

Flexibility in adverbial modification: Reinterpretation as contextual enrichment*

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Abstract

This paper is concerned with the fact that a number of adverbial modifications involve a reinterpretation of at least one of the expressions connected by the operation in question. It investigates the question of to what extent such meaning transfers can be viewed as emerging from operations of semantic coercion. Unlike other proposals, the paper offers an approach in which systematic reinterpretations turn out to be a result of contextual enrichments of an underspecified, yet strictly compositional, semantic representation of the given utterance. The approach proposed takes into account reinterpretations in both temporal and non-temporal modification. Moreover, it allows so-called secondary predications to be handled as a particular kind of adverbial modification. In addition, it opens up the possibility of also treating reinterpretations beyond those triggered by direct semantic conflict. The paper outlines a general formal framework of meaning variation that *inter alia* explains the semantic flexibility we observe in adverbial modification.

1. Introduction

It has been observed that modification by adverbials sometimes seems to involve more than a simple composition of the meanings of the expressions combined. There are cases which suggest that, in addition, they require a *reinterpretation* of at least one of the syntactic constituents connected by adjunction. This is illustrated by sentences like (1) and (2), which contain durative adverbials as modifiers of verbal expressions with which, in a strict sense, they should not be compatible.¹ Nevertheless, the sentences can be interpreted without much difficulty.

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

Sentence (1) is not interpreted as referring to a single sneezing but to repeated sneezing events which together last ten minutes. Sentence (2) is not construed as describing that it took Udo two hours to read a certain novel. Rather, it conveys how long Udo was reading the novel without finishing it. Thus, in both cases, the adverbial is not taken to specify the *situation* denoted originally by the expression it modifies but, rather, the duration of a sortally different situation that is connected with the situation at issue in a specific way.² Evidently, such modifications can be performed only if the given verbal expression undergoes a suitable meaning adaptation.³

Firstly, I will argue that the observation described above is not confined to occasional occurrences of modifying adjunction but rather that reinterpretation in adverbial modification is a ubiquitous phenomenon in utterance understanding. In particular, I will show that the proposal developed in Moens and Steedman (1988), according to which the *situation type* of verbal expressions can be *coerced* by temporal adverbials, does not cover all of the cases where such operations influence the interpretation of the given utterance. The flaw we are facing is twofold. On the one hand, when we take a closer look at such meaning transfers, we encounter numerous occurrences of non-temporal adverbials that have to be taken into account as well. Moreover, from the point of view I am adopting here, so-called secondary predications can also be understood as a special kind of adverbial modification. On the other hand, meaning adaptations can be observed not only in the modified constituents but also in the modifiers. Thus, many modifying adverbials and all secondary predicates turn out to be subject to operations of meaning transfer.

Secondly, I will demonstrate how systematic reinterpretations of the type considered here can be analyzed within a *multi-level model* of meaning representation. Starting from the idea that in understanding an utterance the conceptual information it conveys has to be elaborated step by step, the model rests on a distinction between two types of operations: (i) operations of computing a strictly grammatically determined, context-independent and, hence, *underspecified meaning*; (ii) operations of subsequently specifying by *contextual enrichment* the meaning that results from (i). As a consequence, one and the same expression can receive several readings depending on the context of use. Unlike other partly similar approaches, my proposal builds on the claim that in a compositional derivation, the variation potential of meaning can be systematically extended by obligatory semantic operations of structural enrichment. The strategy followed by this model has several advantages. First of all, in contrast to the proposals of Jackendoff (1991, 1997, 2002) and Pustejovsky (1991, 1995, 1998), the principle of semantic compositionality is entirely maintained in its validity. Second, the

approach opens up the possibility of explaining reinterpretations in adverbial modification as triggered not exclusively by an immediate semantic conflict between the verbal head and its adjunct but also by other factors. And finally, within the model chosen here, the phenomena under discussion turn out to be instances of a more general kind of meaning transfer insofar as the operations underlying them account for the semantic flexibility we observe in utterance interpretation beyond adverbial modification.

The paper is organized as follows. Section 2 gives a survey of relevant reinterpretation data with temporal adverbials as modifiers. Section 3 examines the question of to what extent such meaning transfers can be considered a result of more or less concrete operations of *type coercion*. Section 4 offers, as an alternative, a general outline of the multi-level model of meaning representation. Section 5 applies it to the analysis of the problem area by way of example. In Sections 6 and 7, the approach proposed is extended to further phenomena of meaning transfer. Section 6 delivers an explanation for reinterpretations that come with adverbials of manner, location and direction and Section 7 does so for constructions with depictive and resultative predications.

2. Temporal modifiers that trigger reinterpretation

Let me begin with a closer look at sentences (1) and (2) in which an achievement, or more specifically, a *semelfactive*⁴ and an accomplishment, respectively, are modified by a durative adverbial. The deviation from primary meaning we observe in sentence (1) is based on an *iterative reading* of the verb *niesen* ('sneeze'). Originally, this verb denotes only a property of momentaneous eventualities, or simply, of *moments*. By way of reinterpretation, however, it can denote a property of a process that consists of immediately successive acts of sneezing.⁵ Suppose that **p** and **m** are variables for processes and moments, respectively, TH and CONST are predicates for the relations 'the THEME of' and 'CONSTituent of', respectively, and that τ denotes the temporal trace function that maps eventualities to the time points with which they coincide. Then, ignoring the semantic contribution of tense, mood, etc., the content of (1) can be identified by the structure given in (1a).⁶

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

Thus, sentence (1) indicates the duration of a sneezing process the Theme of which is Eva. Conceptually, if the case of (2) is seen in analogy to (1), an iterative interpretation of *den Roman lesen* ('read the novel') referring to a chain of immediately repeated events, during which one and the same novel is read, would of course be possible. But in view of the time that is usually needed and, according to (2), available for reading through a novel, this interpretation is very unlikely. Instead, in order to meet the condition of the adverbial, we will focus on the internal structure of events and thereby limit ourselves to their so-called developmental phase. Given this, in the *continuous interpretation* of (2), the VP denotes the set of processes which make up events of reading a novel irrespective of their possible completion by culmination.⁷ Using *e* as a variable for events, AG as a predicate for the relation 'the AGent of', and COMPL as a predicate denoting the COMPLETION relation between events and processes, respectively, the information conveyed by (2) can be represented 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)] & $\tau(p) \geq 2\text{hours}$]

Here, Udo is the Agent and a certain novel is the Theme of a process which lasts at least two hours and which forms a constituent part of a potential reading event, the Agent and the Theme of which are likewise Udo and the novel, respectively.⁸

For a sentence like (3) in which, again, an accomplishment comes in combination with a durative adverbial, a process-related interpretation is also possible.

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

While a continuous reading of the VP *das Fenster öffnen* ('open the window') seems to be adequate only under particular contextual conditions, an iterative interpretation is quite feasible. If, however, such an understanding is not explicitly suggested by the context, sentence (3) will have a clear preference for a third kind of interpretation on which the adverbial specifies the duration of the state brought about by the event of opening the window. In this case, (3) conveys that Anna opened the window and the resulting state of its being open lasted at least five minutes. This reading is represented in (3a), where *s* is used as a variable for states, RES and HD as predicates for the relations 'RESulting state of' and 'the HOlDer of', respectively.⁹

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

Unlike the cases considered so far, (3) in this understanding requires the adverbial modifier to be shifted in its meaning in order to meet the conditions of the verbal expression.

The use of durative adverbials such as *fünf Minuten lang* ('for five minutes' – a literal equivalent is missing in English, see below) has hardly been mentioned in the literature, which mostly deals with English.¹⁰ A first proposal for explaining such *resulting state-related reinterpretations* was made in Dölling (1998), which served as a starting point for Piñón (1999) who, however, argues against the necessity of a meaning transfer. Instead, Piñón assumes that the argument structure of a resultative verb like *öffnen* ('open') contains an additional state variable with which the durative adverbial can immediately link up in modification.¹¹ As a consequence, it seems that the adverbials under review here might be treated analogously to adverbials like *für fünf Minuten* or their English equivalents *for five minutes* but have to be restricted to specifying the duration of resulting states. For several reasons, I consider such an approach unacceptable.

First, this approach does not take into consideration the fact that the behaviour of a resultative verb may vary when modified by different result-oriented modifiers. For example, the verbs *zerbrechen* ('break'), *essen* ('eat') und *zerstören* ('destroy') are compatible with *wieder* ('again') in its restitutive reading, although the resulting state induced by these verbs cannot be temporally restricted by other durative modifiers. Since, according to Piñón's proposal, such verbs thus cannot have an additional state variable, it remains unclear how the modifier *wieder* could be linked up with such a variable.¹²

Second, Piñón's proposal should also account for cases in which the putative state variable in the argument structure is not required for adverbial modification. In fact, it includes the assumption that whenever the variable remains unused in this sense, then a special semantic operator takes over the linking. However, since this is evidently the standard case, the proposal requires an additional step in the compositional derivation of these verbs that can scarcely be motivated.

