once we consider the possibility that such adverbs have the readings that they do because they occupy positions with no fixed relation to the sentence, then we can see their inconsistency with the 'association' claim in a rather different (and brighter) light.

3.2. 'Non-contrasting' Positions in Auxiliary Projections

The adverb data examined above by no means exhaust those taken as evidence against the 'association' claim. Another sort, which we turn to in this section, involves adverb positions in the auxiliary verb complex, as illustrated below:

- (30) a. She rudely will be leaving the meeting early.
b. She will rudely be leaving the meeting early.
c. She will be rudely leaving the meeting early.
- (31) a. She rudely will have left the meeting early.
b. She will rudely have left the meeting early.
c. She will have rudely left the meeting early.
- (32) a. She rudely has left the meeting early.
b. She has rudely left the meeting early.
- (33) a. She rudely has been leaving our meetings early.
b. She has rudely been leaving our meetings early.
c. She has been rudely leaving our meetings early.

Although these positions have been widely discussed in the adverb literature (e.g. Jackendoff 1972: 75ff.; Ernst 1984: 265ff.; Travis 1988), their syntactic status and their implications for the 'association' claim remain far from clear. The occurrence of adverbs in some of these positions result in sentences that are, admittedly, rather awkward; however, none seems awkward enough to suggest ungrammaticality. Both this availability and this awkwardness suggest a syntactic representation of these positions as adjunction structures:⁷ we might speculate that if such positions are optionally adjoined — and thus do not represent privileged 'purpose-built' positions for these adverbs —, they might be more at the mercy of prosodic constraints that favour certain word orderings over others. This matter of syntactic structure I shall, however, leave for future research, and focus instead on the challenge that these data pose for the 'association' claim, given their demonstration that a given adverb may occur in a range of different positions with no discernible difference in meaning.

In Shaer (1998: §3), I argued that such synonymy was consistent with a looser 'association' claim on which the interpretation of a particular adverb was not determined directly by its phrase-structural position, but was instead guided by its relation to the syntactic projection of 'event structure'. On the proposal that I sketched there, the head of the main VP designated a property or relation; this head together with its arguments, which constituted the main VP, designated a temporally unspecified situation; and a tensed or otherwise temporally specified VP designated a temporally specified situation. While I noted that auxiliary verbs, too, contributed to the temporal and aspectual description of a sentence, I took the main VP to be the basic designator of a situation. This picture of 'event structure' suggested that no interpretative effect accrued to the placement of 'manner' adverbs in higher or lower VP-external

⁷ This (conservative) view of adverb positions, which I adopted in Shaer (1998: §3), has also recently been advanced by Ernst (e.g. 1998).

positions because these adverbs predicated some property of the very same situation whether they were in higher or lower positions.

Further investigation of these cases, however, reveals that the occurrence of 'manner' adverbs in higher or lower VP-external positions may be associated with interpretative contrasts after all. Consider the pair of sentences in (34):

- (34) a. Louisa rudely has left the party without saying good-bye.
b. Louisa has rudely left the party without saying good-bye.

These sentences seem, at first sight, to be fully interchangeable. Closer inspection, however, suggests that they assert subtly different propositions, related to the contribution made by the perfect form (the auxiliary *have* together with the past participle) in each sentence. These are (i) that Louisa is rude to have left without saying good-bye, and (ii) that she has been rude to leave without saying good-bye, respectively. Such a contrast is consistent with an analysis of the English perfect form advanced by Kamp & Reyle (1993: 566ff.) among others, on which it designates a state 'which results from the occurrence of [the] event' designated by the main VP (ibid., 568). On this view, perfect and non-perfect forms actually describe different situations; so that the same 'manner' adverb predicates the same property of two different situations in (34a) and (34b), respectively, thereby giving rise to sentences with distinct interpretations. Note that the observed contrast between (34a) and (34b) is also consistent with the more 'temporal' approach to 'event structure' adumbrated in Shaer (1998: §3), according to which perfect forms specify the 'post-time' of a situation designated by the main VP (see e.g. Klein (1994)). Here, the semantic difference between (34a) and (34b) would again rest on a distinction between the situations to which the 'manner' adverb predicates some property, but one constituted solely by a difference in the temporal locations of the situations to which the adverb is related, rather than in the kind of entities designated by the respective VP complexes in these sentences.

A comparison of these two approaches to the differences just described is beyond the scope of this study. We might note, however, that the latter, 'temporal', approach readily extends to cases in which 'manner' adverbs occupy different positions with respect to the auxiliary form *will*:

- (35) a. Louisa rudely will be leaving the party without saying good-bye.
b. Louisa will rudely be leaving the party without saying good-bye.

The resulting contrast here is similar to that displayed in (34), involving the respective assertions (i) that Louisa is rude in that she will be leaving without saying good-bye, and (ii) that she will be rude in leaving without saying good-bye. In this case, though, the contrast cannot be attributed to a difference in the kinds of situations that are referred to, so a 'temporal' solution appears to be the only one available.

Note that even these attenuated contrasts do not emerge in every case in which one sentence differs from another in its placement of a 'manner' adverb with respect to an auxiliary. In particular, the placement of the adverb either to the left of or between the two elements that constitute progressive forms does not lead to any contrast, as far as I can tell; and the placement of the adverb to the left of a present or past progressive form leads only to degraded acceptability compared both to the placement of the adverb between the two elements in the progressive form and to analogous future progressive forms. These patterns are given in (36) and (37), respectively:

- (36) a. Louisa will rudely be leaving the party without saying good-bye.
 b. Louisa will be rudely leaving the party without saying good-bye.
- (37) a. ??Louisa rudely is/was leaving the party without saying good-bye.
 b. Louisa is/was rudely leaving the party without saying good-bye
 c. Louisa rudely will be leaving the party without saying good-bye.

The absence of a contrast in (36) may be related to the status of progressive forms as a kind of ‘discontinuous constituent’, which arguably neutralizes the effect of this difference in adverb placement. The pattern in (37), on the other hand, has no such explanation, and may instead be related to prosodic constraints favouring the placement of a stress-bearing element after the unstressed auxiliary element. These remarks are, of course, highly speculative, and a detailed investigation of these and related patterns of interpretation and acceptability remains to be undertaken. What nevertheless emerges from consideration of the data in (30)–(37) is that differences in the positions of adverbs even in the auxiliary complex may lead to differences in interpretation, given the distinct relation that these adverbs may bear to the syntactic projection of ‘event structure’. While these data involve very subtle contrasts, these are real enough to demonstrate that the data are consistent with the ‘association’ claim.

3.3. ‘Neutralization’ of Contrasts

So far, we have seen that various adverb data taken to be at odds with the ‘association’ claim can be reconciled with it, either through an appeal to the exceptional character of particular adverb positions or through a demonstration that structurally-determined interpretative contrasts do emerge even in contexts where they are not generally recognized to. This suggests that the linguistic system makes an interpretative contrast between ‘higher’ and ‘lower’ positions available, although the realization of this contrast depends on additional factors — in particular, the compatibility of ‘higher’ or ‘lower’ readings with a given adverb and VP (as described in §2.1) and with the ‘argument-structure’ requirements of verbs with adverb complements (as described in §2.2.1).

Of course, this conclusion is not incompatible with the existence of ‘manner’ adverbs with non-contrasting ‘higher’ and ‘lower’ interpretations, about which something more, or something else, would need to be said — essentially what we concluded about adverbs in ‘parenthetical’ and ‘fronted’ positions. One class of ‘manner’ adverbs that would be a good candidate for such treatment is ‘agent-oriented’ adverbs (e.g. Ernst 1984: 26), exemplified below:⁸

- (38) a. John has answered their questions cleverly.
 b. John has cleverly answered their questions. (Cinque 1996: §1.4, (83a, c))
- (39) a. Joe had left the door unlocked deliberately/intentionally/reluctantly.
 b. Joe had deliberately/intentionally/reluctantly left the door unlocked.
- (40) a. Oedipus knowingly married Jocasta. (McConnell-Ginet 1982: 152, (21a))
 b. Oedipus married Jocasta knowingly.

⁸ These adverbs are called ‘subject-oriented’ by Jackendoff (1972: 82) and ‘passive-sensitive’ by McConnell-Ginet (1982: 145).

Observation of data like these have motivated proponents of 'association' and 'anti-association' approaches alike to advance synonymy claims for 'higher' and 'lower' occurrences of these adverbs. Cinque (1996) assigns a single base-generated position to the two occurrences, relating one to the other via movement. Wyner (1994), though pursuing a diametrically opposed 'anti-association' claim, likewise assigns the two occurrences a uniform analysis, distinguishing the readings of these adverbs from 'manner' and 'eventive' readings by making explicit their dependence on particular 'thematic participants' in the situation designated by the sentence (*ibid.*, ch. 3). Both approaches, despite their substantial differences, highlight a crucial fact about 'lower' and 'higher' readings as they apply to this class of adverbs. This is that these two readings — which we have taken to involve, respectively, restricting the range of situations referred to (in particular, by specifying the manner in which some action occurs or is performed); and predicating some property of the situation as a whole — appear to blur with 'agent-oriented' adverbs. If, for example, we attempt to apply the 'manner' versus 'eventive' distinction to the sentences in (38), we might arrive at a paraphrase of the 'lower' reading for (38a) that invokes 'a manner that suggests that the agent was clever in answering the questions'. But this looks suspiciously like the 'eventive' paraphrase whereby 'the agent was clever in answering the questions', and begs the question of whether these are really distinct readings after all.

Similar remarks apply to the class of adverbs exemplified below, which Ernst (1984: 94) has described as 'pure manner' adverbs:⁹

- (41) a. He brilliantly performed the trick.
b. He performed the trick brilliantly.
- (42) a. He loudly shuffled the papers.
b. He shuffled the papers loudly.

Like 'agent-oriented' adverbs, these bear no clearly distinguishable 'manner' and 'eventive' readings, but arguably for a very different reason: namely, that these adverbs, as Ernst's label implies, always serve basically to specify the manner of action (even though this manner may be more or less directly perceptible).

Despite the appeal of uniform analyses of the 'higher' and 'lower' occurrences of the adverbs given in (38)–(40) and (41)–(42), what I shall actually be proposing is something quite different. I shall first show that, first appearances notwithstanding, these adverbs are also liable to 'higher' and 'lower' contrasts after all, which can be brought out most readily by VPs that lead to contrasts in the acceptability of 'higher' and 'lower' occurrences. This suggests that these contrasts cut across standard 'manner', 'pure manner', and 'agent-oriented' adverbs alike; and thus that these classes of adverbs have more in common with each other than is generally recognized. What it also suggests, though, is that the 'eventive'/'manner' contrast, which we have been assuming throughout our discussion, does not readily extend to the 'higher' and 'lower' readings attested here, which appear to require a different kind of description.

⁹ This pattern is also attested for frequency adverbs, which I shall not be considering here:

- (i) a. New Yorkers frequently take taxis.
b. New Yorkers take taxis frequently.
- (ii) a. Texans often drink beer.
b. Texans drink beer often.

To proceed, let us take a closer look at ‘agent-oriented’ adverbs like *intentionally* and *knowingly*. Although the patterns presented above offer a compelling picture of these adverbs, this picture turns out not to be an accurate one, given pairs of sentences like the following ones:

- (43) a. You tripped me intentionally — I could see you waiting for me.
 b. ??You intentionally tripped me — I could see you waiting for me.
- (44) a. Oedipus replied knowingly.
 b. #Oedipus knowingly replied.

‘Higher’ occurrences in both cases are distinctly odd. Yet this contrast does not obviously follow the familiar ‘eventive’ versus ‘manner’ pattern: both sentences in (48) seem paraphraseable as ‘Your tripping me was intentional’; and both sentences in (49) seem paraphraseable as either ‘Oedipus was knowing in his reply’ or ‘Oedipus replied in a knowing way’.

The picture of ‘pure manner’ adverbs offered above likewise gives way to one resembling that of standard ‘manner’ adverbs. The (a) and (b) sentences in (45) are compatible only with the continuations in (i) and (ii), respectively, revealing a clear difference in the contribution of ‘higher’ and ‘lower’ adverbs. The (a) and (b) sentences in (46) display a similar contrast.

- (45) a. The prisoner proclaimed his innocence loudly.
 i. He woke up all the other prisoners.
 # ii. He really believed that he had been framed.
 b. The prisoner loudly proclaimed his innocence.
 # i. He woke up all the other prisoners.
 ii. He really believed that he had been framed.
- (46) a. He played poker brilliantly.
 b. #He brilliantly played poker.

Such adverb data indicate that ‘agent-oriented’ and ‘pure manner’ adverbs might have more in common with other ‘manner’ adverbs than the analyses mentioned above suggest. Indeed, we find further support for this contention from the observation that the interpretation of both ‘pure manner’ and standard ‘manner’ adverbs is often as dependent on the ‘thematic participants’ in a situation as is that of the ‘agent-oriented’ adverbs that Wyner and others analyse as ‘thematically dependent’.¹⁰ To see this, consider the following scenario: we witness Yokel, unbeknownst to his dinner companion, Vokel, spitting his olive pits into Vokel’s soup; and then Vokel complaining about this in a very rude fashion to the waiter. We can certainly report the pit-spitting by means of (47a) and the complaining by means of (47b):

- (47) a. That was rude.
 b. What rude complaining!

¹⁰ This is made explicit in McConnell-Ginet’s (1982) and others’ analyses of ‘higher’ adverbs.

But the correct interpretation of such utterances involves attributing the rudeness of the pit-spitting event and the rudeness of the manner of addressing the waiter specifically to the agents of these respective events, as indicated in the following paraphrases:

- (48) a. That (i.e. the pit-spitting) was rude of Yokel.
b. It was rude of Yokel to spit his olive pits into Vokel's soup.
c. Yokel was rude to spit his olive pits into Vokel's soup.
- (49) a. The way that Vokel complained was really rude.
b. Vokel's complaints were made so rudely.

Similar remarks apply to 'pure manner' adverbs. Although a sentence like (50a), for example, can be construed as simply predicating loudness of a music-playing event, a sentence like (50b), which designates a situation with an agent, requires us to attribute loudness specifically to this agent:

- (50) a. Music was playing loudly.
b. The old man complained to us loudly.

Such similarities between the different classes of adverbs under consideration lend further credence to a treatment of 'agent-oriented' and 'pure manner' adverbs that relates them more directly to standard 'manner' adverbs — and, in particular, distinguishes 'higher' and 'lower' readings for them.