Third, Piñón's approach reveals the need for a more general procedure that enables us to capture another type of occurrence of modifiers for which no verbal linking site exists. As we shall see, modifying expressions such as *unauffällig* ('unobtrusively'), *elegant* ('elegantly') or *korrekt* ('correctly') can be used in such a way as not to characterize the resulting state associated with the verb. Rather, these adjuncts relate to objects which emerge as

a result of the respective event. Thus, it appears to be mistaken to assume that such resultative verbs have a further argument position for resulting objects.

It will be shown later that the solution based on Dölling (1998) not only avoids the problems mentioned above but that it also has the advantage of being an instantiation of a more general approach.

In sentence (4), the adverbial *drei Wochen lang* ('for three weeks') certainly neither implies that Jutta arrived three weeks late nor does it specify the duration of a single arrival of Jutta.

- (4) *Jutta kam drei Wochen lang zu spät an.*
'Jutta arrived (too) late for three weeks.'

However, contrary to the cases of reinterpretation adduced above, in (4) it is highly improbable that the modifier is used to characterize a process of arriving late on any occasion within three weeks. Rather, in view of our standard experience, in the given use the achievement *zu spät ankommen* ('arrive late') should be understood in the *habitual reading*.¹³ Thus, (4) refers to a habitual state of Jutta which lasted at least three weeks and which was realized by repeated, but not immediately successive, situations of arriving late.

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

Here, **b** is a variable for borderline situations, or more simply, *borders*¹⁴, as characterized, for example, by the verb *ankommen* 'arrive' while REAL stands for the relation 'REALization of'.

Let me now turn to the analysis of cases where time-span adverbials occur as modifiers of achievements, states or activities. Since, for example, *den Gipfel erreichen* ('reach the summit'), as well as *ankommen*, denotes a property of borders, in a sentence like (5), the adverbial *in zwei Tagen* ('in two days') cannot serve to modify the VP in its original meaning.

- (5) *Ede erreichte den Gipfel in zwei Tagen.*
'Ede reached the summit in two days.'

However, sentence (5) can be understood such that Ede was the Agent of an event which ended within two days by Ede's reaching the summit and thus culminating in it. Using CULM as a predicate for the relation 'the CULmination of', the content of (5) can be represented as in (5a).

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

The core of this *event-related reading* is that the VP *den Gipfel erreichen* changes from a predicate of borders into a predicate of events that terminate in such borderline situations.¹⁵

A sentence like (6) can be treated in a similar way.

- (6) *Sarah war in fünf Minuten wach.*
‘Sarah was awake in five minutes.’

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

As follows from (6a), Sarah is characterized as the Theme of an event which results in her being awake within five minutes. This interpretation of (6) requires the expression *wach sein* (‘be awake’), which originally denotes a property of states, to be changed into a predicate of events that may have the pertinent resulting state.¹⁶

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

- (7) *Peter rannte in fünfundvierzig Sekunden.*
‘Peter ran in forty-five seconds.’

Here, it would be necessary to construe the process predicate *rennen* (‘run’) as a predicate that can describe an event, the developmental phase of which is formed by a quantum of the running process. 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)] & $\tau(e) \leq 45\text{sec}$]

Obviously, such an understanding is justified only in contexts from which a suitable culmination can be drawn – in (7) by way of identifying a certain running distance.

3. Reinterpretation by sort coercion?

Meaning transfers that occur in connection with modification by durative or time-span adverbials have already been documented more or less extensively in the literature, and various proposals for their explanation have been advanced. Basic deliberations can be found in Moens and Steedman (1988), where a first systematic, albeit informal, analysis of reinterpretations in temporal modification is presented. Moens and Steedman analyze temporal adverbials (as well as aspectual auxiliaries) as functions which, under particular conditions, induce changes in the meaning of the verbal expressions they modify. The change involves that the verb's reference to situations of one sort gets transformed into a reference to situations of another sort. Such meaning adaptations based on a correspondingly differentiated network of ontological relationships is referred to as *type coercion*.¹⁷ How the relevant shifts are to be accomplished in detail, however, still requires explication.

It can be assumed that such adverbials trigger semantic operations by means of which the verbal expressions are directly reinterpreted in a suitable way thereby creating the prerequisites for suitable modifications. So, if a conflict arises between the sortal selection restrictions of an adverbial modifier and the semantic sort of its argument, a specific operator applies to the verbal predicate to achieve sort matching. For example, the reinterpretation that takes place in (2) can be explained simply thus: utilizing a special coercion operator which meets the requirements of the adverbial, the meaning of the VP *den Roman lesen* gets transferred from a predicate of events to a predicate of processes.

However, this mechanism of *direct semantic adaptation* leaves a number of questions unsettled. As discussed with respect to (2) above, the occurrence of a sortal conflict between temporal adverbial and verbal expression does not at all predetermine the form of its solution by the underlying conceptual ontology. A first problem is how, out of the set of conceptually possible operators, and in both systematic and economical a way, we can pick out exactly those operators that will each time provide the adequate reinterpretations. It is obvious that this choice cannot be made without resorting to world and discourse knowledge and without allowing for specific pragmatic restrictions. A second, and more serious, problem follows from the fact that by inserting such adaptation operators, contextually determined parts of meaning are introduced into an otherwise compositional derivation. Obviously, under this condition, the general validity of the principle of semantic compositionality cannot be upheld any longer.¹⁸ In view of the fact that we so far lack any convincing alternative to this principle, renouncing a strictly

regulated calculation method of context-independent meaning of expressions is not acceptable.

As a possible way out, some authors have offered a *two-step approach* according to which necessary reinterpretations are realized as follows: In a first step, a semantic representation of a given utterance is constructed in terms of compositionality. If, in the derivation of the context-independent meaning, a sortal conflict arises, it is resolved by inserting an underspecified coercion operator. In a second step, attempts are made to justify this hypothetical sortal adaptation by exploiting world and discourse knowledge in order to contextually specify the semantic representation. Thus, it is only in this step that a proper meaning transfer, if it is possible, gets realized.¹⁹

Taking up this idea for the reinterpretations discussed above, it seems that only two underspecified adaptation operators are required: one for constructions involving durative adverbials and one for those involving time-span adverbials. Given the sortal selection requirements of adverbials, the first operator should allow transferral of predicates of events, borders or moments to predicates of processes or states; the second operator transfers 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, *Q* varies over the quantifiers \forall and \exists , *C* varies over the connectors $\&$ and \rightarrow and *R* is a parameter for relations between situations of various sorts.

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

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

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

$$(10) \quad \textit{Ilse spielte die Sonate einen Tag lang.}$$

‘Ilse played the sonata for one day.’

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

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

- (10) a. $\exists p$ [AG(ilse, p) & $\forall e$ [CONST(e, p) \rightarrow PLAY(e)
& TH(sonata, e)] & $\tau(p) \geq 1\text{day}$]
 b. $\exists p$ [AG(ilse, p) & $\exists e$ [COMPL(e, p) & PLAY(e)
& TH(sonata, e)] & $\tau(p) \geq 1\text{day}$]
 c. $\exists s$ [HD(ilse, p) & $\forall e$ [REAL(e, s) \rightarrow PLAY(e)
& TH(sonata, e)] & $\tau(s) \geq 1\text{day}$]

Which of the alternatives eventually provides the specified content of an utterance of (10), i.e. whether it refers to a process of successively repeated playing the sonata concerned (iterative reading), to a process being only part of an individual playing event (continuous reading) or to a state realized by repeated but not uninterrupted playing the sonata (habitual reading) has to be decided depending on world knowledge and other contextual information.²⁰

However, an approach like this, in which semantic sort adaptation and context-related reinterpretation are separated, will also lead to difficulties. First, it has to meet the condition that meaning transfers can proceed only in one direction.²¹ The inadequacy of this condition emerges from sentences like (3) where in addition to the reinterpretation of the verbal expression, reinterpretation of the modifying expression is also possible. Therefore, the starting point of a required meaning transfer is not at all clearly determined *a priori*. Thus, it has to be decided to which of the involved expressions an adaptation operator is to be applied. However, decisions of this kind are not compatible with a strictly compositional semantic derivation because they require extra-linguistic knowledge to be taken into account.

Second, under this approach, the fact that not every meaning transfer in adverbial modification has to result from a direct conflict of sorts is left out of consideration.²² For example, in (11), *joggen* ('jog') fulfills the sortal selection restriction of durative adverbials insofar as this verb represents a predicate of a process.

- (11) *Renate joggte zehn Jahre lang.*
 'Renate jogged for ten years.'