Of course, the question that now arises is what kind of treatment of 'higher' and 'lower' readings will actually generalize across these classes of adverbs, which despite certain similarities are far from identical. We have already seen that a 'manner'/'eventive' contrast does little justice to the data in question. Another possibility that we might entertain is a contrast between 'situation-internal' and 'situation-external' readings, as invoked in Shaer (1998: §3) and used to good effect by Maienborn (1998) in analysing locative modifiers. Brief reflection, however, suggests that this will be of little help either, since it is unclear how the notion 'external to the situation' can apply to 'higher' occurrences of 'agent-oriented' or 'pure manner' adverbs. Although neither of these possibilities seems to hold much promise, there is at least one other available which, I shall be arguing, does do so: this is Peterson's (1997) distinction between 'restrictive' and 'non-restrictive' modification, which I shall be describing below.

4. Restrictive and Non-restrictive Modification: Peterson (1997)

In the previous section, we saw good evidence for a 'higher'/'lower' contrast for 'agent-oriented' and 'pure manner' adverbs, but did not solve the puzzle of the nature of this contrast as it pertained to these adverbs. In what follows, I shall be arguing that a general solution to this puzzle can be found in Peterson's (1997: 283ff.) distinction between 'restrictive' and 'non-restrictive' adverbial modification, which readily applies to the readings associated with 'higher' and 'lower' occurrences of the adverbs that we have been considering in this study.

Peterson claims that the readings that we have been referring to as ‘lower’ and ‘higher’ are counterparts of the ‘restrictive’ and ‘non-restrictive’ readings found with relative clauses and adjectives, as illustrated in (51):

- (51) a. The men who were tired ate strawberries.
 b. The men, who were tired, ate strawberries.
 c. The tired men ate strawberries. = (a) or (b) (ibid., 231–32, (21), (22))

Peterson motivates his claim primarily by considering adverbs in event nominals, which may have either ‘restrictive’ or ‘non-restrictive’ readings, as shown in these examples:

- (52) a. The Titanic(’s) sinking rapidly caused great loss of life. =
 i. ‘The Titanic’s sinking being rapid caused great loss of life.’ (‘restrictive’)
 ii. ‘The Titanic’s sinking, which was rapid, caused great loss of life.’
 (‘non-restrictive’)
 b. The Titanic(’s) sinking quietly caused great loss of life. =
 i. #‘The Titanic’s sinking being quiet caused great loss of life.’ (‘restrictive’)
 ii. ‘The Titanic’s sinking, which was quiet, caused great loss of life.’
 (‘non-restrictive’) (based on ibid., 233–34, (25)–(27))

These two readings can be understood as follows: the ‘restrictive’ reading amounts to a constraining of the reference of the syntactic constituent being modified; whereas the ‘non-restrictive’ reading ‘amounts to a double assertion’, which in the two cases given in (51) and (52a), respectively, is ‘that all men ate strawberries *and* that they (all the men) were tired’; and ‘that the Titanic’s sinking caused great loss of life *and* that the sinking was a rapid one’ (ibid., 234–35).

Peterson illustrates the restrictive reading of the adverb *rapidly* in a VP structure with the sentence in (53b), showing how a discourse like that in (53a) can make this reading salient:

- (53) a. Lots of ships have sunk at sea and very few of their passengers or crew were killed.
 What caused such a great loss of life in the sinking of the Titanic?
 b. The Titanic sank rapidly.

Interestingly, Peterson offers his ‘restrictive’/‘non-restrictive’ distinction only as a way to capture two different readings that adjectives and adverbs may receive, and does not suggest that these two readings might be related to ‘higher’ and ‘lower’ adverb positions. In fact, he takes the sentence (54b), with a ‘lower’ adverb, to be amenable to the ‘non-restrictive’ reading also, which he claims can be brought out by the following discourse context:¹¹

- (54) a. What memorable events involving large ships in the North Atlantic can you think of?
 b. Well, I crossed the Atlantic in 1957 aboard the *America*. But I remember some more notable events. The *Lusitania* was sunk by a German submarine in 1915. Also, the *Titanic* sank rapidly. It hit an iceberg. (based on ibid., 237, (36), (37))

¹¹ I have altered the wording of Peterson’s original example to make it sound more natural.

Despite his efforts to make the 'non-restrictive' reading salient in this discourse, I do not believe that he succeeds: the reading in question still remains inaccessible. What brings out the desired reading much more readily is the occurrence of the adverb in the 'higher' position (together with a VP that is more fully parallel to that describing the sinking of the *Lusitania*):

b'. ... Also, the *Titanic* rapidly sank off the coast of Newfoundland.

Here, we obtain the kind of 'double assertion' that Peterson associates with the 'non-restrictive' reading: that the *Titanic* sank off the coast of Newfoundland and — 'almost parenthetically', as Peterson notes of the analogous reading of (52a) — that its sinking was rapid.

Another of Peterson's illustrations of the 'restrictive'/'non-restrictive' contrast is given in (55) – (56) below.¹² Here, too, his overlooking of structural position as a possible factor in this contrast underscores its importance. The discourse in (55a) is meant to bring out the relevance of the candle's brightness; whereas that in (56a–b) is meant to describe the brightness as incidental, and to make the 'candle's burning in itself' the likely cause of the curtains catching fire. However, without the addition of the temporal modifier *all evening*, (56b) does not have the effect that Peterson attributes to it, as suggested by the alternative continuation in (56b')

- (55) a. How could you see any of the notes with only a candle to illuminate the music?
b. The candle was burning brightly.

- (56) a. What caused the curtains to catch on fire?
b. Well, there are a number of possibilities. One of the smokers may have dropped a live ash on them. Or, maybe Harold's chafing dish did it. The candle (on the window sill) was burning brightly (all evening). That may have done it.
b'. ... The candle (on the window sill) was burning brightly. That may have done it.

Again, a continuation of the discourse with the adverb *brightly* in 'higher' position seems more effective in bringing out the 'parenthetical' reading that Peterson has in mind:

b"... The candle (on the window sill) was brightly burning. That may have done it.

The problems that Peterson encounters, then, in illustrating 'restrictive' and 'non-restrictive' readings of adverbs with VPs make for compelling evidence that these readings are indeed structurally determined. This is because the implausible readings that he attributes to particular occurrences of adverbs are precisely those that an account distinguishing 'higher' and 'lower' readings on structural grounds predicts to be unavailable.

If we return to the puzzling asymmetries between 'lower' and 'higher' adverbs that we observed in §3.3, repeated as (57) – (60) below, we can see that an analysis of the latter in terms of 'non-restrictive' modification, corresponding to a 'double assertion', is able to capture the unacceptability of 'higher' occurrences in the (b) sentences in (57) – (59) and the interpretative contrast between (60a) and (60b):

¹² Again, I have slightly altered the wording of Peterson's original example, replacing simple past tense forms with progressive forms to make it sound more natural.

- (57) a. You tripped me intentionally—I could see you waiting for me.
b. ??You intentionally tripped me—I could see you waiting for me.
- (58) a. Oedipus replied knowingly.
b. #Oedipus knowingly replied.
- (59) a. He played poker brilliantly.
b. #He brilliantly played poker.
- (60) a. The prisoner proclaimed his innocence loudly.
i. He woke up all the other prisoners.
ii. He really believed that he had been framed.
b. The prisoner loudly proclaimed his innocence.
i. He woke up all the other prisoners.
ii. He really believed that he had been framed.

On a ‘Petersonian’ analysis, the (b) sentences in (57) – (59) can be seen, respectively, to assert that you tripped me, that Oedipus replied, and that he played poker; and to assert ‘almost parenthetically’ that the tripping was intentional, the reply knowing, and the poker-playing brilliant. It is because these latter assertions are ‘almost parenthetical’ that each of these (b) sentences is odd: what we expect in each case is the ‘restricted’ modification of the (a) sentences, which serves to constrain their reference, telling us what kind of tripping you perpetrated (as further clarified by the continuation), what kind of reply Oedipus made, and what kind of poker-playing he did. Similarly, the acceptable (a) and (b) sentences of (60) can be seen to make different assertions and thus to be compatible with different continuations: the former the ‘single’ assertion that the prisoner proclaimed his innocence in a loud manner; the latter the ‘double’ assertion that he proclaimed his innocence and ‘incidentally’ that this proclamation was loud.

Although Peterson (1997) does not offer a formal treatment of the difference between ‘restrictive’ and ‘non-restrictive’ adverbial modification, his theory of ‘complex events’ suggests one way to do so, which appeals to the kinds of events to which ‘restrictively’ and ‘non-restrictively’ modified sentences respectively refer. If we invoke Peterson’s ‘complex event’ approach for sentences with ‘higher’ adverbs, we can understand a sentence like that in (61a), for example, to assert the existence of the complex event of John’s-slicing-of-the-meat being careful, which embeds the unique event of John’s-slicing-of-the-meat (ibid., 248). Peterson formalizes this ‘complex event’ analysis as in (67b) (where ‘x’ and ‘y’ stand for the two events):

- (61) a. John carefully sliced the meat.
b. $\exists y$ Careful (ιx Sliced (John, the meat, x), y) (based on ibid., 248, (58²))

We can distinguish sentences like that in (61a) from sentences with ‘lower’ adverbs like that in (62a) by treating the latter in more standard Davidsonian fashion as asserting the existence of a simple event of a certain type. On this analysis, the sentence in (62a) would be assigned the translation in (62b):

(62) a. John sliced the meat carefully.

b. $\exists x$ (Sliced (John, the meat, x) & Careful (x))

(based on *ibid.*, 244, (55))

The key difference between (61a) and (62a), as highlighted by such an analysis, is that the latter asserts 'that an event of a certain type [exists]', while the former 'contains a reference to that event' (*ibid.*, 244).

This very preliminary sketch of the difference between 'restrictive' and 'non-restrictive' adverbial modification is admittedly silent on a number of important issues in the analysis of 'manner' adverbs, for which I have no concrete answers at present. In particular, it does not incorporate the observation made above, which certainly applies to *carefully*, that 'manner' adverbs in both 'higher' and 'lower' positions may have an 'agent orientation' (see also Peterson (*ibid.*, 245, 376–77)); nor spells out the differences between standard 'manner', 'pure manner', and 'agent-oriented' adverbs. Moreover, it gives no indication of how these formulae are to be derived from syntactic structure. What it does do, however, is suggest one way to cash out the interpretative contrasts associated with 'higher' and 'lower' adverbs, and thus to proceed in the direction indicated in this study.

5. Conclusion

In this study, I have offered substantial evidence that the syntactic position of 'manner' adverbs guides the interpretation of sentences containing them, and thus that Wyner's (1994, 1998) 'anti-association' analysis has missed an important generalization. More specifically, I have demonstrated the robustness of 'higher'/'lower' adverb contrasts on the basis of data from various adverbial as well as nominal and adjectival structures; shown that this contrast emerges with classes of adverbs, including 'agent-oriented' and 'pure manner' adverbs, commonly assumed not to display it; and offered a general characterization of this contrast in terms of Peterson's (1997) distinction between 'restrictive' and 'non-restrictive' adverbial modification. I have also suggested that the 'association' claim extends to the various adverb positions available in the auxiliary verb complex, where interpretative contrasts have not, to my knowledge, been previously recognized.

At the same time, I have shown that Wyner's scepticism of standard 'association' accounts is well placed; and, in particular, that 'manner' adverbs in 'fronted' and 'parenthetical' positions do not behave as such accounts would predict them to. However, rather than seeing these data as constituting evidence against the 'association' claim, I have argued that they reflect the exceptional syntactic status of 'fronted' and 'parenthetical' positions, and are amenable to an analysis consistent with this claim.

Although certain key aspects of my analysis remain in embryonic form, what I have offered here has, I hope, still shed some light on a range of empirical issues that have yet to be adequately addressed in the adverb literature. If it has indeed done so, then it will have helped to reveal which approaches to the analysis of adverbs are promising ones and which approaches are not.

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How are Results Represented and Modified?

Remarks on Jäger & Blutner's Anti-Decomposition

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Abstract

The paper investigates a recent proposal to resultativity by G. Jäger and R. Blutner (J&B). J&B say that the representation of result states of accomplishments by means of CAUSE and BECOME is not correct and should not be done in the syntax in terms of decomposition. They develop an axiomatic approach where each accomplishment/ achievement is related to its result by a particular axiom. Modification of the result by "again" makes use of these axioms and the restitutive/resultative ambiguity is a matter of lexical ambiguity or polysemy. They argue that the classical decomposition theory cannot treat the restitutive reading of "A Delaware settled in New Jersey again" (there had been Delawares in New Jersey but not this particular one; and those earlier Delawares never moved to New Jersey but were borne there). I discuss (and dispute) these data and compare the two theories. J&B's contains an OT-part dealing with the disambiguating role of stress. While the decomposition theory cannot deal with the data mentioned, it can integrate the OT-part of J&B's theory.

1. Introduction

In (Jäger and Blutner, 1999), Gerhard Jäger and Reinhard Blutner (henceforth J&B) have launched a forceful attack against the account of the adverb *wieder* "again" I presented in (Stechow, 1995) and (Stechow, 1996). There I defended a classical account of the repetitive/restitutive ambiguity exhibited by the adverb *wieder*, which is very close to early proposals found in the Generative Semantics literature, notably (Morgan, 1969) and (McCawley, 1971). I argued that German surface syntax shows that something in the style of this old decomposition analysis must be correct.

One of the essential ideas of the decomposition theory in its classical form, which is due to (Dowty, 1979), is that the result state of an accomplishment or achievement verb is represented in its lexical entry directly as a predicate under a BECOME operator. If we want to modify the result with a functional adverb like **again**, then this adverb must apply to this embedded stative and must have narrow scope with respect to BECOME at some level of the representation. For instance, if the verb **open** has roughly the representation (1a), then the result modification by **again** must have the representation (1b), and the repetition of the action must have the analysis (1c):

- (1) a. $\lambda y \lambda x. \text{ACT}(x) \text{ CAUSE BECOME}(\text{open}(y))$
- b. $\lambda y \lambda x. \text{ACT}(x) \text{ CAUSE BECOME}(\mathbf{again} \text{ open}(y))$
- c. $\lambda y \lambda x. \mathbf{again}(\text{ACT}(x) \text{ CAUSE BECOME}(\text{open}(y)))$

Whereas (Dowty, 1979) says that **again** comes to be in the lower position through the application of a meaning postulate, I claimed that the decomposition of the verbal meaning must be visible in the syntax. That is the only difference.