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

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

Unless the person in question has extraordinary abilities, our standard experience of jogging will make us sceptical about the justification of this process reading. Therefore, it has to be concluded that (11) refers to Renate's state as realized by suitable activities of jogging and asserting that this state lasted ten years. Such a habitual interpretation is represented in (11b).

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

Sentence (11) can be construed in this way only if the verb is subject to a shift from a predicate of processes to a predicate of (habitual) states.

4. Reinterpretation as enrichment of the Inflected Semantic Form

I will now develop an approach that, unlike previous attempts, might be considered adequate from the perspective of both content and methodology. In particular, the analysis to be proposed has to meet the following, partly interrelated, requirements: First, in keeping with the present state of research, any treatment of adverbial modifications should strictly obey the principle of semantic compositionality. Second, reinterpretations in modifying adjuncts should not be reduced to just those which display conflicts between the semantic sorts of the expressions involved. Third, a mechanism as general as possible should be provided by means of which meaning transfers of both modified expressions and modifiers can be performed.

Investigating various kinds of systematic meaning variation, I have developed an approach that meets these requirements, see Dölling (1997) and subsequent works. The basic idea of the *multi-level model* is that the conceptual information an utterance may convey has to be spelled out over several levels of meaning representation.²³

My assumption is that the starting point of understanding an utterance is formed by the level of its *Semantic Form* (SF) representing the context-independent meaning of the utterance.²⁴ There are two crucial properties of this kind of conceptual structure: First, SF representations are built up strictly compositionally, i.e. they are calculated exclusively in accordance with the syntactic structure of the expressions involved. Thus, any interference with the autonomously organized semantic structure by making reference to elements of extra-linguistic knowledge is excluded. Second, SF representations are radically underspecified insofar as they contain a lot of parameters, whose contextually determined fixing allows for considerable

variation in the meaning of utterances. It is crucial to my 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 by adding further SF parameters under precisely defined conditions. Given this, *two subtypes of SF* can be distinguished.

- (12) a. The *Basic Semantic Form* SF_B of an expression is that SF which is associated with a lexical item or with a syntactically complex expression as a direct result of the meaning 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* – that are obligatorily applied on the given SF_B .

As will be shown, it is the extended variation potential given by SF_I that allows for the type of meaning transfers considered here.²⁵

The SF of an utterance provides the basis to which various kinds of interpretative operations may apply. By means of the latter, the SF gets step by step contextually specified by exploiting world and discourse knowledge and by utilizing pragmatic principles. What emerges at the end of this process is what I call the *Propositional Content* (PC) of the utterance. In calculating this level of meaning representation, the procedure of abductive interpretation plays a major role. According to this procedure, the information conveyed by the utterance is reconstructed by ‘explaining’ its SF via deduction from a suitable conceptual knowledge base.²⁶ An intermediate result of this derivation is what might be called a *Parameter-fixed Structure* (PFS) of this utterance. It is conceived as a level of meaning representation which immediately succeeds the level of SF but differs from it in that the parameters of SF are now replaced by actually instantiable conceptual units. Thus, PFS results from the first step in the course of specifying the context-independent meaning of the utterance concerned. The conceptual structure provided by PFS represents the very level on which systematic meaning variations take place.

Let me now characterize the operators to be used in SF inflection in more detail. In the papers mentioned above, 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 that, on the other, are general enough to cover all cases of systematic meaning transfer observed so far. The inflection operator *met* proposed in Dölling (2000)

seems to be a suitable candidate for reinterpreting any expression of the type $\langle e, t \rangle$ by fixing the parameters that have been introduced by SF inflections.²⁷ In particular, the operator *met* enables us to treat the reinterpretations in adverbial modification as cases of *contextual enrichments* which apply to inflected semantic forms SF_I .

For expository reasons, I will use the operator *met* in a slightly simplified version. In (13) I present the inflection operator *met'*, where \mathbf{x} and \mathbf{y} are individual variables and Q_n , C_n and R_n are parameters for the quantifiers \exists and \forall , for the connectors $\&$ and \rightarrow and for relations between elements of ontological sorts, respectively.²⁸

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

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

$$(14) \text{ SF}_B(\alpha) \text{ of type } \langle e, t \rangle \text{ has to be transferred to } \text{SF}_I(\alpha) \text{ such that holds:} \\ \text{SF}_I(\alpha) = \textit{met}'(\text{SF}_B(\alpha)).$$

The fixing conditions of SF_I of α given in (15) determine in which way special parameters are substituted for the SF parameters introduced by means of *met'*:

- (15) $SF_I(\alpha)$ can be specified to PFS(α) as follows:
- (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 some other general relation holding between elements of two ontologically distinct sorts;
 - (iii) in the case of default, Q_n , C_n and R_n are fixed by \exists , $\&$ and $=$, respectively.

Condition (iii) warrants that whenever there is no reason for a meaning transfer of α , the contribution of *met'* to the interpretation of α in PFS amounts to zero.

(17a) invites some comments. First, the derivation shows that for SF, a representation format in which no sorted individual variables and, hence, no variables for situation sorts occur, is to be preferred.²⁹ The differentiation of ontological sorts is accounted for in terms of axioms for the constants involved. Second, the three occurrences of *met'* indicate that in the SF derivation exactly as many predicates appear in the role of a SF_B and therefore, in agreement with (14), require an according number of operator applications. The last application of *met'* takes place for the sake of completeness only. SF parameters that are introduced by *met'* are relevant to the possible reinterpretations of the results of modification but not to those of their components. Third, a special operator **MOD** for type coercion is used. By means of **MOD**, expressions of the type predicate can be transferred to predicates of the type modifier. In this sense, the application of the **MOD** operator forms a crucial condition for realizing adverbial modifications.³⁰

Starting from the result of (17a), we may assume a SF for sentence (16) as represented in (16a), which is simplified in several respects.

$$(16) \quad \text{a. SF: } \exists x [\theta(\text{anna}, x) \ \& \ Q_3 y [R_3(y, x) \ C_3 \ Q_1 z [R_1(z, y) \ C_1 \ \text{OPEN}(z) \\ \& \ \text{TH}(\text{window}, z)] \ \& \ Q_2 z [R_2(z, y) \ C_2 \ \tau(z) \geq 5\text{min}]]]$$

θ is an additional SF parameter which has to be fixed by participation relations like AG, HD or TH. The parameter θ is part of the particular coercion operator **SUBJ** as given in (18).

$$(18) \quad \text{SUBJ: } \lambda P \lambda y \lambda x. \theta(y, x) \ \& \ P(x)$$

My assumption is that **SUBJ** serves to extend the SF of the given verbal expression by one argument place for the SF of grammatical subjects.³¹

The compositionally calculated SF of (16), that is (16a), has now to be interpreted against the background of contextual knowledge (in the broadest sense); the first step in doing this consists in fixing the parameters that occur in (16a). Obviously, the knowledge required to do this is obtained from diverse sources. First of all, it includes axioms like (19a), (19b) and (20), which provide the conditions of use for more specific conceptual units and configurations.

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

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

Thus, (19a) characterizes every opening as an eventuality that involves an Agent and a Theme as participants; (19b) lays down that every opening implies a resulting state of being open. The axiom in (20) may be considered a condition which restricts the use of durative adverbials. Moreover, certain axioms of conceptual ontology are required as well. They serve to characterize the basic properties and relations of various sorts of situations. Such general fixings may have the form of, for example, (21a)–(21d) or (22a) and (22b).

- (21) a. $\Box \forall x \forall y [\text{RES}(x, y) \rightarrow \text{STATE}(x) \ \& \ \text{CHANGE}(y)]$
 b. $\Box \forall x [\text{CHANGE}(x) \rightarrow \exists y [\text{STATE}(y) \ \& \ \text{RES}(y, x)]]$
 c. $\Box \forall x [\text{CHANGE}(x) \rightarrow \text{EVENT}(x)]$
 d. $\Box \forall x \forall y \forall z [\text{RES}(x, y) \ \& \ (\text{TH}(z, y) \vee \text{AG}(z, y) \ \& \ \neg \exists z \text{TH}(z, y)) \rightarrow \text{HD}(z, x)]$
- (22) a. $\Box \forall x \forall y [\text{CONST}(x, y) \rightarrow \text{PROCESS}(x) \ \& \ \text{EVENT}(y)]$
 b. $\Box \forall x [\text{EVENT}(x) \rightarrow \exists y [\text{PROCESS}(y) \ \& \ \text{CONST}(y, x)]]$

Axioms (21a)–(21c) define a *change* as an event such that there is a certain state resulting from it.³² From (19a) and (21b), it follows that OPEN and +OPEN are predicates of changes and of states, respectively. Axiom (21d) – in connection with (21a) – ensures that the Theme or – if there is no Theme – the Agent of a change is also the Holder of its resulting state. Finally, (22a) and (22b) give a first characterization of the relation of constitution which links processes with events. Needless to say, if we were to describe the interpretation at issue in more detail, further axioms would have to be added as part of the conceptual knowledge base.³³

Given a sufficient number of fixings of the kind outlined above, we obtain the following conceptually possible specifications of SF₁ of *fünf Minuten lang das Fenster öffnen*:

- (17) b. PFS₁: $\lambda x. \exists y [= (y, x) \ \& \ \exists z [= (z, y) \ \& \ \text{OPEN}(z) \ \& \ \text{TH}(\text{window}, z)] \ \& \ \exists z [\text{RES}(z, y) \ \& \ \tau(z) \geq 5\text{min}]]$
 = $\lambda x. \text{OPEN}(x) \ \& \ \text{TH}(\text{window}, x) \ \& \ \exists y [\text{RES}(y, x) \ \& \ \tau(y) \geq 5\text{min}]$
- c. PFS₂: $\lambda x. \exists y [= (y, x) \ \& \ \forall z [\text{CONST}(z, y) \rightarrow \text{OPEN}(z) \ \& \ \text{TH}(\text{window}, z)] \ \& \ \exists z [= (z, y) \ \& \ \tau(z) \geq 5\text{min}]]$
 = $\lambda x. \forall y [\text{CONST}(y, x) \rightarrow \text{OPEN}(y) \ \& \ \text{TH}(\text{window}, y)] \ \& \ \tau(x) \geq 5\text{min}$

- d. PFS₃: $\lambda x. \exists y [= (y, x) \ \& \ \exists z [\text{COMPL}(z, y) \ \& \ \text{OPEN}(z)$
 $\ \& \ \text{TH}(\text{window}, y)] \ \& \ \exists z [= (z, y) \ \& \ \tau(z) \geq 5\text{min}]]$
 $= \lambda x. \exists y [\text{COMPL}(y, x) \ \& \ \text{OPEN}(y) \ \& \ \text{TH}(\text{window}, y)]$
 $\ \& \ \tau(x) \geq 5\text{min}$
- e. PFS₄: $\lambda x. \exists y [= (y, x) \ \& \ \forall z [\text{REAL}(z, y) \ \rightarrow \ \text{OPEN}(z)$
 $\ \& \ \text{TH}(\text{window}, y)] \ \& \ \exists z [= (z, y) \ \& \ \tau(z) \geq 5\text{min}]]$
 $= \lambda x. \forall y [\text{REAL}(y, x) \ \rightarrow \ \text{OPEN}(y) \ \& \ \text{TH}(\text{window}, y)]$
 $\ \& \ \tau(x) \geq 5\text{min}$

Each of these PFSs involves a meaning transfer in one of the two components of the verb-adverbial construction: in PFS₁, the adjunct *fünf Minuten lang* is reinterpreted as a predicate of resulting states, in PFS₂ to PFS₄, the VP *das Fenster öffnen* is reinterpreted as a predicate of processes – either in terms of iterations (17c) or of developmental phases of events (17d) or as a predicate of (habitual) states (17e).

Of course, given our everyday knowledge of typical events like opening a window and of the situations connected with them, the four possible specifications differ in likelihood. So, an interpretation of (16) as yielded by (17e) can be ruled out under normal conditions. Interpretations that draw on (17c) or (17d) seem to be more probable but still marginal. As mentioned above, under normal conditions we will prefer the interpretation of the VP *fünf Minuten lang das Fenster öffnen* that is represented in (17b).

Thus, the PFS to be assumed for (16) as the most likely one is the one given in (16b).

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

Beside the parameters introduced into the PFS of (16) by *fünf Minuten lang das Fenster öffnen*, θ is fixed as Agent due to (19a). After further steps of enrichment which, among others, include backtracking to axioms like (19b) and (21d), the process of interpretation ends in yielding the propositional content PC of (16). In a somewhat simplified form, this PC can be identified with the structure in (16c).

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

Compared with (16b), the structure (16c), which represents the full-specified meaning of the utterance (16), is determined more exactly in that (i) the resulting state is shown to be that of being open; and (ii) the holder of this state is shown to be identical with the Theme of the change (cf. also (3a)).

6. Further adverbial modifications with reinterpretation

Contrary to what is generally assumed in the literature, reinterpretations of the kind under consideration are not confined to modification by temporal adverbials. First, it has to be stated that the use of manner adverbials may also involve a transfer of meaning of the verbal expression modified. For example, in analogy to the interpretation of (5), sentence (23) has to be understood as characterizing a change, the Agent of which was Claudia and the culmination of which is Claudia's finding the flat.

- (23) *Claudia fand die Wohnung schnell.*
'Claudia found the flat quickly.'

Thus, for simplicity's sake again using sorted variables as a means of representation, the structure in (23a) can be assumed to be the PFS of (23).³⁴

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

It is part of the interpretation of (23) that – as a result of enriching its SF_I – the VP *die Wohnung finden* ('find the flat') denotes, deviating from its original meaning, not a property of borders but a property of changes, as noted in (24b).

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

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

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

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

In parallel with the interpretation of (6), (25) asserts a change that results in a state of being in town.³⁵ More specifically, (25a) and (25b) can be considered the PFS and the PC of (25), respectively, where INSTR denotes the relation ‘instrument of’.

- (25) a. PFS: $\exists c$ [AG (stefan, c) & $\exists s$ [RES(s, c) & ⁺IN_THE_CITY(s) & INSTR(car, c)]]
 b. PC: $\exists c$ [AG (stefan, c) & $\exists s$ [RES(s, c) & ⁺IN_THE_CITY(s) & HD(stefan, s)] & INSTR(car, c)]

In order to specify Stefan’s state indirectly by determining the instrument used for its coming about, the copula-predicative construction *in der Stadt sein* (‘be in town’) has to be shifted from a predicate of a state to one of a change. In addition, in (25b), the fact that Stefan is the holder of the state is inferred on the basis of axiom (21d).

Unlike (25), sentence (26) below is an example in which an originally change-related or process-related PP, in this case the manner adverbial *mit Begeisterung* (‘with enthusiasm’), is reinterpreted in such a way that it is compatible with an expression that denotes a property of states.

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

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

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

Based on a suitable fixing of the SF parameters that occur in (27a), the PP *mit Begeisterung* (‘with enthusiasm’) contributes the PFS given in (27b).

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

In what follows, it will become clear that reinterpretations of adverbial modifiers are not at all exceptional. Most of the examples below are cases in which the meaning of the modifying adjunct is subject to various kinds of transfer.

In Eckardt (1998) it is argued that sentences like (28) and (29) do not just permit an interpretation according to which the manner adverbial specifies the described event as unobtrusive and elegant, respectively.

- (28) *Anna frisierete Max unauffällig.*
 ‘Anna dressed Max’s hair unobtrusively.’
- (29) *Maria kleidete Hans elegant.*
 ‘Maria clothed Hans elegantly.’

The adverbials at issue can also specify a result that is achieved by the action concerned. It seems to be obvious that they are interpreted, in analogy to the temporal adverbial in (3), as making a predication about states.³⁶ If so, the second interpretation of (28) would imply that Anna dressed Max’s hair and that Max’s state resulting from this was unobtrusive. However, this assumption cannot be upheld as the analysis of sentences (30) and (31) shows.³⁷

- (30) *Der Student übersetzte den Brief korrekt.*
 ‘The student translated the letter correctly.’
- (31) *Die Bibliothekarin stapelte die Bücher ordentlich.*
 ‘The librarian piled up the books neatly.’

Clearly, (30) does not mean that the letter was in a correct state as a result of its translation by the student concerned. Rather, (30) conveys that the translation of the letter that resulted from this event, i.e. the object produced in this way, was correct.³⁸ Supposing that RES_OBJ stands for the relation ‘the resulting object of’ and that *o* is a variable for objects, such a *resulting object-related interpretation* of the adverbial *korrekt* (‘correctly’) will yield the PFS given in (30a).

- (30) a. PFS: $\exists c [\text{AG}(\text{student}, c) \ \& \ \text{TH}(\text{letter}, c) \ \& \ \text{TRANSLATE}(c) \ \& \ \exists o [\text{RES_OBJ}(o, c) \ \& \ \text{CORRECT}(o)]]$

In a similar way, the adverbials *unauffällig* ('unobtrusively'), *elegant* ('elegantly') and *ordentlich* ('neatly') may assert a property of Max's hair-style (28), of Hans's clothing (29) or of the pile of books (31).³⁹ But to be applicable as modifiers, these object predicates have to become predicates of changes at the level of PFS in order to be provided with a suitable site of application in the meaning structure of the sentences in question.

Suppose that, in (32a), the SF₁ of *unauffällig* indicates that the predicate UNOBTRUSIVE is left unspecified wrt. its applicability to objects or to situations.