If I understand correctly, J&B hold the view that this type of analysis is not right. They claim that the result-state information does not belong to the lexical entry of the verb. The entry of the verb **open** is simply a relation between the subject and an object (and an event). There is a RESULT functor that is defined via postulates for each verb. Adverbs operate on verbs modified by that operator. This is obviously an entirely different architecture, and it raises many questions about the representation of lexical information and about the syntax-morphology interface. Unfortunately J&B's theory is not worked out thoroughly enough to be fully assessed. Notably, it is not clear to me how modality could be implemented. But it is clear enough to comment on some detail.

On the following pages, I want to compare the decomposition analysis with J&B's, and thereby acknowledge some of the weaknesses they raise of my approach. Partly, the criticisms levelled by J&B can be overcome. In addition to the criticism, J&B's paper has an independent part, namely an optimality theoretically based explanation of the disambiguation of certain ambiguities arising with *wieder* "again". I accept that part of the paper and I think it constitutes genuine progress in our understanding of functional adverbs.

The structure of this paper is as follows. In section 2, I report and discuss J&B's criticism of my work. In section 3 and 4, I give an exposition of J&B's theory. In section 5, I compare J&B's approach with the decomposition approach. Section 6 reports the OT-part of their work. Section 7 carries the OT-principles over to decomposition theory. The final section contains the (non-) conclusion.

2. J&B's Arguments against Decomposition

(Stechow, 1996) starts from the observation that the German sentence (2a) is ambiguous between a repetitive and a restitutive reading, whereas sentence (2b) only has the repetitive reading.

- (2) a. weil Fritz das Fenster wieder öffnete
because Fritz the window again opened
b. weil Fritz wieder das Fenster öffnete
because Fritz again the window opened

The explanation is that an accomplishment verb has the following syntactic structure, which for convenience is given in English:

- (3) [_{VoiceP} Fritz [_{Voice} CAUSE [_{VP} BECOME [_{XP} the window OPEN]]]]

At s-structure, the direct object moves to a Case-position AgrO above VoiceP, and the subject moves to AgrS. Thus, we have the following possible s-structures for (2a):

- (4) a. [_{AgrS} Fritz₁ [_{AgrO} the window₂ again [_{VoiceP} t₁ [_{Voice} CAUSE [_{VP} BECOME [_{XP} t₂ OPEN]]]]]] (repetitive)
b. [_{AgrS} Fritz₁ [_{AgrO} the window₂ [_{VoiceP} t₁ [_{Voice} CAUSE [_{VP} BECOME again [_{XP} t₂ OPEN]]]]]] (restitutive)

The functional adverb *again* can attach to any syntactic projection to which its semantic application makes sense. If it appears to the right of the object, there are at least two possible positions which it might be occupying: the higher position indicated in (4a) or the lower position indicated in (4b). The former position is associated with the repetitive reading, i.e.,

on which the presupposition is that Fritz had already opened the window once in the past. The latter position is associated with the restitutive reading: the window is presupposed to have been open in the past, but neither Fritz nor anyone else need have opened it. Thus, the ambiguity of (2a) is simply a syntactic ambiguity and the explanation is in terms of operator scope. (2b), however, has only one possible syntactic analysis: *again* precedes the direct object and must therefore have wide scope with respect to the VoiceP “Fritz CAUSE...” and, therefore with respect to the CAUSE and BECOME operators. The only interpretation here is that the action is repeated. We need an appropriate semantics for the functors CAUSE and BECOME and **again**, of course. If we assume the semantics in (Dowty, 1979), CAUSE is interpreted as a chain of counterfactual dependencies, a relation between propositions. Then the causer must be analysed as “Fritz has some property”. (Stechow, 1996) does it in slightly different way, but it really doesn’t matter. BECOME can have Dowty’s meaning, i.e., it denotes intervals that separate a false proposition from a true one, and *again(p)(i)* says that *p* is true at the interval *i* and it presupposes that *p* is true at an *i'*. where *i'* is either before *i* or abuts *i*. We are assuming an intensional framework where propositions are sets of worlds and times.

These are the essentials of my account. The syntax is a bit abstract, but it fits neatly into what is done in current generative work (cf. e.g. (Kratzer, 1994), (Chomsky, 1995), (Rapp, 1997), (Marantz, 1997), (Ernst, 1998), and many others).

Let us come to J&B’s criticism of the theory now. They say that the account both over-generates and undergenerates.

Here is an example for overgeneration:

- (5) John CAUSE again BECOME the window open [12]

J&B correctly observe that there is a position between CAUSE and BECOME, and that presumably **again** should be able to take scope there, but it cannot, that is, the associated reading is claimed not to exist. This is an old problem, which already troubled Dowty in his early work on the problem. One can try to treat the problem syntactically. Most syntacticians assume that only one “light verb” is permitted above our XP. If both CAUSE and BECOME are in V, then no intermediate scope would be possible. This seems a reasonable solution. On the other hand, in (Stechow, 1996), I suggest that the reading in question might sometimes be available. Consider the scenario described by the following discourse:

- (6) The window opened by itself. Mary closed it. John opened the window again.

The reading of the last sentence certainly can be represented as (5). Of course a representation with **again** under BECOME would do as well. But it seems to me that it is hard to argue that the reading (5) cannot exist at all.

Now we come to undergeneration. A criticism that I hear very often is that the theory cannot capture the restitutive/repetitive ambiguity exhibited by statives (Bierwisch, Frey & Pittner). (Fabricius-Hansen, 1983) gives examples like these:

- (7) a. Der Kapitän ist WIEDER betrunken.
The captain is drunk again.
b. Der Kapitän ist wieder NÜCHTERN.
The captain is sober again.

In some sense, the first sentence expresses a repetition, the second one a restitution. I think, it is quite obvious what is going on here. In the first case, one period of drunkenness may follow the next one, we have an “abutting” scenario and might be quite annoyed with that. We could express this as one and the same state, but we do not. So one should not express the pre-

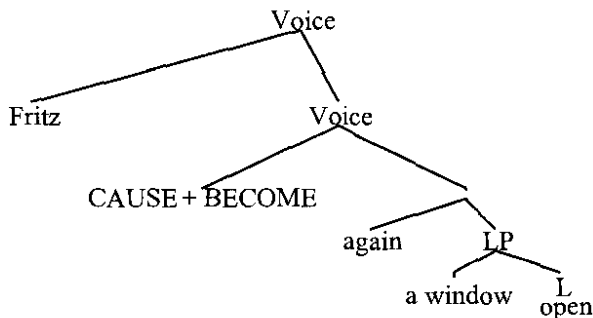
supposed states in terms of maximality as I have done previously. The restitution in (7b) is triggered by the contrastive focus on the adjective. We oppose this to the alternative *betrunken* “drunk”. So previous soberness must be separated by a non-soberness period. This is not directly expressed in the meaning of the adverb, but it is easily inferred.

Another putative case of undergeneration is (8). J&B claim that this sentences, in which *wieder* precedes the direct object, can have a restitutive reading:

- (8) weil Fritz wieder ein **Fenster** öffnet [33a]

My theory predicts that (8) should only have the repetitive reading, whereas it is easy to invent a story which triggers the restitutive reading. I accept this criticism. It is possible, however, to amend the approach, based on the fact that definite and indefinite objects must clearly be distinguished. We have to say that the structural accusative position is not above VoiceP. It is the nearest SpecXP under Voice, where Voice is filled by the an Agent-relation, here CAUSE in order to be close to J&B. A related proposal is made in (Kratzer, 1994). The structure of the sentence would then be something like this:

- (9)



I have located the information CAUSE + BECOME in one node in order to meet the objection that there is no attachment site for **again** between CAUSE and BECOME. The interpretation would be achieved via functional composition. The notation L for the “root” is in the spirit of Distributed Morphology (Halle and Marantz, 1993). In order to derive the word order effects for the interpretation, I have to assume that definite and in particular deictic terms scramble out of the VP; cf. (Diesing, 1992). This has the consequence that *wieder* has scope over the entire VP whenever it precedes a definite term at s-structure. These changes do not affect the essentials of my version of the decomposition theory.

I have to add two caveats to the revised treatment. First we have to restrict the restricting property of the quantifier **a window** contextually.¹ Otherwise the meaning of (9) would be too weak, because the sentence could be true if there were no window at the beginning of the opening process, but the process created an open one. This consequence of the meaning of BECOME is not addressed in the literature, and it might point at a serious weakness of the approach.²

The most serious example of (an alleged) undergeneration is the following sentence:

- (10) A Delaware settled in New Jersey again.³ [16]

¹ Perhaps by a property variable in the style of (Fintel, 1994).

² See (Stechow, 1999).

³ I am not so sure whether this is a very suggestive example. The original sentence that motivated J&B’s theory is the German sentence

Neuerdings haben sich wieder einige Delawaren in New Jersey angesiedelt/niedergelassen.

J&B claim that this sentence has the following restitutive reading: a Delaware settled in New Jersey (recently), but no Delaware had ever settled in New Jersey before, though Delawares once lived in New Jersey (before they were expelled). The scenario presupposes that Manitou or some other divinity created the Delawares in New Jersey.

I think that J&B are correct in claiming that a decompositional approach of the sort outlined cannot account for the restitutive reading where the presupposition is that a Delaware lived in New Jersey. The reason is that we have a “control accomplishment” in the sentence. The only restitutive reading we can have is this:

- (11) $\exists x$ [Delaware(x) & settle(x) CAUSE BECOME(again in New Jersey(x))]

Here, the particular settler must have been in New Jersey before; this is not what J&B want. They want this:

- (12) Content: A Delaware settled in New Jersey.
Presupposition: One Delaware or other had been in New Jersey before.

The prediction of J&B’s approach is that causative accomplishments/achievements always have the restitutive reading with an indefinite subject.⁴ In a discussion, G. Jäger gives the following example:

- (13) weil sich in Polen wieder ein Kommunist zum Präsidenten hat wählen lassen
because himself in Poland again a communist for president has elect let

The reading of interest is that on which there has been a communist president before, but he wasn’t elected. I don’t get that reading, and the restitutive readings are very hard to get in all similar cases. One of the reasons might be that it is difficult to imagine an example with a causative subject control accomplishment/achievement that is true without a repetition of the action. A plausible story might be the scenario of *The Omega Man*, where everyone has an eye sickness called EB. In this situation one might say perhaps:

- (14) Jetzt hat sich wieder jemand **geheilt**⁵
Now has himself again someone cured

By curing himself, someone reestablished the state that someone is healthy. In order to enforce the reading wanted, we have to assume that the agent was born with EB, so no specific reading is possible. Still the sentence should be appropriate in that situation. According to my judgement, it is not possible to use the sentence in this scenario. So I have doubts that data like (10) really necessitate J&B’s theory. In many cases the reading claimed is not possible, and we should look for an explanation for why the reading is possible in some cases at all. We

⁴ The criticism carries over to transitive accomplishments like “to open” if they are analysed as verbs of object control. Suppose, this verb has the following decomposition structure:

(i) OPEN(x,y) CAUSE BECOME OPEN(y)

Here, OPEN would be a 2-place relation meaning that x affects y in a particular way, the opening way. This is the manner component of the action. OPEN describes the result. Restitutive again must have a position below BECOME. But then no non-specific reading for an indefinite object like **a window** would be possible, because this quantifier must bind both occurrences of y and must therefore have wide scope with respect to BECOME. Thus, decomposition theory seems to predict that the rather plausible decomposition (i) is not possible.

⁵ The verbs of healing and their interaction with *wieder* have been analysed in (Kamp and Rossdeutscher, 1994). This approach contains axioms/meaning postulates as well, and it would be interesting to compare it with J&B.

might find a pragmatic explanation, i.e., the literal meaning doesn't describe the situation, but it is a good approximation of a true description.

In the following section, I want to investigate in more detail whether it is at all possible to express J&B's reading in a decomposition theory. We will see that for principled reasons the answer is no.

3. J&B on "again"

J&B say that **again** is lexically ambiguous between a repetitive and a restitutive adverb. Both apply to properties of events. The first one says that the property is instantiated by an event only if there was an event of the same type in the past. The second one says that the property is instantiated by an event if the result state of the event occurred in the past. In formal terms, their meanings are these:

- (15) a. $AGAIN_{rep} := \lambda p \lambda e.p(e) : \exists e' < e(OBTAINS(e') \ \& \ p(e'))$ [26]
 b. $AGAIN_{rest} = \lambda p \lambda e.p(e) : \exists s < e(OBTAINS(s) \ \& \ RESULT(p)(s))$

OBTAINS applies to a possible event/state and says that it is real, i.e., it occurs in the real world. In other words, J&B assume possibilistic quantification in their system throughout.⁶ The intuitive reading of RESULT(p)(s) is "s is the result state of a p-event", or "in s the post-conditions of a p-event hold". J&B use the sign ":" in order to mark the presupposition of an expression. Actually, the variable e occurring in the presuppositions should be bound by the λ -operators. I will assume that this is intended.

One might object that the stipulation that AGAIN should be lexically ambiguous makes this theory less favorable than a scope account. I will not raise this objection, but I want to point to another problem: the underlying AGAIN predicates are only defined for properties of events, not of states. But *wieder* "again" should be defined for properties of states as well. I will comment on this point in the next section.

Recall that the theory is designed to derive reading (12) for sentence (10), which J&B represent as (16) in their formal language:

- (16) $\exists e [(OBTAINS(e) \ \& \ \exists x (DELAWARE(x) \ \& \ SETTLE_IN(e,x,NJ)))]$ [17]
 $\exists s < e(OBTAINS(s) \ \& \ \exists x (DELAWARE(y) \ \& \ LIVE_IN(s,x,NJ)))]$ [32]

The task is to derive this from the LF that the two authors assume for sentence (10), which should be the following formula⁷:

- (17) $\exists e (OBTAINS(e) \ \& \ AGAIN_{rest}(\lambda e [\exists x (DELAWARE(x) \ \& \ SETTLE_IN(e,x,NJ))])(e))$

Inserting the definition of $AGAIN_{rest}$, we obtain:

- (18) $\exists e [(OBTAINS(e) \ \& \ \exists x (DELAWARE(x) \ \& \ SETTLE_IN(e,x,NJ)))]$
 $\exists s < e(OBTAINS(s) \ \& \ RESULT(\lambda e [\exists x (DELAWARE(x) \ \& \ SETTLE_IN(e,x,NJ))])(s))]$

In order to derive (16) from (18), J&B use the following theorem, which I will discuss in the next section but which we will take for true here.