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

Then, via specification, at least two PFSs can be obtained for this expression, 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: $\lambda c. \exists o [\text{RES_OBJ}(o, c) \ \& \ \text{UNOBTRUSIVE}(o)]$

Since in (32b) the contribution of *met'* to the interpretation is reduced to zero, it is only the change described by (28) which is left to be characterized by the adverbial *unauffällig*. In contrast, (32c) involves a transfer of *unauffällig* from a predicate of an object to a predicate of a change, which enables the adverbial to specify the object resulting from this change.

To sum up, in terms of RES_OBJ all sentences in (28) to (31) make reference to an ontological relation by means of which object-related predicates that surface as adverbial modifiers can be interpreted properly. We will see below that quite a number of similar cases of reinterpretation in adverbial modification have to be taken into account.

Findings presented in Maienborn (2001, this volume) prove that not all adverbial occurrences of locative PPs may be interpreted as localizing the situation to which the respective sentence immediately refers. Sentence (33), for example, can be understood in two ways.

(33) *Die Bankräuber flüchteten auf Fahrrädern.*
'The bank robbers escaped on bicycles.'

(33) can be understood as a description of a bizarre scenario in which the bank robbers escaped not by cycling but while being situated on (perhaps oversized) bikes – the bikes as such not being relevant to the escaping. In

addition to this *situation-related interpretation*, there is another reading, which in view of our everyday knowledge obviously has to be preferred, namely the *object-related interpretation* on which the locative modifier *auf Fahrrädern* ('on bicycles') specifies the bank robbers' location in a way that is relevant to their act of escaping. The two interpretations of (33) can be represented by the following PFSs:

- (33) a. PFS₁: $\exists p$ [AG(robbers, p) & ESC(p) & $\exists p'$ [= (p', p) & LOC_{ON}(p', bicycles)]]
 = $\exists p$ [AG(robbers, p) & ESC(p) & LOC_{ON}(p, bicycles)]
 b. PFS₂: $\exists p$ [AG(robbers, p) & ESC(p) & $\exists o$ [AG(o, p) & LOC_{ON}(o, bicycles)]]

As we may rule out the case that two different objects play the role of the same participant, the identity of the localized Agents can be directly inferred from PFS₂. Moreover, as demonstrated by Maienborn, the object-related interpretation of the modifier permits us to infer, due to additional axioms, that the bikes served as instruments of escape. Thus, the structure in (33c) can be assumed to render the PC₂ of (33).

- (33) c. PC₂: $\exists p$ [AG(robbers, p) & ESC(p) & LOC_{ON}(robbers, bicycles) & INSTR(bicycles, p)]

The second interpretation of sentence (33), however, is possible only by transferring *auf Fahrrädern* from an object predicate to a predicate of processes. In analogy to the sentences considered before, such a reinterpretation supplies the precondition for combining the object-localizing occurrence of the adverbial PP with the verb *flüchten* ('escape').⁴⁰

(34) exemplifies a sentence that allows at least three different readings of the locative PP used as a modifier.⁴¹

- (34) *Der Koch bereitete das Hähnchen in einer Marihuana-Tunke zu.*
 'The cook prepared the chicken in a marijuana sauce.'

Again, the PP *in einer Marihuana-Tunke* ('in a marijuana sauce') can be seen as an adverbial of localizing the event to which (34) refers. In this case, the PFS concerned permits, depending on the conceptual knowledge involved, alternative inferences as to whether only the chicken or – under quite bizarre circumstances – also the cook is localized at the given place as objects participating in the event. Second, the modifying expression can be

considered to relate exclusively to the chicken. Thus, the Theme, but not the entire situation, is localized in a marijuana sauce. Additionally, in analogy to the second interpretation of (33), the local content of the PP is overlaid with an instrumental reading that specifies the medium of preparation. Third, there is also the possibility to construe the PP as specifying the place the cook took while preparing the food.⁴² Note that the latter object-localizing interpretation of the modifier belongs to what is usually subsumed under the term *secondary predication*.

Before turning my attention to this issue, I will briefly discuss a case in which a directional PP occurs as adverbial modifier.

- (35) *Fred tanzte in den Saal.*
‘Fred danced into the hall.’

Sentence (35) refers to a change that is performed by Fred and that results in Fred’s being in the hall. Here, the PP *in den Saal* (‘into the hall’) accomplishes the task of providing the process of dancing with a result state and thus of transferring it to a change.⁴³ The PFS given in (36) can be assumed to be the meaning representation of this adverbial. While the second conjunct represents its locative part, i.e. ‘being in the hall’, the first one stands for its resulting part.⁴⁴

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

As can be seen from (36), the modifying combination of the directional PP with *tanzen* (‘dance’) requires the verb – in parallel with, for example, *rennen* in sentence (7) – to become a change predicate in the course of specification of its SF_I. The PFS arising therefrom can be identified with the structure given in (37).

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

If, in addition, the parameter θ gets fixed by AG, we obtain the following PFS for (35):

- (35) a. PFS: $\exists c [\text{AG}(\text{fred}, c) \ \& \ \exists p [\text{SUBST}(p, c) \ \& \ \text{DANCE}(p)]$
 $\ \& \ \exists s [\text{RES}(s, c) \ \& \ \forall o [\text{HD}(o, s) \rightarrow \text{LOC}_{\text{IN}}(o, \text{hall})]]]$

The remaining parts of the PC of (35), including the assertion that Fred is both Agent of the dancing process and Holder of the state of being in the hall, can be inferred from axiom (21d) in conjunction with additional axioms for DANCE and SUBST.

7. Secondary predications as adverbial modifications

Following current views, the semantic difference between a secondary predicate and an adverbial is based on the condition that the former, in contrast to the latter, does not relate directly to a verbal expression but to a DP in the sentence.⁴⁵ Two subtypes of secondary predicates are distinguished: *Depictive predicates* refer to an additional property which pertains to one of the participants during the situation denoted by the verb; *resultative predicates*, however, refer to a state which results from the event covered by the verb. Examples of sentences containing secondary predications are (38) to (40).

- (38) *Der Koch bereitete das Hähnchen roh zu.*
‘The cook prepared the chicken raw.’
- (39) *Der Koch bereitete das Hähnchen betrunken zu.*
‘The cook prepared the chicken drunk.’
- (40) *Der Koch bereitete das Hähnchen knusprig zu.*
‘The cook prepared the chicken crisp.’

Under standard conditions, *roh* (‘raw’) in (38) is used as a depictive predicate that relates to the grammatical object, *betrunken* (‘drunk’) in (39) as one that relates to the grammatical subject, whereas *knusprig* (‘crisp’) in (40) is used as a resultative predicate that relates to the grammatical object.

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

- (38’) *Während der Koch das Hähnchen zubereitete, war es roh.*
‘While the cook was preparing the chicken, it was raw.’

It is crucial for the understanding of (38) that the characterization of the chicken as being raw does not just refer to a state that covers the temporal

interval required for preparing the chicken but, more precisely, to a state that is to be considered a concomitant circumstance (of secondary import) to this process. Using CIRC as a shorthand predicate denoting this particular relation, the structure given in (38a) represents the PC of (38).

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

The axioms (41) and (42) hold, among others, for CIRC, whereby v is a variable ranging over situations.

- (41) $\Box \forall s \forall v$ [CIRC(s, v) \rightarrow $\tau(s) \supseteq \tau(v)$]
 (42) $\Box \forall s \forall v \forall o$ [CIRC(s, v) & (AG(o, v) \vee TH(o, v) \vee HD(o, v)) \rightarrow
 HD(o, s)]

Now, how can (38a) be derived?

In what follows, I assume that depictive predications can be considered adverbial modifications, in which reinterpretations of the expression used as a modifier occur as the general rule and, hence, quite regularly.⁴⁶ Related to (38), this implies that *roh* ('raw') is combined with the verb *zubereiten* ('prepare') in a modifying way and, for this reason, is shifted in the process of parameter fixing from an object predicate to a change predicate. Supposing (43a) as PFS of the adjective in its primary meaning, (43b) shows the PFS of *roh* resulting from this meaning transfer.⁴⁷

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

It is evident that a SF_I representation obtained by means of the *met'*-operator used so far will not be sufficient as the basis for a more complex transfer. Therefore, a revision of (13) is inevitable.

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

- (44) *met''*: $\lambda P \lambda x. \exists y$ [$R^2_n(y, x)$ & Q_{nz} [$R^I_n(z, y)$ 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 such a way that in transition to PFS, two parameters R'_n and R''_n can now be suitably fixed by = or by another general relation holding between elements of two ontological sorts. Such a use of *met*' does not lead to any problems in the cases considered earlier since the contribution of the newly introduced components will prove empty at the PFS level there.

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

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

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

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

After fixing all remaining SF parameters, the following PFS results for (38):

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

Finally, the PC given by (38a) is obtained by axiom (42), which makes the chicken – as the Theme of preparing – into the holder of the state that is concomitant with the preparation.

The type of depictive exemplified by (39) differs from the one considered above only in 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 PC of (39).

$$(39) \text{ a. PC: } \exists c [\text{AG}(\text{cook}, c) \ \& \ \text{PREPARE}(c) \ \& \ \text{TH}(\text{chicken}, c) \\ \& \ \exists s [\text{CIRC}(s, c) \ \& \ \text{HD}(\text{cook}, s) \\ \& \ \forall o [\text{HD}(o, s) \ \rightarrow \text{DRUNK}(o)]]]$$

A consequence of this difference, which is confined to PC, is 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) *Peter verließ Maria traurig.*
 ‘Peter left Mary sad.’

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

Accordingly, the PC given in (45b) as well as that given in (45c) is deductively derivable from (45a) by means of axiom (42).

(45) b. PC₁: $\exists b$ [AG(peter, b) & LEAVE(b) & TH(maria, b)
 & $\exists s$ [CIRC(s, b) & HD(hans, s)
 & $\forall o$ [HD(o, s) \rightarrow SAD(o)]]]
 c. PC₂: $\exists b$ [AG(peter, b) & LEAVE(b) & TH(maria, b)
 & $\exists s$ [CIRC(s, b) & HD(maria, s)
 & $\forall o$ [HD(o, s) \rightarrow SAD(o)]]]

Which of the two possible PCs of (45) is to be viewed as adequate for the respective utterance is decided on the basis of additional knowledge of the situation referred to.

An example for the use of a PP as a depictive predicate is given by the third interpretation of sentence (34) discussed in Section 6 and repeated here.

(34) *Der Koch bereitete das Hähnchen in einer Marihuana-Tunke zu.*

Suppose that the locative PP *in einer Marihuana-Tunke* in its object-localizing meaning has the following PFS:

(46) a. PFS: λo . LOC_{IN}(o, marijuana_sauce)

Then, by fixing parameters occurring in the SF_I, its depictive use is represented by (46b).

(46) b. PFS: λc . $\exists s$ [CIRC(s, c) & $\forall o$ [HD(o, s) \rightarrow
 LOC_{IN}(o, marijuana_sauce)]]

As can be seen from (46b), it denotes a property of changes which have a concomitant state such that its holder is localized in a marijuana sauce.⁴⁸ Finally, the PC representing the reading concerned indicates that in parallel with (39), the Agent of the change is also the holder of the respective state.

- (46) c. PC: $\lambda c. \exists s [\text{CIRC}(s, c) \ \& \ \text{HD}(\text{cook}, s)$
 $\ \& \ \forall o [\text{HD}(o, s) \ \rightarrow \ \text{LOC}_{\text{IN}}(o, \text{marijuana_sauce})]]$

Like (38), sentence (47) involves a depictive predicate related to its grammatical object.

- (47) *Maria aß das Brot in Scheiben.*
 ‘Maria ate the bread in slices.’

Characterizing a state of the object as playing the role of the Theme of Maria’s eating, the PP, however, includes an occurrence of *in* which has lost its locative meaning. The fact that *in Scheiben* (‘in slices’) is replaceable with the clear-cut manner adverbial *scheibenweise* (‘slice by slice’) does not just confirm the metaphoric use of the preposition. It also delivers an additional argument in support of my assumption that secondary predications can be viewed as a special kind of adverbial modification.⁴⁹

Turning now to resultative predicates, I do not see any reason to treat this type of secondary predication in a principally different way. Such cases are evidently also instances of adverbial modification which, like depictives, always involve reinterpretations of the secondary predicate. For example, sentence (40) differs from (38) and (39) only insofar as *knusprig* (‘crisp’) does not specify a state that accompanies, but one that results from, the preparation of the chicken.⁵⁰

Once more, the SF_I of the adjective derived with *met*’ contains all parameters the fixing of which supplies the resultative predicate.

- (48) a. SF_I: $\lambda x. \exists y [R^2_k(y, x) \ \& \ Q_{kz} [R^l_k(z, y) \ C_k \ \text{CRISP}(z)]]$

As can be seen from (48b), its PFS differs from that of a depictive predicate, above all, in involving RES in the place of CIRC.

- (48) b. PFS: $\lambda c. \exists s [\text{RES}(s, c) \ \& \ \forall o [\text{HD}(o, s) \ \rightarrow \ \text{CRISP}(o)]]$

The three levels of the meaning representation of (40) relevant to our purposes are given in (40a)–(40c).

- (40) a. SF: $\exists x [\theta(\text{cook}, x) \ \& \ \text{PREPARE}(x) \ \& \ \text{TH}(\text{chicken}, x)$
 $\ \& \ \exists y [R^2_k(y, x) \ \& \ Q_{kz} [R^l_k(z, y) \ C_k \ \text{CRISP}(z)]]]$

- b. PFS: $\exists c$ [AG(cook, c) & PREPARE(c) & TH(chicken, c)
& $\exists s$ [RES(s, c) & $\forall o$ [HD(o, s) \rightarrow CRISP(o)]]]
- c. PC: $\exists c$ [AG(cook, c) & PREPARE(c) & TH(chicken, c)
& $\exists s$ [RES(s, c) & HD(chicken, s)
& $\forall o$ [HD(o, s) \rightarrow CRISP(o)]]]

The statement contained in PC, on the basis of which the Theme of the change is determined to also be the holder of its resulting state, follows again from axiom (21d).

A case of a resultative predicate in which not only the modifying AP but also the modified verb is reinterpreted can be found in (49).

- (49) *Gerda wischte den Tisch sauber.*
'Gerda wiped the table clean.'

Here, *sauber* ('clean') – in analogy to *knusprig* in (40) – is transferred from a predicate of states into a predicate of changes by fixing the parameters occurring in its SF₁. However, since *wischen* ('wipe') is one of those process verbs which, when connected with a quantized object DP, do not necessarily result in an accomplishment,⁵¹ the verb also has to be transferred to a predicate of change – in analogy to *tanzen* in (35). More specifically, by fixing the parameters in the SF₁ of *wischen* in (50a), we get the PFS given in (50b).

- (50) a. SF₁: $\lambda x. \exists y$ [$R^2_k(y, x)$ & Q_{kz} [$R^1_k(z, y)$ C_k WIPE(z)]]
b. PFS: $\lambda c. \exists c'$ [= (c', c) & $\exists p$ [SUBST(p, c') & WIPE(p)]]
= $\lambda c. \exists p$ [SUBST(p, c) & WIPE(p)]

Finally, the structure in (48a) obtains as the PC of (48).

- (48) a. PC: $\exists c$ [AG(gerda, c) & TH(table, c) & $\exists p$ [SUBST(p, c)
& WIPE(p) & AG(gerda, p) & TH(table, p)]
& $\exists s$ [RES(s, c) & HD(table, s)
& $\forall o$ [HD(o, s) \rightarrow CLEAN(o)]]]

Sentence (51) exemplifies the kind of resultative secondary predication using a locative PP.

- (51) *Peter versteckte das Geld in der Kiste.*
 ‘Peter hid the money in the box.’

Suppose that in parallel with (46a), the structure in (52a) is the PFS of the PP *in der Kiste* (‘in the box’) in the object-localizing reading.

- (52) a. PFS: $\lambda o. \text{LOC}_{\text{IN}}(o, \text{box})$

Then, its resultative interpretation which emerges from meaning transfer in secondary predication is represented as follows:

- (52) b. PFS: $\lambda c. \exists s [\text{RES}(s, c) \ \& \ \forall o [\text{HD}(o, s) \rightarrow \text{LOC}_{\text{IN}}(o, \text{box})]]$

By recourse to axiom (21d), the money is identifiable as the holder of the resulting state. Thus, the structure given in (51a) can be assumed as the PC of (51).

- (51) a. PC: $\exists c [\text{AG}(\text{peter}, c) \ \& \ \text{HIDE}(c) \ \& \ \text{TH}(\text{money}, c)$
 $\ \& \ \exists s [\text{RES}(s, c) \ \& \ \text{HD}(\text{money}, s)$
 $\ \& \ \forall o [\text{HD}(o, s) \rightarrow \text{LOC}_{\text{IN}}(o, \text{box})(o)]]]$

Crucially, resultative predications by locative PPs have to be clearly distinguished from directional PPs used as arguments or as modifiers of verbal expressions.⁵² To take an example closely related to (51), consider sentence (53).

- (53) *Peter legte das Geld in die Kiste.*
 ‘Peter put the money into the box.’