⁶ A proper elaboration of J&B's theory requires a possible worlds framework, I suppose.

⁷ There is no full LF for the sentence in the paper. I have deduced it from several pieces of calculation.

Theorem 1: $\exists x (P(x) \& \text{RESULT}(Q(x))(s)) \leftrightarrow \text{RESULT}(\lambda e \exists x (P(x) \& Q(x)(e)))(s)$

Furthermore, J&B assume a meaning postulate whose content is that someone lives in some place iff he is in the result state of settling in that place:

(MP2) $\forall x \forall y \forall s (\text{LIVE_IN}(s,x,y) \leftrightarrow \text{RESULT}(\text{SETTLE_IN}(x,y))(s))$

At first glance, the postulate seems absurd. In the meaning under discussion, “settling in” implies “going/moving to”. Certainly someone can live in some place without being an immigrant. He might be born there. In order to avoid this consequence, J&B say that the event of bringing about the result might be merely a possible event. Furthermore, many possible events may have the same result state, for instance, the event that x is born in y , $\text{BORN-IN}(e, x, y)$ would have the same result, i.e., J&B should accept the following equivalence, if I understand them correctly:

(19) $\text{RESULT}(\text{BORN_IN}(x, y))(s) \leftrightarrow \text{RESULT}(\text{SETTLE_IN}(x,y))(s) \leftrightarrow \text{LIVE_IN}(s,x,y)$

For the time being we will not worry about this. We accept the theorem and the meaning postulate and can now easily show that (18) is equivalent with (16). Here is the proof:

$\exists e [(\text{OBT}(e) \& \exists x (\text{DW}(x) \& \text{SET}(e,x,NJ))):$
 $\exists s < e(\text{OBT}(s) \& \text{RES}(\lambda e [\exists x (\text{DW}(x) \& \text{SET}(e,x,NJ))](s)))]$
 iff
 $\exists e [(\text{OBT}(e) \& \exists x (\text{DW}(x) \& \text{SET}(e,x,NJ))):$
 $\exists s < e(\text{OBT}(s) \& \exists x (\text{DW}(x) \& \text{RES}(\text{SET}(x,NJ))(s)))]$ by THEOREM 1
 iff
 $\exists e [(\text{OBT}(e) \& \exists x (\text{DW}(x) \& \text{SET}(e,x,NJ))):$
 $\exists s < e(\text{OBT}(s) \& \exists x (\text{DW}(x) \& \text{LIV}(x,NJ))(s))]$ by MP2

So J&B have proved their point.

Note that the theory allows the subject of (10) to have a specific reading with respect to **again**_{rest}, i.e., we can have the following Quantifying in-structure:

(20) $\exists e (\text{OBTAINS}(e) \& \exists x (\text{DELAWARE}(x) \& \text{AGAIN}_{\text{rest}}(\lambda e [\text{SETTLE_IN}(e,x,NJ)])(e)))$ ⁸

This formula expresses the reading that a particular Delaware came back to New Jersey. And we can have the two parallel repetitive readings as well. We simply have to choose $\text{AGAIN}_{\text{rep}}$ instead of $\text{AGAIN}_{\text{rest}}$. All this looks rather attractive so far, and friends of logical deduction will be quite pleased that the desired consequences come out so nicely. But logical syntax needs semantic justification. So let us investigate J&B’s model theory, where the notion of **RESULT**, which is crucial for the approach, is interpreted.

If we compare this account with the decomposition approach, we see that the essential difference is in terms of the concept of result: the result generated by a **CAUSE + BECOME-**

⁸ This is the derivation of the restitutive reading:iii

$\text{AGAIN}_{\text{rest}}(\lambda e.\text{SETTLE_IN}(e,x,NJ))(e)$
 $\leftrightarrow \text{SETTLE_IN}(e,x,NJ) : \exists s < e(\text{OBTAINS}(s) \& \text{RESULT}(\lambda e.\text{SETTLE_IN}(e,x,NJ))(s))$ (meaning of $\text{AGAIN}_{\text{rest}}$)
 $\leftrightarrow \text{SETTLE_IN}(e,x,NJ) : \exists s < e(\text{OBTAINS}(s) \& \text{SETTLE_IN}(s,x,NJ))$ (MP2)
 Quantifying in the indefinite term yields:
 $\exists x (\text{DELAWARE}(x) \& \text{AGAIN}_{\text{rest}}(\lambda e.\text{SETTLE_IN}(e,x,NJ))(e))$
 $\leftrightarrow \exists x (\text{DELAWARE}(x) \& \text{SETTLE_IN}(e,x,NJ) : \exists s < e(\text{OBTAINS}(s) \& \text{SETTLE_IN}(s,x,NJ)))$

verb is much stronger. If a door was closed by John, then the decomposition approach says that that door was closed thereafter. J&B say, however, that if a door was closed by John, then *some* door was closed thereafter. And if some Delaware came to New Jersey, the decomposition theory says that this Delaware was in New Jersey thereafter. J&B say that *some* Delaware was in New Jersey thereafter. It is clear then that we cannot obtain J&B's result by the classical method. For convenience, I give the decomposition LF for the sentence in its restitutive reading, where s^* denotes the speech time.

- (21) $\exists e < s^*(\exists x(\text{DELAWARE}(x) \ \& \ \text{SETTLE}(e,x) \ \& \ \text{CAUSE BECOME}(\text{AGAIN}(\text{LIVE_IN}(x, \text{NJ}))))))$

Since **AGAIN** operates on the singular proposition $\text{LIVE_IN}(x,\text{NJ})$, we obtain the much stronger presupposition that x used to live in New Jersey in the past.

So is there a way to emulate J&B's result in a decomposition approach? The answer is no. The reason is the following.⁹ An inspection of the formula (18) reveals an essential detail of J&B's solution: the indefinite term *a Delaware* is analysed by two occurrences of the existential quantifier $\exists x$ ($\text{DELAWARE}(x)\dots$). So this is not a control structure, but a sort of sloppy-identity structure. The LF (17) shows that $\text{AGAIN}_{\text{rest}}$ has wide scope with respect to the subject. If this were not so, the existential quantifier could not distribute to the presupposition. It is Theorem 1 that enables us to export the quantifier from the scope of **RESULT** in the content but to leave it there in the presupposition. But we can have a repetitive reading with $\text{AGAIN}_{\text{rep}}$ in the same position. This means that it is essential for the approach that **again** is lexically ambiguous. In a decomposition theory the two readings are represented by a difference in scope. But it is not possible to have a restitutive reading for an **again** that has scope over the subject of a causative verb, because that scope position would automatically give rise to a repetitive reading.

Recall that (Dowty, 1979) wants to combine a decompositional approach with a restitutive **again** that has wide scope with respect to the subject in the syntax. He has a meaning postulate that interprets this **again** as if it were under the scope of **BECOME**. (Zimmermann, 1993) and (Zimmermann, 1999) have argued that Dowty's postulate is not sound. My approach was designed to overcome these theoretical shortcomings and to correlate the surface position of **again** with the possible interpretations.

One appealing way of attempting to obtain J&B's reading would be to move the subject across the board and to interpret the trace as a variable of the quantifier type Q :

- (22) a Delaware $\lambda Q [Q(\lambda x.\text{settle-in}(\text{NJ})) \ \text{CAUSE BECOME}(Q(\lambda x.\text{again in}(\text{NJ})))]$
 = a Delaware $(\lambda x.\text{settle-in}(\text{NJ})) \ \text{CAUSE BECOME}(a \ \text{Delaware}(\lambda x.\text{again in}(\text{NJ})))]$

This won't work, because the meaning is too weak. The formula would be satisfied in a scenario in which some Delaware caused other Delawares to settle in New Jersey again. Intuitively, however, sentence (10) doesn't have that reading. The conclusion is that the reading J&B want for (10) cannot be represented in a decomposition approach.

A case for lexical ambiguity might be made by pointing out that there are adverbs that express only the restitutive or only the repetitive reading. I am not aware of an adverb with the first property, but **erneut** is an adverb with the second property.

- (23) Fritz erneut ein Fenster öffnete

⁹ I thank Ede Zimmermann for helping me to clarify this point.

Erneut means the same as **again**, but the sentence only has the repetitive reading. J&B could express this by saying that the only lexical entry of **erneut** is $AGAIN_{rep}$.¹⁰ (Stechow, 1996) blocks this interpretation by the syntactic stipulation that **erneut** may not attach to the “root” LP.

4. J&B’s Model Theory

The technical part of J&B’s model theory is given in appendix A of their paper. Before I review its essentials, I want to say something about the intuitions that lead the authors to their proposal. At the beginning of their paper, J&B discuss and reject an analysis of **AGAIN** in purely temporal terms. These are the critical meaning rules:

- (24) a. repetitive **AGAIN**: $\lambda p \lambda i.p(i) : \exists j < i(p(j))$ [19]
 b. restitutive **AGAIN**: $\lambda p \lambda i.p(i) : \exists j < i(\text{RESULT}(p)(j))$

Here, *i* and *j* are time intervals, and *p* is a set of time intervals or set of world-times intervals. We can ask then what the **RESULT**-function should be. J&B write on this:

»The first idea that comes to mind is roughly the following: *result(p)* is the most specific proposition that is always true after an interval immediately following an interval where *p* was true. This first attempt will not do, however. To derive the restitutive reading of (2) correctly, we have to demand that the result of “John opening the window” is “the window is open”. After an event of John opening the window, it is certainly true that the window is open, but it is also true that the window has been opened by John. So in the restitutive reading, (2) would presuppose that the window is open as a result of John opening it before, and thus the restitutive reading would coincide with the repetitive one.«

(Jäger and Blutner, 1999: 10)

The observation is, then, that a pair (*p*,*i*) consisting of a temporal proposition and a time cannot determine the result (*r*,*j*), where *r* is temporal proposition as well and *j* is a time immediately following *i*. Anyone who has thought about these problems will immediately agree, I guess. So this is not really surprising. J&B add the following comment:

»We take this as an indication that an analysis of actions, states etc. in terms of world/time pairs is too extensional in a sense: even if two event types are extensionally equivalent at all indices their result states might still differ.«

That might be right, but the comment is not supported by the examples considered. On the contrary, in the preceding section we observed that many different actions must have exactly the same result for J&B.¹¹

I would like to mention another problem that arises with this kind of semantics. Consider again the restitutive reading of sentence (10). If some Delaware or other settled in New

¹⁰ The modification of statives would require the “third” entry, viz. $AGAIN_{state}$, which is introduced below.

¹¹ In personal communication, G. Jäger told me this. The sentence (i) can be true without presupposing the statement (ii):

- (i) John is again opening a door that is being opened
 (ii) A door that was being opened was open

This argument needs to be elaborated. I don’t even know how to render it in a consistent way.

Jersey then this must be at least one particular person, say John Yellowhorse. Therefore, at the time j immediately following the time i of immigration, it is true that John Yellowhorse was in New Jersey. Therefore the sentence should presuppose that John Yellowhorse had been in New Jersey before j . But the sentence doesn't presuppose that. Call this the **Problem of Existential Instantiation**.

In order to overcome the first difficulty, J&B recur to a Davidsonian approach, which is rejected in its classical form. Here are the reasons why. Take the meaning rules (24) and take i as a variable for events, whereas j is a variable for events in the first rule and a variable for states in the second rule. As before, we have Theorem 1 and the postulate MP2. The restitutive reading of the sentence is now represented as:

$$(25) \exists e \exists x [(DELAWARE(x) \& SETTLE_IN(e,x,NJ)):$$

$$\exists s < e (\exists x (DELAWARE(x)$$

$$\& RESULT(\lambda e [\exists x (DELAWARE(x) \& SETTLE_IN(e,x,NJ))](s)))]$$

We have shown that the presupposition is equivalent to

$$(26) \exists x (DELAWARE(x) \& LIVE_IN(x,NJ))(s))$$

But this is not the only presupposition that we can derive from the presupposition in (25). J&B point out that simple first order reasoning allows us to infer (27) from the presupposition in (25).

$$(27) \exists s < e (RESULT(\lambda e. \exists x (\exists e' (DELAWARE(x) \& SETTLE_IN(e', x, NJ))$$

$$\& SETTLE_IN(e, x, NJ)))(s))$$

By Theorem 1 and MP2, this equivalent to

$$(28) \exists s < e (\exists x (\exists e' (DELAWARE(x) \& SETTLE_IN(e', x, NJ)) \& LIVE_IN(s, x, NJ)))$$

But this means that the Delaware the presupposition speaks about lives in New Jersey as a result of some settling event. This is precisely the presupposition the sentence should not have in its restitutive reading. Therefore the approach breaks down again. In order to rescue the proposal, J&B say that events are not the usual events.

»Instead we propose to view events as pieces of pure information like states of affairs in situation semantics. They have participants, possibly temporal and local parameters and so on, but they may or may not obtain in reality. (A better term than just “event” might be “conceivable event”). Under this abstract notion of event, nothing is wrong with the claim that for every open window there is an event of this window being opened. Events that do take place in the world form a proper subset of the set of abstract events. They are in the extension of the predicate constant OBTAINS. (The same holds *ceteris paribus* for states.)«

(Jäger and Blutner, 1999: 12)

If I understand this correctly, J&B want a Davidsonian approach with possible and actual events. The quantification is over possibilities and the predicate OBTAINS says that an event is real. Properties of result states like “living in” or “being open” are generated by events, but these events are merely possible, not real. These possible events have all the properties actual events have and they occur in time, because time is a notion is derived from them (Jäger and Blutner, 1999: fn. 8). But they need not be parts of the real world.

Let us look at the details of J&B's model theory. In view of their discussion, we expect an intensional framework. But we are deceived. The **model** proposed is entirely extensional.¹² We have three sorts of things, individuals (D), states (S) and events (E). For events and states we have the usual relations temporal overlap (O), temporal inclusion (\subseteq), abutness (\succ) and the like. The language should be typed, but the authors are not interested in too many details.¹³

The model provides a relation R between events and states, that satisfies the following restriction, which I call Axiom 1:

(29) **Axiom 1:** $\forall e \exists s (e \succ s \ \& \ eRs)$

This should be read as: "Every event abuts a state in which its post-conditions hold". In isolation, this condition is almost entirely trivial, because it neither characterises events nor does it describe their result states. The only information that can be read from the condition is that events have abutting states, but we don't know what R should be. This R is used to define the RESULT-function, a logical constant of the language. Thereby, R gains a little more in the way of content.

(30) **Axiom 2:** $\forall s: s \in \parallel \text{RESULT}(\phi) \parallel$ iff $\exists e [eRs \ \& \ e \succ s \ \& \ e \in \parallel \phi \parallel]$, ϕ a predicate of events.

(The name "Axiom 2" for the principle is my addition.) It is now very easy to prove Theorem 1, which is repeated for convenience¹⁴:

Theorem 1: $\exists x (P(x) \ \& \ \text{RESULT}(Q(x))(s)) \leftrightarrow \text{RESULT}(\lambda e \exists x (P(x) \ \& \ Q(x)(e)))(s)$

I omit the interpretation function $\parallel \dots \parallel$ in the following proof:

$\exists x (P(x) \ \& \ \text{RESULT}(Q(x))(s))$	
$\leftrightarrow \exists x (P(x) \ \& \ \exists e (eRs \ \& \ e \succ s \ \& \ Q(x)(e)))$	Axiom 2
$\leftrightarrow \exists e (eRs \ \& \ e \succ s \ \& \ \exists x (P(x) \ \& \ Q(x)(e)))$	Predicate Logic
$\leftrightarrow \text{RESULT}(\lambda e. \exists x (P(x) \ \& \ Q(x)(e)))(s)$	Axiom 2

The proof crucially makes use of the commutativity of existential quantifiers. Therefore, we do not get the non-specific reading for a universal quantifier. In other words,

¹² To give an idea of the difficulties, consider the one place predicate **sad**, which should be a relation between an individual and a state. In order to express modality, the sentence **Fritz is sad** should express the set worlds in which Fritz is sad. But what should that be? We are tempted to say, it is the set $\{w \mid \exists s[\text{OBTAIN}(w,s) \ \& \ \text{SAD}(\text{Fritz}, s)]\}$. But what is $\text{SAD}(\text{Fritz}, s)$? Presumably a truth-value, and SAD is an absolute relation not depending on the world parameter. Then OBTAIN would encode Lewis' (1968) counterpart relation C and the relation I "lives in". I don't know whether J&B have this in mind. And we have to see whether this procedure is compatible with standard modal logic. One of the issues to be investigated is whether it is enough to speak of counterparts of events and states. Usually, one has to speak about counterparts of individuals as well in such an approach. For a recent discussion of the theoretical problems, see (Kupffer, 1999).

¹³ I don't know how modality is expressed in this theory. I suppose that sentences must express sets of worlds and not truth-values as assumed by J&B. But then the OBTAIN predicate must be relativised to worlds. I am not sure whether these changes are trivial.

¹⁴ J&B give a somewhat winded proof. The following proof shows that the theorem is a direct consequence of the axioms.

$$\forall x [P(x) \rightarrow \text{RESULT}(Q(x))(s)]$$

is not equivalent to

$$\text{RESULT}(\lambda e \forall x [P(x) \rightarrow Q(x)(e)])(s).$$

This is a welcome result, because the sentence

(31) Recently, every Delaware settled in New Jersey again

does not presuppose that every Delaware used to live in New Jersey at some earlier time.

5. Jäger & Blutner & Dowty

It is instructive to compare the two different methods of representing result states. Decomposition theory in the style of (Dowty, 1979) represents result states in the lexical representation of the verb. Verbs with result states have the structure ...BECOME + Stative proposition. Different verbs of change have different stative predicates under BECOME. Result states are qualitatively described. I have always taken this to be the great advantage that this kind of theory has in comparison to theories that speak of the “the result of an event” simpliciter, a notion that doesn’t make sense to me.

J&B’s theory is not so different in this respect, despite the appearance that the relation R seems to be exactly this vacuous notion. But this is not so. The qualitative description of the result of each particular verb of change is described by a meaning postulate. There are as many meaning postulates as transformative verbs. Roughly the following correspondence holds:

(32) a. Decomposition theory:

Lexical entry for **settle-in**:

$$\lambda w' \lambda t' [[\lambda w \lambda t. \text{SETTLE_IN}_{wt}(x, y)] \text{CAUSE}_{w't'} [\lambda w \lambda t. \text{BECOME}_{wt} \\ \lambda w \lambda t. \text{LIVE_IN}_{wt}(x, y)]]$$

b. J&B:

Lexical entries: **SETTLE_IN**

Accompanying meaning postulate: $\text{RESULT}(\text{SETTLE_IN}) = \text{LIVE_IN}$

We change the decomposition theory in the following way: (32a) is not anymore the lexical analysis for the transitive verb **settle_in**. This verb is analysed as the two-place predicate **SETTLE_IN**, which is like J&B’s with the difference that it depends on world and time. We now add the following axiom:

(33) **The SETTLE_IN-Axiom**

$$\forall w' \forall t' \forall x \forall y [[\lambda w \lambda t. \text{SETTLE_IN}_{wt}(x, y)] \text{CAUSE}_{w't'} [\lambda w \lambda t. \text{BECOME}_{wt} \\ \lambda w \lambda t. \text{LIVE_IN}_{wt}(x, y)]]$$

Every model has to satisfy this axiom. Next, let us define a RESULT-operator for two-place predicates as input and two-place predicate as output. There are many similar operators, i.e., a proper definition should take care of polyadicity:

$$(34) \quad \forall w' \forall t' \forall x \forall y [\text{RESULT}(P)(Q)(w)(t)(y)(x) \\ \leftrightarrow [[\lambda w \lambda t. P_{wt}(x, y)] \text{CAUSE}_{w't'} [\lambda w \lambda t. \text{BECOME}_{wt} \lambda w \lambda t. Q_{wt}(x, y)]]]$$

We are now in a position to define for restitutive adverbs **again** (verbs of other valencies require further definitions). Each of these must have a transitive predicate as an argument in order to recover the result-state of the property. If the predicate is saturated, we cannot recover the result property anymore. The other arguments must consist of subject and object. These can be arguments of the individual type or of the quantifier type.

(35) The meanings restitutive of **again**

- a. $\|\mathbf{again}^1\|_{wt}(P)(y)(x) \text{ iff } P_{wt}(y)(x) = 1 : \exists t' < t [\text{RESULT}(P)_{wt'}(y)(x) = 1]$
- b. $\|\mathbf{again}^2\|_{wt}(P)(Q)(x) = 1 \text{ iff } Q_{wt}(\lambda w \lambda t \lambda y. P_{wt}(y)(x)) = 1 : \exists t' < t [Q_{wt'}(\lambda w \lambda t \lambda y. \text{RESULT}(P)_{wt}(y)(x)) = 1]$, Q a quantifier intension
- c. $\|\mathbf{again}^3\|_{wt}(P)(y)(Q) = 1 \text{ iff } Q_{wt}(\lambda w \lambda t \lambda x. P_{wt}(y)(x)) = 1 : \exists t' < t [Q_{wt'}(\lambda w \lambda t \lambda y. \text{RESULT}(P)_{wt}(y)(x)) = 1]$, Q a quantifier intension
- d. $\|\mathbf{again}^4\|_{wt}(P)(Q)(R) = 1 \text{ iff } R_{wt}(\lambda w \lambda t \lambda x. Q_{wt}(\lambda w \lambda t \lambda y. P_{wt}(y)(x))) = 1 : \exists t' < t [R_{wt'}(\lambda w \lambda t \lambda x. Q_{wt'}(\lambda w \lambda t \lambda y. \text{RESULT}(P)_{wt}(y)(x))) = 1]$,
Q,R quantifier intensions

The unspecific restitutive reading of the sentence **A Delaware settled in New Jersey again** could now be represented as:

- (36) $\mathbf{again}^3_{wt}(\text{SETTLE_IN})(\text{N.J.})(\lambda w \lambda t. \mathbf{a}_{wt} \text{ Delaware})$
 $\leftrightarrow \mathbf{a}_{wt} \text{ Delaware}(\lambda w \lambda t \lambda x. \text{SETTLE_IN}_{wt}(\text{N.J.})(x)) :$
 $\exists t' < t [\mathbf{a}_{wt'} \text{ Delaware}(\lambda w \lambda t \lambda y. \text{RESULT}(P)_{wt}(\text{N.J.})(x)) = 1]$ Def. of \mathbf{again}^3
 $\leftrightarrow \exists x [\text{Delaware}_{wt}(x) \ \& \ \text{SETTLE_IN}_{wt}(\text{N.J.})(x) : \exists t' < t [\exists x [\text{Delaware}_{wt'}(x) \ \& \ \text{RESULT}(\text{SETTLE_IN})_{wt'}(\text{N.J.})(x) = 1]]$ Def. of **a**
 $\leftrightarrow \exists x [\text{Delaware}_{wt}(x) \ \& \ \text{SETTLE_IN}_{wt}(\text{N.J.})(x) : \exists t' < t [\exists x [\text{Delaware}_{wt'}(x) \ \& \ \text{LIVE_IN}_{wt'}(\text{N.J.})(x) = 1]]$ Def. of RESULT and SETTLE_IN-Axiom

This is the simulation of J&B's theory in a classical framework. It is perhaps not as elegant as their proposal, but it is clear how modality works and it is compatible with Dowty's analysis of aspectual classes. There is a proliferation of polysemy and syntactic types. But J&B have to assume more ambiguity as well, it seems to me. Their AGAIN operates on properties of events only, but **again** can modify statives, as the examples in (7) show. Let us call this third **again** AGAIN_{state}. In J&B's theory, the meaning of this adverb should be this:

- (37) $\text{AGAIN}_{\text{state}} := \lambda p \lambda s [p(s) : \exists s' < s (\text{OBTAINS}(s') \ \& \ p(s'))]$

So there is much room for ambiguity here. While this section has shown that we can simulate J&B's approach in a classical approach, it has not been shown that this is the optimal account. I would like to finish this paragraph by recalling you the problem of lexical variation. All achievements/accomplishments have result states, since all allow the formation of an adjectival passive. But not all of these verbs have a restitutive reading for **again** for all speakers.

- (38) Maria putzte die Küche wieder. "Mary cleaned the kitchen again"

Some people don't obtain the restitutive reading for this sentence – I do get it. I can say that those speakers do not decompose the verb in the syntax and hence have no attachment site for

the inner reading. The theory that applies **again**_{rest} to the verb would have a problem here, because the result state of the verb **clean** is the property **clean**, which applies to the object and must be introduced by an appropriate axiom. J&B make the strong empirical prediction that all transformative verbs exhibit the repetitive/restitutive ambiguity.

6. Disambiguation by Word Order and Stress: Bi-directional OT

One of the objections (Stechow, 1996) raised against an account of the different readings of **again** in terms of lexical ambiguity was that it had nothing to say to disambiguation effects achieved by word order. (Dowty, 1979: 253) observes that we only have the external (= repetitive) reading, when **again** occurs in sentence initial position.

(39) Again John opened the door

Dowty concludes the difference in readings must have a structural explanation, but his theory does not offer one because he assumes two meanings for **again** which are related by a meaning postulate. While (Stechow, 1996) gives a structural explanation for this particular example, I had nothing to say there about the disambiguating effect of the accent.

(40) a. Hans das Fenster **wieder** öffnete
 b. Hans das Fenster wieder **öffnete**

(40a) can only have the repetitive reading, and (40b) can only express a restitution. J&B formulate OT (OT = Optimality Theory) principles that derive these facts. While I am not yet convinced by their axiomatic approach to resultativity, I believe that the OT part of the paper is on the right track, and there is genuine progress in our understanding of language here. In this section I present & B's OT principles and show their impressive predictive power. In the next section I try to carry over the principles to Decomposition Theory. J&B assume the following constraints.

(41) **DS**: Definites scramble (out of the VP)
SC: Surface word order mirrors scope relations
DOAP: Don't overlook anaphorical possibilities ("Given constituents are de-accented")
GIVEN: De-accented constituents are given

Principle DS is attributed to (Reis, 1987) and it is stated as well in (Diesing, 1992). SC is folklore at least among semanticists, but I am not aware that this principle has been stated explicitly within an OT-approach. DOAP should be read as indicated in the parenthesis; J&B claim that this interpretation can be subsumed under the more general formulation DOAP, which is due to (Williams, 1997). GIVEN, finally, is attributed to (Schwarzschild, 1999)¹⁵. Taken together, the principles DOAP and GIVEN form a biconditional, something is given if

¹⁵ It is not straightforward to compare J&B's theory with that of Schwarzschild. Schwarzschild's concepts are rather different, for he speaks mostly of F-marking, not of accenting. His principles are: GIVEN: A constituent that is not F-marked is given; AVOID-F: Do not F-mark; FOC: A FOC-marked phrase contains an accent (where a phrase is FOC-marked iff its F-maker is not immediately dominated by another F-marker); HEADARG: A head is less prominent than its internal argument. The ranking is GIVEN \cong FOC >> AVOIDF >> HEADARG.

and only if it is decaccented.¹⁶ We will see how these principles must be applied in concrete cases.

The ranking of the constraints is this:

(42) SC >> DOAP \cong DS >> GIVEN

Standard OT has an input, an output and an evaluation procedure that says which is the best output. Here, the input is a phonetic form π and the output is a proposition λ or perhaps an LF denoting λ . The OT assumed by J&B is bi-directional. One direction assumes that a phonetic form is the input and propositions are the output. The other direction assumes that a proposition is the input and phonetic forms are the output. The technical definition is this:

(43) Bidirectional Optimality (Jäger and Blutner, 1999: 17)

(π, λ) is optimal iff

1. $(\pi, \lambda) \in \text{GEN}$ (i.e., both are well-formed),
2. there is no optimal $(\pi', \lambda) \in \text{GEN}$ such that $(\pi', \lambda) < (\pi, \lambda)$, and
3. there is no optimal $(\pi, \lambda') \in \text{GEN}$ such that $(\pi, \lambda') < (\pi, \lambda)$.

I understand it that condition 2 covers the case where some meaning or LF λ is the input. (π, λ) can only be optimal if there is no π' that expresses λ in a more economical way. But this is not enough to guarantee the optimality of (π, λ) . π could express another meaning λ' in a more economical way than it expresses λ . Then the pair (π, λ') would be better than (π, λ) and hence blocks it. Thus condition 3 covers the case in which π serves as the input of the evaluation. I take it that $(\pi', \lambda) < (\pi, \lambda)$ means that the derivation of π' from λ violates fewer constraints than the derivation of π from λ . Similarly, $(\pi, \lambda') < (\pi, \lambda)$ means that the derivation of λ' from the input π violates fewer constraints than the derivation of λ from π .

Condition 2 and 3 use the notion of optimality that should be defined here, but it is not clear to me in what sense the definition can be a recursive one. So I will simply ignore the adjective *optimal* in the two conditions.