The conceptual information conveyed by (53) is to be represented as follows:

- (53) a. PC: $\exists c [\text{AG}(\text{peter}, c) \ \& \ \text{PUT}(c) \ \& \ \text{TH}(\text{money}, c)$
 $\ \& \ \exists s [\text{RES}(s, c) \ \& \ \text{HD}(\text{money}, s)$
 $\ \& \ \forall o [\text{HD}(o, s) \rightarrow \text{LOC}_{\text{IN}}(o, \text{box})(o)]]]$

As can be seen from a comparison with (51a), the PCs of sentences (51) and (53) turn out to be structurally identical. But their derivations are distinct in one important respect. Since *legen* (‘put’) is an explicitly directional motion verb, it requires an argument like *in die Kiste* (‘into the box’) to account for

the direction of the transport. Evidently, the PFS to be assigned to the PP is the same as the one given in (52b). However, whereas the locative PP *in der Kiste* does not have this meaning structure prior to acquiring a resultative reading by specifying its SF₁, the resultative reading of the PP *in die Kiste* is inherited from a corresponding interpretation of the preposition *in*.

Finally, I briefly discuss cases which may appear to be problematic for the approach proposed here. Unlike the ('weak') resultatives analyzed so far, so-called 'strong' resultatives give the impression of resisting an analysis as adverbial modifications.⁵³ This is based on the fact that, in such cases, the resultative predicates – as exemplified in (55) – do not relate to a DP subcategorized by the verb.

- (55) *Der Gast trank das Glas leer.*
'The guest drank the glass empty.'

Intuitively, 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 PC of (55), where CONT stands for the relation 'content of'.

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

Obviously, the interpretation of (55) involves a metonymic interpretation of the DP *das Glas* ('the glass').⁵⁴ Thus, although we have to resort to more complex interconnections, I suppose that resultatives of this kind can also be explained in the framework proposed above. This, however, has to be left to future work.

8. Conclusions

The subject of my discussion was several forms of reinterpretation as observed in various occurrences of adverbial modification. Essentially, I did not just consider meaning shifts that come with temporal and non-temporal adverbials modifying verbal expressions. Rather, it was demonstrated that by allowing reinterpretation, so-called secondary predications can also be understood as a special kind of adverbial modification. As a suitable framework for analysis, I presented a multi-level model of meaning representation in which reinterpretations proved to be the result of contextual enrichments

of an underspecified, yet strictly compositionally structured, Semantic Form (SF). A crucial ingredient of this approach is the use of obligatory inflection operations that systematically extend the lexically given potential of meaning variation by introducing additional parameters. The paper concentrates particularly on the formal possibilities offered by the level of SF for realizing the pertinent meaning transfers. In contrast, syntactic preconditions and some ‘spell-out’ steps of interpretation in deriving the Propositional Content (PC) of utterances are only touched on briefly. Moreover, psycholinguistic aspects of the topic concerned were neglected.⁵⁵ It remains the task of further investigations to formulate sufficiently precise grammatical, pragmatic, as well as conceptual, conditions of systematic meaning variation and to analyse their realization in processing. Although, admittedly, the approach proposed has partly programmatic features, its fertility as a general device for explaining meaning flexibility in adverbial modification should be clear.

Notes

- * I wish to thank especially Ewald Lang and an anonymous referee for productive comments on an earlier draft of the paper. Thanks for helpful discussion are also due to Manfred Bierwisch, Markus Egg, Stefan Engelberg, Wilhelm Geuder, Manfred Krifka, Claudia Maienborn, Barbara Partee, Chris Piñón, Anita Steube, and Ilse Zimmermann.
1. Traditionally, compatibility with temporal adverbials is considered a crucial criterion for classifying verbal expressions into *states*, *activities*, *accomplishments* and *achievements* (Vendler 1967; cf. also Dowty 1979). According to this, 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 ‘exceptions’ resembling those to be discussed here, the justification of this classification has often been questioned (see e.g. Smith 1991; Klein 1994).
 2. Following the basic conception advanced in Mourelatos (1978) and Bach (1986), I take *situations* or, according to Bach’s terminology *eventualities*, to comprise at least *processes*, *events* and *states* as forming pairwise distinct ontological subsorts that are systematically related to each other. Later on, I will distinguish between some further sorts of eventualities.
 3. Sentences emerging from (1) and (2) by deletion of the adverbials lend themselves also to a corresponding reinterpretation. As we will see, such facts support the approach proposed here. However, in the cases considered, the readings of the sentences are coerced by the respective modifiers.
 4. Cf. Smith (1991).
 5. Accordingly, the general ontological assumption to be made here is that a process can be composed of a number of temporally connected moments of the same kind. Like most other conditions on the conceptual ontology that under-

lies our speaking of eventualities, this assumption is in need of further elaboration which, however, cannot be done here.

6. In the following, I will represent the meaning structure of verbal expressions in a neo-Davidsonian format as used in Parsons (1990) or Krifka (1992). For the treatment of measure phrases, cf. Krifka (1992, 1998) and Kamp and Reyle (1993), except for some simplifications I will make for expository reasons.
7. My provisional assumption with respect to the ontological status of events draws on ideas that emerged in several versions, e.g. Bach (1986), Moens and Steedman (1988), Parsons (1990), Kamp and Reyle (1993) and Piñón (1996). Without going into the details, I prefer the suggestion by Piñón (1996) that events are constituted by spatio-temporally superposed processes.
8. Note that I use the \exists -quantifier without existential commitments and, thus, only in the sense of ‘for a certain ... it is true that’. As a consequence, using \exists does not presuppose the entity at issue to exist in the actual world.
9. For the understanding of states and their holders see Parsons (1990, 2000), Kratzer (1996) and Dölling (1998, 1999). In terms of ⁺OPEN, a ‘blocking’ manner of representation is used for the complex state predicate proper. For comments see the running text below.
10. One of the first semantic analyses of this use in German is given in Worm (1995).
11. For a similar analysis of resultative verbs cf. Kratzer (2000).
12. In Dölling (1998) an explanation for modification with restitutive *wieder* ‘again’ is proposed which corresponds to that for modification with durative adverbials.
13. Such an interpretation has been suggested in Smith (1991) and de Swart (1998).
14. For an analysis of achievements as predicates of such temporally atomic situations that form the beginning and the end of states, processes and events thus limiting them, see Piñón (1997).
15. This is questioned by an anonymous reviewer who points out that there is a difference between the PP *nach etlichen Strapazen* (literally ‘after several strains’) in (i) and (ii):
 - (i) *Ede hat den Gipfel in zwei Tagen nach etlichen Strapazen erreicht.*
‘Ede reached the summit in two days after considerable physical strain.’
 - (ii) *Ede hat den Gipfel in zwei Tagen nach etlichen Strapazen bestiegen.*
‘Ede scaled the summit in two days after considerable physical strain.’

While in (ii), the ‘physical strain’ must have already arisen before Ede’s scaling of the summit, the PP in (i) can refer to the time of the scaling itself. I am unable to follow the reviewer’s argumentation that this shows the reinterpretation postulated in (5) to be untenable. Rather, it must be assumed that in (i) the extended VP *den Gipfel nach etlichen Strapazen erreichen* is shifted to an event-predicate. The conditions on application of the time-frame adverbial are thereby met and, furthermore, the PP *nach etlichen Strapazen* characterizes activities/states which precede the actual reaching of the summit.

16. Arguments for analyzing copular-predicative constructions like *wach sein* ('to be awake') as predicates of states are provided in Dölling (1999) (cf. also Parsons 1990). As I maintain the arguments presented there, let me add only some comments. In its basic meaning, an adjective like *wach* is represented as an object predicate $\lambda o.AWAKE(o)$, where o is a variable for objects. To combine with the copula, the adjective has to be reinterpreted by means of a procedure assumed for any predicatives as state predicate $\lambda s.\forall o[HD(o, s) \rightarrow AWAKE(o)]$. The latter structure can be abbreviated $\lambda s.^+AWAKE(s)$, which in turn is used in (6a) in the 'blocking' representation used for *wach sein*; cf. also the predicate ^+OPEN which occurs in (3a).
17. The concept of 'type coercion' of an argument by its functor is also dealt with, from a more general view point, in Pustejovsky (1991, 1995, 1998). In these works, however, reinterpretations in adverbial modifications play only a minor role. Following the tradition of Logical Semantics, I prefer to use the term *sort coercion* rather than *type coercion*. In my opinion, it is obvious that the phenomena under consideration are related not to the problem of separating expressions into semantic types but to the problem of additionally separating them into semantic sorts. For the use of operators of type coercion in the strict sense, see e.g. Partee (1987, 1995), Dölling (1995, 1997), and the main text.
18. Indeed, Jackendoff (1997) – cf. also Jackendoff (2002) – 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 (1991, 1995), Jackendoff pleads instead for treating the meaning of a complex expression as a function of the meanings of its parts and the way they are combined syntactically only as a default in a wider range of options.
19. Generally, 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 is first followed in Worm (1995). The approach is presented in Pulman (1997) and de Swart (1998) in a more detailed way.
20. With respect to the alternatives considered, an anonymous referee remarks that the most probable reading is not given here and is perhaps not possible in this approach, namely, the reading that Ilse was playing various parts of the sonata the whole day through, without necessarily playing the whole sonata at least once without intermediate repetitions or repeatedly as a whole – but just in the way musical students practise. This, the reviewer claims, would require two steps of reinterpretation (an iteration [1] of different parts [2] of the sonata). Although I wonder why it should be the most probable interpretation, I agree that this interpretation of (10) exists. At the moment, I am not able to make a proposal for representing it.
21. In particular, this assumption is made in Moens and Steedman (1988), Bierwisch (1989), Pustejovsky (1991, 1995, 1998), Jackendoff (1991, 1997, 2002), Worm (1995), Pulman (1997) and de Swart (1998). For the general possibility of different starting points and, hence, directions in reinterpretations see Nunberg (1995) and Dölling (2000a).