J&B say nothing to the technical realisation of the theory. Normally, OT constraints concern the output or the input + output. No intermediate “abstract” structure is permitted. But precisely this seems to be required here. The OT-constraints operate neither on the PF π nor on the LF λ , but on an intermediate structure like s-structure or Spell Out. It would seem then that the approach has to presuppose a derivation relating π and λ . For OT this means that the input cannot be as simple as J&B assume, we have to consider this intermediate structure as well. This is not in the spirit of standard OT but I will assume that it is necessary for doing semantics.

In order to make the theory work, J&B make the following assumptions for constituents in the scope of *wieder* “again”:

- (44) a. There is only one structural position of *wieder*. Like the negation this adverb separates the subject from the VP. If an object occurs in front of *wieder*, it is scrambled out of the VP.
- b. The object of a VP in the scope of *wieder* “is given by the presupposition, no matter whether we take the repetitive or the restitutive reading”. (p. 18)

¹⁶ There is a remark in J&B’s paper (p. 18) that I do not understand: “We restrict attention here to empty contexts, so one might expect that every stressed constituent violates this requirement.” I would have thought that it is just the other way round. In an empty context nothing is said and therefore nothing is given.

- c. The verb of a VP in the scope of *wieder* “is always given under the repetitive reading, but never under the restitutive reading”. (p. 19)
- d. “The constituent “object + verb” ...is given in all repetitive but in no restitutive reading.”
- e. Every sentence has a default stress that is realised on VP. If the VP has an object, the accent is realised there. If a VP contains no stress, it is de-accented. In that particular case, the accent has a default realisation on the adverb, if there is one.
- f. A VP can only be de-accented, if the object is not scrambled.

Let me comment on the alleged unique position of *wieder*, however. (Stechow, 1996), (Stechow and Rapp, 2000) and (Ernst, 1998) hold the view that functional adverbs like *wieder* and *fast* “almost” can attach to any projection at which they can be interpreted. Consider, e.g., the following examples:

- (45) a. *Wieder/*nicht* stand das Signal auf Rot. *Wieder* hielt der Zug an.
 again/*not stood the signal on red. again stopped the train
- b. *weil wieder/*nicht* das Signal auf Rot stand und *wieder/nicht** der Zug anhielt.
 because again/*not the signal on red stood and again/not* the train stopped

The negation in (45a) is not possible at all, and in (45b) it can only have a contrastive meaning. It is not difficult to show that *wieder* has a wider distribution than (sentential) *nicht*. Werner Frey (p.c.) points out to me that the indefinites *wer*, *was* do not scramble in German, but *wieder* may precede *was* in a sentence with a specific restitutive reading.

- (46) *Fritz was wieder geÖFFnet* hat
 Fritz something again opened has

This points to the availability of the lower position for *wieder*. Note finally, that the assumption creates problems for the syntax in J&B’s crucial example (10), whose German counterpart would be the following sentence:

- (47) *weil sich wieder ein Delaware in New Jersey niedergelassen* hat
 because himself again a Delaware in New Jersey downsettled has

Either the subject is located within the VP or *wieder* attaches to S. The former option has consequences for the evaluation, because we would have to say something about the movement of the subject to a sentential initial position, Is it an instance of Scrambling? The principles governing stress assignment assumed by J&B seem to be these: sentential stress is realised on the verb. If there is a direct object, the stress is realised there. If the VP is de-accented and we have a functional adverb, the sentential stress is realised on the adverb.

Many researchers hold the view that presuppositions are given, i.e., they are old stuff. Assuming the theory of (van der Sandt, 1992), presuppositions may even be thought as being given by the previous text. A decomposition approach could say that the material in the scope of *wieder* is given. In the syntax, a verb would be given if all of its semantic components (CAUSE + BECOME + L) are given. In J&B’s theory, conditions (44b) and (44c) have a stipulative flair.

Let us look now how the theory evaluates the following pattern (J&B’s (6)):

- (48) a. Hans wieder das **Fenster** öffnete. [6]
 b. Hans **wieder** das Fenster öffnete.
 c. Hans das Fenster wieder **öffnete**.
 d. Hans das Fenster **wieder** öffnete.

Here are the OT-tableaux for (48) by J&B.

(49) Definite object

		Repetitive reading						Restitutive reading			
		SC	DOAP	DS	GIVEN			SC	DOAP	DS	GIVEN
	(48a)		**	*			(48a)		*	*	
⇒	(48b)			*			(48b)			*	**
	(48c)		**			⇒	(48c)				
⇒	(48d)		*				(48d)				*

For the evaluation of the VP, the reader is referred to the next footnote.¹⁷ Like J&B, I will use the abbreviations *rep* and *rest* for repetitive and restitutive reading, respectively. The shorts *ns* and *ws* will stand for wide and narrow scope, respectively. DOAP is violated twice in example (48a, rep), because both the VP and the object carry the sentential stress. In (48b, rep), the VP is de-accented and the default accent lies on *wieder*. So only DS is violated. (48c, rep) exhibits two violations of DOAP, because the verb is not de-accented and the VP cannot be de-accented, since there is no intact VP. (48d, rep) is like (48c, rep) with the difference that the verb is de-accented. So this is a better candidate. As usual, the arrows point to the optimal candidates.

In (48a, rest), the object is given and should be de-accented. So DOAP is violated. One would think that the missing accent on the verb violates GIVEN, but the verb is not de-accented, since VP is not de-accented. The situation is different in (48b, rest); the VP is de-accented and should therefore be given. But neither the verb nor the VP are given. Hence GIVEN is violated twice. (48c, rest) violates no constraint. (48d, rest) differs only in having the verb de-accented. Thus GIVEN is violated.

The evaluation goes like this. (48c, rest) blocks (48a/b/d, rest), because these express the same meaning in a less economical way. And it blocks (48c, rep), because this reading involves more costs. (48b, rep) and (48d, rep) are equally harmonic and block all the other candidates in the tableau, i.e., (48a/c rep). As a result we have that (48b/d) unambiguously express the repetitive reading while (48c) unambiguously expresses the restitutive reading. This is exactly the correct prediction.

Next consider the evaluation of the following pattern:

¹⁷ In an email of June 6, 2000, Gerhard Jäger writes (my translation from German [A.v.S.]):

1. Every sentence receives an accent.
2. A de-accented constituent receives no accent.
3. The accent of Head-Complement structures is realised in the complement.
4. The accent of a constituent is realised in its head.

For the purposes of GIVENness a phrase counts as de-accented only if it should bear an accent. In other words, DOAP is violated if a given phrase contains an accent. Being an adjunct, *wieder* receives no accent. Therefore *wieder* doesn't count as de-accented if – as in (6c) – it carries no accent. In (34b) the default accent would go to the verb. Since it is on *wieder* instead, the verb has to be counted as de-accented.

- (50) a. Hans wieder ein **Fenster** öffnete.[33a]
- b. Hans **wieder** ein Fenster öffnete[33b]
- c. Hans ein Fenster wieder **öffnete**[34a]
- d. Hans ein Fenster **wieder** öffnete[34b]

We have to investigate four combinatorial possibilities: the indefinite object has wide or narrow scope with respect to *wieder* and the reading is repetitive or restitutive. Here are the tableaux offered by J&B:

- (51) Indefinite object has narrow scope

		Repetitive reading						Restitutive reading			
		SC	DOAP	DS	GIVEN			SC	DOAP	DS	GIVEN
⇒	(50a)		**			⇒	(50a)		*		
⇒	(50b)					⇒	(50b)				**
⇒	(50c)	*	**			⇒	(50c)	*			
⇒	(50d)	*	*			⇒	(50d)	*			*

- (52) Indefinite object has wide scope

		Repetitive reading						Restitutive reading			
		SC	DOAP	DS	GIVEN			SC	DOAP	DS	GIVEN
⇒	(50a)	*	**			⇒	(50a)	*	*		
⇒	(50b)	*				⇒	(50b)	*			**
⇒	(50c)		**			⇒	(50c)				
⇒	(50d)		*			⇒	(50d)				*

That (50b, ns, rep) and (50c, ws, rest) are winning optimal candidates is obvious, because they do not violate any constraint. Note first that these block any other candidate in their tableaux. In other words, (50a/c/d, ns, rep) and (50a/b/d, ws, rest) are ruled out. Furthermore, (50b, ns, rep) blocks (50b, ns, rest), and (50c, ws, rest) blocks (50c, ws, rep). It is also clear that (50d, ws, rep) should be optimal because it is the best candidate in its tableau and there is no better PF that could block it. What comes as a surprise is that (50a, ns, rest) should be optimal, since there is a better candidate in its tableau, viz. (50b, ns, rest). But this candidate is blocked by (50b, ns, rep). On the other hand, nothing blocks (50a, ns, rest), so this is an optimal (π, λ) indeed.

Again these results are exactly as we want to have them. It is not so clear, however, whether the theory really predicts all these results for the picture may change if we widen the range of candidates in competition. Consider the following PF – LF pair:

- (53, ns, rest) weil Hans wieder ein Fenster **öffnete**

This candidate violates no constraint and should therefore block all the other PFs expressing (ns, rest). In particular, (50a, ns, rest) should be blocked. For J&B, this is not a wanted result, because (50a, ns, rest) is a prototypical counterexample against my theory. I don't want to exclude, however, that the theory can be improved so that this difficulty can be met.

I would like to end this section with a remark on Dowty's sentence (39). J&B say nothing about English and we could re-rank the constraints. But we cannot explain restitutive/repetitive ambiguity structurally, because every variant of again applies to the entire VP.

If the restitutive reading for (39) is never available – regardless what the stress pattern is – J&B seem to need an ad hoc constraint for **again** in Topic-position that excludes a repetitive reading.

7. Decomposition and OT

Let us try to carry over the OT-principles to a decomposition approach. Recall that my representation is something like the structure (9) with repetitive **wieder** above VoiceP. The tree is Bierwisch’s Lexical Semantic Structure (LSS).¹⁸ The only difference to Bierwisch is that I have access to this structure in the syntax directly. The principles determining givenness are the following ones:

- (54) a. An constituent is given iff the constituent or its trace is in the scope or *wieder* “again” at LSS.
 b. A (phonological) verb is given, if all of its LSS-heads are given.

It follows that the verb *öffnete* is not given if *wieder* has narrow scope with respect to BECOME, but *öffnete* is given if *wieder* has wide scope with respect to CAUSE. In the first case, the LSS-heads BECOME and CAUSE are not in the scope of *wieder*. In the second case, they are. The technical details of this would have to be elaborated, but the approach is a step toward a semantic explanation of J&B’s stipulations.

Since my syntax has more docking positions for *wieder*, I have to compare more pairs of structures than do J&B. We only consider sentences with a definite object and check first which candidates are best for the repetitive reading. The winners are marked by an arrow.

- (55) The repetitive reading
- a. Hans wieder das **Fenster** öffnete
 - aa. Hans CAUSE+BEC wieder das **Fenster** OPEN
 - ab. Hans₂ wieder das **Fenster**₁ t₂ CAUSE+BEC t₁ OPEN
 - b. Hans **wieder** das Fenster öffnete
 - ba. Hans CAUSE+BEC **wieder** das Fenster₁ OPEN
 - bb. Hans₂ **wieder** das Fenster₁ t₂ CAUSE+BEC t₁ OPEN ←
 - c. Hans das Fenster wieder **öffnete**
 - ca. Hans₂ das Fenster₁ t₂ **CAUSE+BEC** wieder t₁ **OPEN**
 - cb. Hans₂ das Fenster₁ wieder t₂ **CAUSE+BEC** t₁ **OPEN**
 - d. Hans das Fenster **wieder** öffnete
 - da. Hans₂ das Fenster₁ t₂ CAUSE+BEC **wieder** t₁ OPEN
 - db. Hans₂ das Fenster₁ **wieder** t₂ CAUSE+BEC t₁ OPEN ←

There are more representations; for instance, *wieder* can have wide scope with respect to CAUSE and the object may remain in situ. This configuration would not change the result. The SS (55aa) is not compatible with an LF that gives us the repetitive reading, because *wieder* occupies the wrong position. I have subsumed this under the Scope Principle SC.

Next, consider the candidates for the restitutive reading:

¹⁸ (Bierwisch, 1983, 1996)

- (56) The restitutive reading
- a. Hans wieder das **Fenster** öffnete [6]
 - aa. Hans CAUSE+BEC wieder das **Fenster** OPEN
 - ab. Hans₂ wieder das **Fenster**₁ t₂ CAUSE+BEC t₁ OPEN
 - b. Hans **wieder** das Fenster öffnete
 - ba. Hans CAUSE+BEC **wieder** das Fenster OPEN
 - bb. Hans₂ **wieder** das Fenster₁ t₂ CAUSE+BEC t₁ OPEN
 - c. Hans das Fenster wieder **öffnete**
 - ca. Hans₂ das Fenster₁ t₂ **CAUSE+BEC** wieder t₁ **OPEN**
 - cb. Hans₂ das Fenster₁ t₂ **CAUSE+BEC** wieder t₁ **OPEN** ←
 - d. Hans das Fenster **wieder** öffnete
 - da. Hans₂ das Fenster₁ t₂ CAUSE+BEC **wieder** t₁ OPEN
 - db. Hans₂ das Fenster₁ **wieder** t₂ CAUSE+BEC t₁ OPEN

The candidate (56cb) is the most highly ranked, as is desired. An here are the evaluation tableaux.

	Repetitive reading					Restitutive reading				
	SC	DOAP	DS	GIVEN		SC	DOAP	DS	GIVEN	
⇒	(55aa)	*	**	*		(56aa)		*	*	
	(55ab)	*	**	*		(56ab)	*	*		
	(55ba)	*		*		(56ba)			*	**
⇒	(55bb)					(56bb)	*		*	**
	(55ca)	*	**	*		(56ca)			*	
	(55cb)		**			⇒ (56cb)				
	(55da)	*		*		(56da)				**
⇒	(55db)					(56db)	*			**

In order to complete the comparison, we would have to consider the examples with an indefinite object as well. It should be clear, however, that we can simulate most of the results of J&B in the decomposition approach. And we have the same problem with sentence (50a, ns, rest). It cannot be marked as optimal with the restitutive reading and a narrow scope indefinite. For convenience, the sentence is repeated:

- (58) a. Hans wieder ein **Fenster** öffnete [(50a)]
 b. Hans CAUSE+BEC wieder ein **Fenster** OPEN

The reading in question is expressed by the SS/LF (58b). This sentence violates DOAP, since the object is given and should therefore be de-accented. Furthermore, GIVEN is violated, because the verb is not given and must therefore carry an accent. As before, sentence(53, ns, rest) violates no constraints if it has the same SS. Therefore, this candidate should block the PF-LF-pair in (58b).

Recall, however, that I cannot represent causative control verbs in the same way as J&B.

8. Conclusion

The revision of the decomposition theory can be summarised as follows: we still distinguish several positions for the functional adverb *wieder*, the restitutive one under CAUSE+BECOME and one or several repetitive positions above CAUSE+BECOME. We have to assume that accusative can be assigned to the base position of the object. This done, the OT-part of J&B can be integrated into the theory, notably the principles that account for the disambiguation of the different readings by means of stress. The decomposition theory has some intuitive appeal when we ask why a VP is entirely given under the repetitive reading, but not entirely under the restitutive reading. On the other hand, unspecific restitutive readings with subject control verbs cannot be obtained in a decomposition approach, as we have seen. We must assume that functional adverbs are lexically ambiguous if we accept these readings.

We have seen that J&B's readings are often not available, and we would like to know why this is so. There remain empirical problems for both theories, notably sentence (48a).

It could turn out that the strategy to separate the result state information from the content of the verb is the correct one. The same strategy is pursued in (Kamp and Rossdeutscher, 1994); I didn't have the time to compare this approach with J&B's account. From what I remember, the new data discussed by J&B cannot be treated by Kamp and Rossdeutscher. So what is the correct view? As it stands, the issue cannot be decided because J&B's framework remains to be extended to cover a larger body of phenomena, notably intensional contexts.

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German Participle II Constructions as Adjuncts*

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Abstract

The present investigation is concerned with German participles II (past participles) as lexical heads of adjuncts.

Within a minimalist framework of sound-meaning correlation, the analysis presupposes a lexicalist conception of morphology and the differentiation of Semantic Form and Conceptual Structure. It is argued that participles II have the same argument structure as the underlying verbs and can undergo passivization, perfectivization and conversion to adjectives. As for the potential of participles to function as modifiers, it is shown that attributive and adverbial participle constructions involve further operations of conversion. Participle constructions are considered as reduced sentences. They do not have a syntactic position for the subject, for an operator (comparable to the relative pronoun in relative clauses) or for an adverbial relator (as in adverbial clauses). The pertinent components are present only in the semantic structure.

Two templates serve the composition of modifiers - including participle constructions - with the modificandum. It is necessary to differentiate between modification which unifies two predicates relating to participants or to situations and frame setting modification where the modifier is given the status of a propositional operator.

The proposed analysis shows that the high degree of semantic underspecification and interpretative flexibility of German participle II constructions resides in the indeterminacy of participles II with respect to voice and perfect, in the absence of certain constituents in the syntactic structure and in the presence of corresponding parameters in the Semantic Form of the participle phrases.

1. Introduction

This article refers to work I did on the syntax and semantics of constructions with an adjective or a participle as lexical head and on modification (Zimmermann 1985, 1987, 1988a, 1988b, 1992). Now I will put forward certain refinements, which partly result from the comparison of my analysis with the treatment of participle phrases by Fanselow (1986), Wunderlich (1987, 1997a), Bierwisch (1990, 1997b), Kratzer (1994a, 1994b, 1998), von Stechow (1998, 1999a, 1999b) and Dölling (1998). A more detailed version of this reconsideration is published in Zimmermann (1999, 2000).

I shall concern myself with German participles II (past participles) as lexical heads of attributive and adverbial phrases, as in (1)-(6).

- (1) die in meiner Heimat gleich nach Ostern geschorenen Schafe
the in my home country right after easter shorn sheep
'the sheep that are/were shorn in my home country right after easter'

* I presented this paper in 1998 at the Zentrum für Allgemeine Sprachwissenschaft and in 1999 at the Projektgruppe Strukturelle Grammatik in Berlin, at the workshop „Kopulaverben und Prädikative“ of the SFB 282 in Wuppertal, January 15-16, 1999, at a conference in honour of Anita Steube at the Institut für Linguistik in Leipzig, July 9, 1999 and at the conference „Approaching the Grammar of Adjuncts“ at the University of Oslo, September 22-25, 1999. I would like to thank the respective audiences for the inspiring discussions. For helping with the English text I am indebted to Jean and Barbara Jane Pheby and Ewald Lang.

- (2) die trotz der Kälte schon geöffneten Apfelblüten
the despite the cold already opened apple blossoms
'the apple blossoms that (have) already opened despite the cold'
- (3) der seit zwei Wochen verreiste Nachbar
the since two weeks away neighbour
'the neighbour who has been away for two weeks'
- (4) Irene kann sich, endlich von ihrer Angst befreit, wieder besser konzentrieren.
Irene is able, finally freed of her fear, again to concentrate better
'Finally freed of her fear, Irene is able to concentrate better.'
- (5) Das Fleisch bleibt, im Römertopf gegart, schön saftig.
the meat stays, in the chicken brick roasted, nice and juicy
'Roasted in the chicken brick, the meat stays nice and juicy.'
- (6) Mit ein paar Blumen geschmückt, sieht das Zimmer gleich viel freundlicher aus.
with a few flowers decorated, looks the room at once much more friendly
'Decorated with a few flowers, the room looks much more friendly at once.'

In the examples (1)-(3) we are dealing with modifiers attributively used which agree with the nominal head of the modificandum in gender, number and case. In (4)-(6) there is no morphologically indicated relation between the modifier and the modificandum. I regard these participle constructions as adverbial modifiers, which can be paraphrased as adverbial sentences. In many languages there are special morphemes marking the adverbial form of the verb, the so-called adverbial participles (Haspelmath 1995, König 1995, Hengeveld 1998, V.P. Nedjalkov 1995, I.V. Nedjalkov 1995, 1998, Ružička 1978, 1982, Kortmann 1995).

I will leave aside the characterization of participle constructions as secondary predicates.

2. The framework

Within a minimalist framework of sound-meaning correlation the analysis follows a lexicalist conception of morphology (Wunderlich 1997c) and the differentiation of Semantic Form and Conceptual Structure (Bierwisch 1987, 1997a, Lang 1987, 1990, 1994, Dölling 1997).

A strict distinction is made between morphological marking and semantic interpretation of morphological forms. There are syntactic configurations which serve to check morphosyntactic features and/or their semantic interpretation. This means that the relation between morphology and semantics in many cases is mediated by syntax.

The semantic characterization of constituents can be underspecified. It is assumed that the Semantic Form of linguistic expressions involves parameters which are specified in Conceptual Structure (Dölling 1997). I will show explicitly in which respects participle II constructions are semantically underdetermined.

Any analysis of participles II must take a stand on the nature of tense, aspect and Aktionsarten.

Aktionsarten are semantic characteristics of verb phrases and depend on the semantics of the verb and of the modifiers and argument realizations.

As regards aspect, it is evident that German does not express aspect morphologically. There is no differentiation between perfective and imperfective aspects. I assume that in German, there are neither morphosyntactic features of aspect nor an aspect phrase.

As regards perfect, I take it as a special time interval (Anagnostopoulou/Iatridou/Izvorski 1998) and will discuss whether it is necessary to assume a perfect phrase as von Stechow (1999a, 1999b) does.

The syntactic structure of participial modifiers is sentence-like. Only the highest domains of the extended projection of verbs - ForceP, MoodP and TenseP - are absent. The problem whether there is a special Participle phrase on top of the participle construction will be discussed below.

Participle constructions in the function of attributive or adverbial modifiers are - like all modifiers - syntactic adjuncts. This means that they can be embedded into the matrix construction at those places where they are given the right interpretation according to their nature and with respect to scope relations (Grundzüge 1981, Maienborn 1996, 1997, 1998, Frey/Pittner 1998, Haider/Rosengren 1998, Haider 1999).

3. The analysis

3.1. Lexical representation of participles II as verb forms in the third status

The participle II as an infinite verb form differs from the verb stem in the Phonetic Form (PF) and in the Morphosyntactic Characterization (MSC). Its Semantic Form (SF) basically is the same as the SF of the verb stem.

- (7) a. /.../
 b. +V -N α sein +infin +3S β part β A-FI γ pass δ perf ϵ max
 ($\epsilon = - \rightarrow \beta = +$, $\gamma = - \rightarrow \delta = +$)
 c. $\lambda x_n \dots \lambda x_1 \lambda t \lambda s$ [[Ts \mathbb{R}_{asp} t] & [s INST [...x₁ ... x_n ...]]]
 (T \in $\langle \alpha, i \rangle$, $\alpha \in \{e, i\}$, $\mathbb{R}_{asp} \in \langle i, \langle i, t \rangle \rangle$, INST $\in \langle t, \langle e, t \rangle \rangle$)

(7a) represents the PF of the affixation process of participle II formation, e.g. *operiert*, *gelesen* (without adjectival inflection) or *operierte*, *gelesenem* (with adjectival inflection). (As regards the representation of the affixes *-t* and *-n* of German participles II, see Zimmermann 1999.)

(7b) categorizes participles II as an infinite verb form (+infin), as third status (+3S) and as *-part* for the supinum or as *+part* for the participle (in the understanding of Bech 1955/1957). \pm A-FI is a morphological feature shared by adjectives, participles, determiners and certain numerals which can take adjectival inflection. \pm max serves to characterize the word structure level. +sein and -sein are selectional features of verbs forming the perfect with the auxiliary verb *sein* or *haben* respectively. Furthermore, I assume that the participle II is characterized by the morphosyntactic features +pass and/or +perf, which are the basis for selection by auxiliary verbs and for semantic interpretation of participle constructions¹. The following table shows the possible combinations of the features \pm part, \pm pass and \pm perf.

¹ As an illustration, I am adding the lexical representation of the auxiliary verb form *hat* ('has'):

- (i) a. /hat/
 b. +V-N +perf -pass -prät -fut -pl -1 -2
 c. λP [P]
 +3S
 -part
 +perf
 -pass
 -sein

(8)	3S	part	pass	perf	
	+	+	+	+	vom Chefarzt operiert(-)
	+	-	+	+	vom Chefarzt operiert worden sein
	+	+	+	-	gern gelesen(-)
	+	-	+	-	gern gelesen werden
	+	+	-	+	gestern verweist(-)
	+	-	-	+	gestern verweist sein, gearbeitet haben

The semantic impact of these feature combinations will be accounted for by special rules of semantic interpretation.

The SF of participles II is given in (7c). I assume that the SF of verbs and of their participles is an x_n+2 -ary predicate with $\lambda x_n \dots \lambda x_1$ as argument positions for participants and λt as argument position for time characterizations and λs as the referential argument position. I shall leave open whether it is necessary to have verb semantics associated with possible worlds (i.e. to have one further position for possible worlds). INST in (7c) reads as 'instantiates' and introduces the situation argument s for all lexical verbs (Bierwisch 1987). R_{asp} is a parametric relation between the time interval of the situation and a time interval t . t can be specified by perfect, tense and modifiers.

3.2. Passivization and perfectivization

In the following, we must decide how to capture the semantics of passivization and of perfectivization. In principle, there are two possibilities. We could simply formulate semantic interpretation rules for the constituents bearing the features +pass and/or +perf and indicate on which level of syntactic projection the corresponding semantics comes into play. I will call this method affixless interpretation. The second possibility is connected with the idea of feature checking in a certain syntactic configuration with a phonetically empty functional head which brings in the pertinent semantics. I call this method affixal interpretation. It is evident that with the second solution the syntactic structure is less economic. Therefore, I tend to prefer the first method of semantic interpretation. In the following representations I will put the functional PF and MSC information into parentheses, thereby indicating the omission of the zero head and of its projection.

Passivization and perfectivization do not change the lexical category of the input. The two rules are mutually ordered. Like the auxiliaries in the verbal complex (for instance, *gelesen worden sein*), passivization - following the mirror principle - comes first.

3.2.1. Passivization

As examples like (1) and (6) illustrate there are attributive and adverbial participle II constructions with passive voice semantics. I assume that constituents with participles like *gelesen* or with the supinum *gelesen* in complex verb forms like *gelesen wird*, *gelesen worden ist* as lexical heads undergo the following rule of interpretation:

The auxiliary selects the third status of the supinum (+3S -part) marked by the morphosyntactic features +perf -pass -sein. Following Bierwisch (1990), I assume that auxiliary verbs and their complements form verb complexes as in (ii):

(ii) [[gelacht] hat] ('has laughed')

It is important to note that the auxiliary does not enrich the semantics of the participle II. I assume that the semantic interpretation of the participle II and of complex verb forms with the participle II is delayed.

(9) Passive voice interpretation (PASS)

- (a. /Ø/)
- (b. +pass)
- c. $\lambda P \lambda t \lambda s \exists x [P \ x \ t \ s]$
+pass

The only condition for the rule to apply is the presence of the morphosyntactic feature +pass in the MSC of the constituent to be given its passive voice semantics. Passive voice semantically consists in existential binding of the highest argument for participants. (For selectional restrictions see Rapp 1997. As regards passivization of verbs with three participants, see Zimmermann 1999, 2000.) The rule is not limited to word structure. It can be freely applied at the level of phrase structure.² The same is true of perfectivization and of conversion to adjectives.

3.2.2. Perfectivization

Again, the rule of perfect interpretation applies to a constituent marked by a characteristic feature, in this case by +perf.

(10) Perfect interpretation rule (PERF)

- (a. /Ø/)
- (b. +perf)
- c. $\lambda P \lambda t \lambda s \exists t' [[t' < t] \ \& \ [P \ t' \ s]]$
+perf
($< \in \langle i, \langle i, t \rangle \rangle$)

Semantically, perfectivization amounts to the temporal characterization that there is a time interval t' such that t' is before ($<$) t or abuts (\times) t (von Stechow 1999a, 1999b). The question whether or not the abut relation must be restricted to constructions with the perfect supinum (+3S -part) so that constructions with the perfect participle (+3S +part) will get the perfect semantics with the before-relation deserves clarification.³

3.3. Conversion

Whereas passive voice interpretation and perfect interpretation can be looked at as semantic rules combined with the checking of the features +pass and/or +perf, conversion of participles II to adjectives is connected with the change of the lexical feature -N of verbs to +N of adjectives. Participles II converted to adjectives combine with the copula *sein*, which in

² The passive interpretation rule (9) has to interact with the integration of quantifier phrases in cases like (i).

(i) Es wurde alles kritisiert.
it was everything criticized
'Everything was criticized.'