22. This erroneous assumption is shared by almost all authors concerned with the phenomenon discussed here.
23. For similar considerations see Carston (1999). Cf. also the general assumptions made in Löbner (2002).
24. Cf. e.g. Bierwisch (1988, 1989), Bierwisch and Lang (1989), Lang (1994), and Maienborn (1996, 2001, this volume).
25. In a similar way, Maienborn (2001, this volume) assumes that, under certain conditions, new SF parameters may be introduced in a compositional derivation independent of whether or not there is a semantic incompatibility. The possibilities of meaning transfer thus given are, however, only partial in nature insofar as a systematic extension of the interpretation potential is limited to so-called internal adverbial modifiers, cf. the respective notes in Section 6. The approach I am advocating also has some similarity to the concept of reinterpretation proposed by Egg (2000). On this approach, an underspecified semantic description formalism marks specific sites in the meaning structure of expressions, in which, by means of certain operators, material can be inserted to mediate between semantically conflicting constituents. It is an advantage of this procedure that it permits an integrative treatment of very different kinds of meaning flexibility, among them also scopal ambiguities; for the latter, see Pinkal (1996). However, there are also weaknesses in Egg's approach. First, the principles that govern the systematic marking of the relevant insertion sites remain obscure; second, the mere marking of insertion sites does not sufficiently constrain the admissible structure of the material to be inserted.
26. This mechanism was proposed by Hobbes et al. (1993). As it still has to be elaborated in the future, I will not deal with it here. An overview of how it works within the multi-level model of meaning representation is given in Dölling (1997), for further demonstrations see Dölling (1998) and Maienborn (2001, this volume).
27. The term *met* is to indicate that the operator at issue provides the prerequisites to explain, within a uniform formal framework, metonymic and metaphoric interpretations as basic types of meaning transfer.
28. Cf. also Dölling (1998, 1999). As will be shown, this hypothetically assumed operator has to be modified in order to also cover other cases of reinterpretation in adverbial modification.
29. The reason for this is twofold. On the one hand, the network of ontological sorts is much too differentiated to allow for an assessment of the number of variables to be admitted in SF. On the other hand, the possible presence in SF of sorted variables would impair the use of general operators like *met*'.
30. Cf. e.g. Partee (1987, 1995), Zimmermann (1992), Wunderlich (1997), Dölling (1998) and Maienborn (2001, this volume). It is conceivable that in calculating modifications, instead of using the Boolean conjunction '&', the use of a non-commutative restriction operation will turn out to be more appropriate. For suggestions in that direction, see Bierwisch (1989) or Zimmermann (1992).

31. In this respect, I follow an idea of Kratzer (1996) where the category VOICE is used to induce subject argument places in corresponding structures. See also Dölling (1999).
32. Axioms (21a)–(21c) allow to account for the fact that, in contrast to a widespread view, not all events are changes of states. Egg (1995) proposes to separate events of the latter sort from *intergressives* as denoted by predicates like *ein Lied singen* ('sing a song') or *ein hundred Meter schwimmen* ('swim a hundred metres'). Piñón (1999) argues for explicitly characterizing expressions of change by including a component of resulting state in their semantic representation and, accordingly, for supplementing their argument structure by a state variable. In Section 2, I expressed some doubts about this proposal.
33. It will be a crucial task for future conceptual analysis to investigate the various fields of knowledge and their interaction in greater detail.
34. In order to be more precise, in what follows, *c*, *c'* etc. are used as variables for changes.
35. Once more, the analysis of the copula sentences (25) and (26) is based on Dölling (1999). For an alternative approach, see Maienborn (2002).
36. Cf. Dölling (1998). This idea was suggested much earlier in Parsons (1990).
37. This observation has been made in Dölling (2000b). For a more detailed discussion of the topic, see Geuder (2000). Cf. also Eckardt (this volume).
38. Cf. Bierwisch (1988) for the proposal to assume for a nominalization like *Übersetzung* ('translation'), in addition to the basic meaning as an event predicate, a derived meaning as a predicate for objects that are brought about by the event at issue.
39. As adverbs do not have any special morphological marking in German, the question may arise whether it is really the adverbial use of adjectives that we face here. Relying on parallel English sentences, this question can be answered in the affirmative. Parsons (1990), however, assesses the use of the ending *-ly* in these constructions, e.g. *she dressed elegantly*, as "a mere case of compensating hypercorrectness" and, therefore, as unjustified in the strict sense.
40. Distinct from my approach, Maienborn (2001, this volume) assumes a special mechanism for deriving the object-related reading 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 position adjacent to the verb. This, in turn, is explained by the fact that different operations are used depending on whether the locative adjunct applies to a VP or to a V constituent. While cases of VP adjunction follow the 'usual' pattern, cases of V-modification require a special semantic operation that paves the way for suitable contextual specifications. It is no doubt an asset of Maienborn's proposal that, in this way, syntactic as well prosodic restrictions on reinterpreting adverbial modifiers are accounted for. But this proposal has not only the drawback that it can hardly be extended to occurrences where the meaning of the modified expression is transferred. The proposal also seems to be problematic insofar as other possibilities of meaning transfer in VP-modifiers are ruled out.

I think that a more general approach to systematic meaning variation in adverbial modification should be preferred.

41. This example is also drawn from Maienborn (2001).
42. By taking into account this reading, I deviate from the analysis proposed for the sentence in Maienborn (2001).
43. Basically, similar considerations can be found in Pustejovsky (1991) where, however, motion verbs like *to drive* or *to walk* which are implicitly directional are treated in this manner. Crucially, in contrast to *to dance*, directional PPs do not play the role of adjuncts to but of complements of such verbs.
44. My assumption is that the directional interpretation of the preposition *in* ('into') can be represented by the PFS $\lambda o\lambda c. \exists s [\text{RES}(s, c) \ \& \ \forall o' [\text{HD}(o', s) \rightarrow \text{LOC}_{\text{IN}}(o', o)]]$. Applying this to the object-referring DP *der Saal* ('the hall') will immediately produce the structure in (36).
45. See, among others, the proposals in Koch and Rosengren (1995), Maienborn (1996), Wunderlich (1997) and Kaufmann and Wunderlich (1998). That adjectives that function as heads of secondary predicates are not used as adverbs can be directly seen in the English examples by the absence of *-ly*.
46. Here, I follow the basic understanding of depictives as stated in Zimmermann (1992) and Steube (1994). For the use of past-participle constructions as depictive predicates, not allowed for here, see Zimmermann (this volume).
47. 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 ${}^{\text{+}}\text{RAW}(s)$.
48. By way of contrast, the PFS being derivable for *in einer Marihuana-Tunke* in the second interpretation of (34) is represented by $\lambda c. \exists c' [= (c', c) \ \& \ \exists o [\text{TH}(o, c') \ \& \ \text{LOC}_{\text{IN}}(o, \text{marijuana_sauce})]]$ or, after logically simplifying, by $\lambda c. \exists o [\text{TH}(o, c) \ \& \ \text{LOC}_{\text{IN}}(o, \text{marijuana_sauce})]$. I assume that it is only possible to understand locative PPs in the sense of such a direct object localization if, similar to *auf Fahrrädern* in (33c), by inferring an instrument – in the broad sense – an additional participant of the situation can be identified.
49. I am indebted to Ewald Lang for this observation.
50. At this point, the difference to modifications by manner adverbials, as discussed wrt. the sentences (28)–(31), should be recalled. There, properties of objects resulting from the events but not properties of resulting states are specified.
51. The characteristics of such verbs are explicated in, among others, Engelberg (2000). For the concept of quantized nominal predicates, cf. Krifka (1992, 1998).
52. The need to realize this distinction has been pointed out to me by Ewald Lang.
53. For the distinction of these two kinds of resultative predication see Kaufmann and Wunderlich (1998).
54. See Dölling (1995, 1997, 2000a).
55. Cf. Piñango, Zurif, and Jackendoff (1999) and Dölling (to appear).

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