Es wurde über alles gelacht.
it was about everything laughed
'Everything was laughed at.'

Evidently, the possibility to get a $\exists x \forall y$ reading must be left open. One way to guarantee this consists in the application of passive interpretation after the integration of the universally quantized entity.

³ Possibly the temporal relation between t' and t in the perfect interpretation rule (10) should be considered as a parameter, R_{perf} , with the possible values $<$ and \times the selection of which being determined in Conceptual Structure.

modifier phrases as a rule remains silent. They can be prefixed by *un-* (Lenz 1995) and undergo synthetic comparative and superlative formation and occur in all environments of adjective phrases. I agree with Rapp (1996, 1997) that the so-called Zustandspassiv does not exist. Like Kratzer (1994a, 1994b, 1998), I assume that the conversion can take place at the level of word structure or of phrase structure.

(11) Conversion to adjectives (CONV)

- a. /Ø/
- b. +V+N
- c. $\lambda P \lambda x \exists s' \exists s \exists t [[s' \text{ RESULT } s] \& [P \text{ x t s}]]$
 +3S
 +part
 $\left. \begin{array}{l} +\text{sein} \\ +\text{pass} \\ +\text{refl} \end{array} \right\}$
 (RESULT $\in \langle e, \langle e, t \rangle \rangle$)

The input to this rule are participles II with the marking +3S +part, which in addition have the feature +sein or have undergone passivization or belong to the class of verbs with the morphosyntactic feature +refl (like *sich rasieren*, *sich verändern*, *sich verspäten*, *sich betrinken* etc.).

Semantically, the rule of conversion characterizes the highest participant as being in a result state of the underlying verb. I assume that a meaning postulate makes explicit that the resulting situation *s'* instantiates the proposition which in the semantic representation of the verb identifies the goal state (for instance, [OFFEN *x*] in the case of *geöffnet* as the converted adjective of *öffnen* or of *sich öffnen*).

3.4. The copula

Adjectival phrases are one-place predicates and can combine with the copula, which - like all lexical verbs - comes with a situation argument *s* and a temporal argument *t*.

(12) The copula

- a. /sein/, /Ø/
- b. +V-N
- c. $\lambda P \lambda x \lambda t \lambda s [[T_s \text{ R}_{asp} t] \& [s \text{ INST } P \text{ x}]]$

By assuming the existence of a silent copula one can explain the far-reaching parallelism of participial modifiers and modifiers with an embedded adjective phrase. For instance, consider cases like (13) and (14).

- (13) *der seit zwei Wochen Ø_{cop} kranke Nachbar*
 the since two weeks ill neighbour
 'the neighbour who has been ill for two weeks'

- der seit zwei Wochen Ø_{cop} verreiste Nachbar*
 the since two weeks away neighbour
 'the neighbour who has been away for two weeks'

- (14) der krank gewesene_{cop} Nachbar
 the ill been neighbour
 'the neighbour who has/had been ill'
- der verreist gewesene_{cop} Nachbar
 the away been neighbour
 'the neighbour who has/had been away'

In (13), the adverbial *seit zwei Wochen* relates to the time interval provided by the silent copula. In (14), the explicit perfect form *gewesen* of the copula furnishes the modifier construction with perfect semantics, more precisely with the preterite-like before-relation. In order to avoid unnecessary syntactic effort, I propose to combine adjectival modifiers with the copula only if the situation argument or the temporal argument have to be considered.

3.5. Participial modifiers as reduced sentences

Adjectival and participial modifiers are considered as reduced sentences. They do not provide a syntactic position for the subject or for an operator (comparable to the relative pronoun in relative clauses) or for an adverbial relator (as in adverbial clauses).⁴ The pertinent components are present only in the semantic structure. The functional projections ForceP, MoodP and TenseP are absent.

I assume that adjectival modifiers without the copula have the SF schema (15), whereas participial modifiers including adjectival phrases enriched by the copula have the SF schema (16a) or (16b).

- (15) SF schema for adjectival modifiers
 $\lambda x [\dots x \dots]$

- (16) SF schemata for participial modifiers
 (a) Attributive modifiers
 $\lambda x \exists s \exists t [\dots s \dots t \dots x \dots]$

- (b) Adverbial modifiers
 $\lambda s' \exists s \exists t [[s' \mathbf{R}_{adv} s] \ \& \ [\dots s \dots t \dots x \dots]]$
 $(\mathbf{R}_{adv} \in \langle e, \langle e, t \rangle \rangle)$

Thus it is necessary to convert participle constructions to the schemata in (16) so that they can function as one-place modifiers. Again, there are two possibilities: the affixless method or the method of zero-affixation. My preference is clear. But this time, I would like to leave open the possibility of having the modifier construction undergo a category change: either to adjectival or to prepositional phrases. I indicate these conversions in (17b) and (18b). I believe there is some evidence for these conversions. Firstly, attributive participle constructions come up with adjectival inflection (see (1)-(3)). Secondly, the adverbial meaning in (18c) - though very abstract - is comparable with that of adverbial conjunctions such as *bis*, *seit*, *während* etc., which I would categorize as -V-N entities.⁵

⁴ Compare the analysis of adjectival and participial modifiers by Fanselow (1986).

⁵ For the status of adverbial conjunctions see Steube (1987).

(17) Conversion to adjectival modifiers (ADJ)

(a. /Ø/)

(b. +V+N)

c. $\lambda P \quad \lambda x \exists s \exists t [P \ x \ t \ s]$

+MAX

+3S

+part

$\left\{ \begin{array}{l} +sein \\ +pass \\ +refl \end{array} \right\}$

(18) Conversion to adverbial modifiers (ADV)

(a. /Ø/)

(b. -V-N)

c. $\lambda P \quad \lambda s' \exists s \exists t [[s' \ R_{adv} \ s] \ \& \ [P \ x \ t \ s]]$

+MAX

+3S

+part

$\left\{ \begin{array}{l} +sein \\ +pass \\ +refl \end{array} \right\}$

As in the case of conversion of participles to adjectives, the two rules apply to constituents marked by the features +3S +part and +sein or +pass or +refl, respectively.⁶ The rules are restricted to maximal projections (+MAX). (17) equips us with modifiers relating to partici-

⁶ The question in which cases participles II as heads of modifiers relate to reflexive verbs deserves special attention. In contexts like (i), the participle does not seem to correspond to the reflexive verb *sich öffnen*. It can be understood as passive of the verb *öffnen* or as the converted adjective.

- (i) *das gestern geöffnete Fenster*
 the yesterday opened window
 'the window that was opened yesterday'

But in (ii) the participles could also be related to the pertinent reflexive verbs.

- (ii) *die geöffneten Blüten*
 'the open blossoms'
 cf. *die Blüten haben sich geöffnet*

der verspätete Eilzug
 'the delayed express train'
 cf. *der Eilzug hat sich verspätet*

'the drunken porter'
 cf. *der Pförtner hat sich betrunken*

In many cases, as in (iii), the participle is ambiguous between being an adjective and being derived from the corresponding transitive or reflexive verb.

- (iii) *Die Frau fühlte sich, in eine warme Decke gehüllt, wieder wohler.*
 the woman felt, in a warm blanket wrapped, again better
 'Wrapped in a warm blanket, the woman felt better again.'

Die in eine warme Decke gehüllte Frau fühlte sich wieder wohler.
 the in a warm blanket wrapped woman felt again better
 'The woman who was wrapped in a warm blanket felt better again.'

Therefore, among various possibilities I have made the applicability of the three conversions CONV, ADJ, ADV depend on the presence of the morphosyntactic feature +refl in the MSC of the participle.

pants, (18) with those relating to situations. In both cases, the situation argument and the temporal argument of the underlying verb are existentially bound. In addition, (18) blocks the highest participant argument x of the verb. This variable can be regarded as a parameter involved in control relations (Haspelmath 1995). The relational parameter R_{adv} in (18c) leaves room for context-dependent specification of the pertinent adverbial relation between two situations in Conceptual Structure (König 1995).

3.6. The semantic integration of modifiers

There are four types of modifiers I wish to distinguish: intersective modifiers, appositive modifiers, secondary predicates⁷ and operator-like modifiers. On their own all modifiers, - according to the conception proposed here - are one-place predicates. Thus, the differentiation mentioned above must reside in the mode of combining the modifying predicates with the modificandum. Here I will concentrate on intersective modification and on operator-like modification, MOD1 and MOD2.

(19) Modification template MOD 1

$$\lambda Q \lambda P \lambda x [[P x] \& [Q x]]$$

($P, Q \in \langle e, t \rangle$)

(20) Modification template MOD 2

$$\lambda Q \lambda p [[Q x] \underline{C} p]$$

($Q \in \langle e, t \rangle, \underline{C} \in \langle t, \langle t, t \rangle \rangle$)

Both templates operate on one-place predicates and enrich them by adding a position for the modificandum.⁸ Furthermore, (19) unifies the highest arguments of the modifier and the modificandum.⁹ The two propositions are combined by $\&$. (20) leaves the nature of the connector unspecified. \underline{C} is a parameter. The modificandum in (20) is a proposition and the highest argument position x of the modifier is blocked. This variable, too, is a parameter, which can take part in relations of co-reference. With (20) we get frame setting modifiers which specify conditions for the pertinent proposition of the modificandum to be valid.

I believe the template in (19) integrates the intersective modifiers of the examples (1)-(4), whereas (20) characterizes the modifiers in (5)-(6) as propositional operators.

3.7. Examples

Having commented on the basic components of my analysis I would like to add three examples with participial modifiers which have undergone the proposed operations of morphological, syntactic, and semantic structuring.

⁷ See Koch/Rosengren (1995) and Kaufmann/Wunderlich (1998).

⁸ Compare the assumptions of Wunderlich (1997b), who proposes enriching the argument structure of the modificandum in order to integrate a modifier.

⁹ Possibly, we need a more general schema of intersective modification unifying several arguments of the modifier and of the modificandum at once (Jacobs 1995). Moreover, it seems necessary that various arguments of the modificandum are allowed to be unified with the highest arguments of the modifier. The schema (i) should replace MOD1.

(i) $\lambda Q \lambda P \lambda \underline{z} \dots [[P \underline{z} \dots] \& [Q \underline{z}]]$
 ($Q \in \langle \alpha, t \rangle, P \in \langle \beta, t \rangle, \lambda \underline{z}, \underline{z} - n$ lamda operators and variables ($n \geq 1$))

- (21) das [von allen geliebte] Kind¹⁰
 the by everybody loved child
 'the child that is/was loved by everybody'

MOD 1 (ADJ (MOD1 (von allen')(Pass (VP'))))

$\text{ty} [[\text{CHILD } y] \& \exists s \exists t [[\exists x [[\text{Ts } \underline{R}_{\text{asp}} t] \& [s \text{ INST } x \text{ LOVE } y]]] \& \forall z [[\underline{P} z] \rightarrow [z \underline{R}_{\text{th}} s]]]]]]$

- (22) [Geleert] fuhren die Wagen ins Depot.
 unloaded went the lorries to the depot
 'After having been unloaded, the lorries went to the depot.'

MOD 1 (ADV (PERF (PASS (VP'))))

$\exists s [[\text{die Wagen}_i \text{ fuhren ins Depot}' (s)] \& \exists s' \exists t' [[s \underline{R}_{\text{adv}} s'] \& \exists t'' [[t'' < t'] \& \exists x [[\text{Ts}' \underline{R}_{\text{asp}} t''] \& [s' \text{ INST } x \text{ DO-CAUSE BECOME EMPTY } y_i]]]]]]$

- (23) [Verwelkt] kaufe ich die Rose nicht.
 faded buy I the rose not
 'Faded as it is I will not buy the rose.'

MOD 2 (CONV (VP'))

$\exists s' \exists s \exists t [[s' \text{ RESULT } s] \& [[\text{Ts } \underline{R}_{\text{asp}} t] \& [s \text{ INST BECOME WELK } x_i]]] \subseteq [\text{ich kaufe die Rose}_i \text{ nicht}']$

Co-reference is represented by indices. The SF of the modifiers results from the operations indicated. The SF of the matrix constructions in (22) and (23) is not laid out in detail. As to their nature, the participles in (22) and (23) contrast heavily. *Geleert* in (22) functions as intersective modifier relating to situations. *Verwelkt* in (23) functions as operator-like modifier and relates to a proposition. *Geliebt* in (21) is an intersective modifier.

4. Summary

This article is concerned with the interaction of morphology, syntax and semantics. It deals with German past participles and concentrates on their function in attributive, adverbial and operator-like modifier phrases.

The proposed analysis shows that the high degree of semantic underspecification and interpretative flexibility of German participial modifiers resides in the indeterminacy of past participles with respect to voice and perfect, in the absence of certain constituents in the syntactic structure of modifiers and in the presence of corresponding parameters in the Semantic Form of participle phrases.

It is presupposed that syntactically, modifiers are adjuncts. As to their internal syntax, participial modifiers are regarded as reduced sentences without a syntactic position for the grammatical subject, for an operator comparable to relative pronouns or for an adverbial relator as in adverbial clauses and without tense and mood (Wunderlich 1987).

¹⁰ *Von allen* in example (21) is integrated as a modifier with two parameters, \underline{P} and $\underline{R}_{\text{th}}$. In the context of *lieben*, \underline{P} will be specified as PERSON and $\underline{R}_{\text{th}}$ as EXPERIENCER so that x and z in the SF of (21) can be identified.

The morphosyntactic features +pass, +perf of the past participle are checked in syntax by being interpreted semantically. Whether these operations are connected with phonetically empty functional heads or are simply devices of delayed semantic interpretation of morphosyntactic features is left open to consideration.

It can be assumed that there are three conversions. One of them equips us with adjectives with resultative meaning. The two other conversions interpret participle phrases as adjectival or adverbial modifiers respectively.

I assume two templates that concern the composition of participle constructions as modifiers with the modificandum. One of them accounts for intersective modification, the other for operator-like modification. Appositive modifiers, parentheses and secondary predicates are left out of consideration.

The analysis follows minimalist principles of sound-meaning correlation and tries to avoid unnecessary syntactic structures. Much work is left to Conceptual Structure. The Semantic Form of linguistic expressions in general, and of German participle II constructions in particular, is highly underdetermined. It has been shown that various parameters leave the SF of German participle II phrases highly unspecified.

Finally, I would like to mention that my analysis of German participial modifiers is guided and influenced by having in mind the rich system of participles and adverbial participles in Russian. Morphologically, these are far more differentiated and semantically, these are far less unspecified.

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