

## Adjuncts in HPSG

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Within linguistic theory and its computational modelling very little effort is spent on a theory of adjuncts. In current grammatical frameworks like HPSG, adjuncts are treated as behaving basically either like arguments or like functors. Both strategies mix lexical information with purely combinatorial information within the lexicon and are therefore unsuitable to cope with the combinatorial variability that is characteristic for adjuncts. We present an alternative approach for adjuncts in HPSG which strictly distinguishes lexical and combinatorial parts of information and therefore avoids the existing difficulties of the HPSG analysis. The main emphasis is put on the development of a compositional semantics for adjunct phrases in comparison with semantic composition of argument phrases and copula constructions. Locative adverbials are used for the illustration of our proposal.

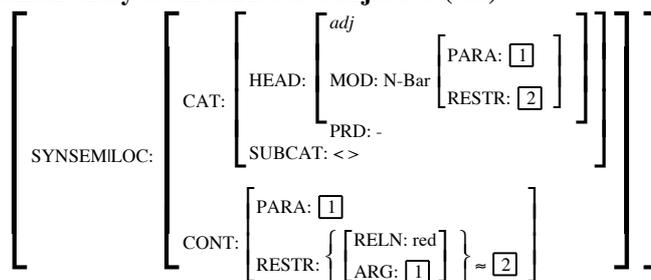
Adjunkte gehören zu den gemeinhin vernachlässigten Kategorien linguistischer Theoriebildung und computerlinguistischer Modellierung. In gängigen Grammatik-konzeptionen wie der HPSG orientiert sich die Behandlung von Adjunkten entweder an derjenigen von Argumenten oder derjenigen von Funktoren. Das zentrale Manko beider Strategien besteht in der Vermengung von lexikalischer mit genuin kombinatorischer Information im Lexikon. Damit kann der charakteristischen kombinatorischen Variabilität von Adjunkten nicht mehr angemessen Rechnung getragen werden. Im Rahmen des vorliegenden Beitrags wird eine alternative Adjunkt-konzeption für die HPSG vorgestellt, die sich durch eine strikte Trennung von lexikalischen und kombinatorischen Informationsanteilen auszeichnet und damit die Schwierigkeiten des bestehenden HPSG-Ansatzes vermeidet. Der Schwerpunkt der Überlegungen richtet sich dabei auf eine kompositionale Semantik für Adjunkte, die verträglich ist mit dem kompositionalen Bedeutungsaufbau bei Argumenten und Kopula-Konstruktionen. Die Argumentation für den hier vertretenen Ansatz erfolgt anhand einer Analyse von Lokaladverbialen.

### 1 Shortcomings of the current approach

The analysis of adjuncts within the current version of HPSG (cf. Pollard & Sag 1994; henceforth P&S) follows essentially the approach taken by Categorical Grammars. In this paradigm, adjuncts are analysed as functors which are applied to a category of a certain logical type yielding as a result a category of the same type; cf. Cresswell (1973), Dowty (1979). In HPSG, this is realised by a head feature MOD (*modified*) that specifies which categories may be modified by the corresponding adjunct. Within the modifier's content (CONTENT) it is lexically specified, that the modifier's and the modificandum's parameters (PARA) must be identified and that

their restriction sets (RESTR) must be unioned.<sup>1</sup> Thus, HPSG advocates a lexical analysis for adjuncts that specifies the mode of semantic combination corresponding to a head-adjunct structure at the lexical head of an adjunct and assigns the resulting semantic structure to the adjunct. Fig. 1 shows the lexical entry of an attributive adjective proposed in P&S: 46.<sup>2</sup>

**Fig. 1: Lexical entry of an attributive adjective (*red*)**



The hierarchical organisation of head-adjunct structures is determined by the *Immediate Dominance Schema* (ID-Schema) given in (1); cf. (P&S: 46). This ID-Schema ensures informational transfer from the head daughter to the adjunct daughter.

(1) ID-Schema 5

A phrase with DTRS value of sort *head-adjunct-structure* (*head-adj-struc*), such that the MOD value of the adjunct daughter is token-identical to the SYNSEM value of the head daughter.

The percolation of semantic information is ensured by the *Semantics Principle*. Usually, in all non-adjunct structures, the semantic content percolates along the head projection line. Only adjunct structures need a different treatment because in this case the resulting semantic content is assigned to the adjunct daughter. Therefore, P&S: 47 define the *Semantics Principle* (in a preliminary version not adapted to the treatment of quantification) as follows:

(2) Semantics Principle

In a headed phrase, the CONTENT value is token-identical to that of the adjunct daughter if the DTRS value is of sort *head-adj-struc*, and with that of the head daughter otherwise.

In order to simplify this formulation of the *Semantics Principle*, P&S introduce the notion of a *semantic head*, which serves to express semantic functor-argument relationships. The semantic head of a phrase is defined as the adjunct daughter in head-adjunct structures and the head daughter otherwise; cf. (P&S: 375). With that, percolation of semantic information in complex phrases, licensed by the *Semantics*

<sup>1</sup> Set union is a suitable means for describing the semantics of so-called *intersective modifiers*. We restrict our considerations to this type of modifiers, but cf. Higginbotham (1985), Bierwisch (1988) for the treatment of more complex cases of modification within the chosen framework like, e.g., the famous *alleged terrorist*. Due to lack of space, we limit our illustrations to the "classical" modifier categories A and P and concentrate especially on locative adverbials.

<sup>2</sup> Attributive use is marked by a negative value of the feature PRD (*predicative*) and by specifying the MOD value. Since it is irrelevant for the question in point, we neglect the adaptation of lexical data types to quantification carried out in P&S: ch. 8.

*Principle*, may be characterised uniformly as an inheritance from the semantic head to the mother constituent; cf. (P&S: 376). In this view, head-adjunct structures are the only phrasal signs with diverging syntactic and semantic heads. Therefore, only adjuncts make the corresponding distinction necessary within the HPSG framework. That much about the current HPSG analysis of adjuncts. The problems involved in this approach are a consequence of fixing lexically the occurrence of a phrase as adjunct (MOD) and its corresponding mode of semantic combination (set union). The lexical specification of adjectives and prepositions as illustrated in (1) is limited to the use of APs or PPs as adjuncts. APs and PPs in head-complement structures or in copula constructions call for additional assumptions. Locative adverbials, e.g., may occur as modifier of N- or V-projections (cf. (3.a, b)), as predicative in copula constructions (cf. (3.c)), and as locative argument of verbs of position (cf. (3.d)).

- (3) a. the tree in the garden  
b. The children are playing soccer in the garden.  
c. Peter is in the garden.  
d. Peter is lying in his bed.

Without going into more detail, P&S: 48 suggest to handle this combinatorial potential of APs and PPs by classifying adjectives and prepositions as *polymorphic categories* which have different feature specifications for each combinatorial type. This strategy fails to capture the common base underlying all occurrences of APs and PPs and to express it by a unique lexical specification for the corresponding categories. The solution advocated by P&S thus turns out to be extremely unsatisfactory from the viewpoint of grammar theory for lack of explanatory force as well as with regard to the maxim of achieving an efficient computational modelling.

The need of multiple lexical entries for adjectives and prepositions indicates that within standard HPSG, the lexicon takes over tasks of the grammar: Exclusively combinatorial information, namely information about the way of combining the semantic contents of two sister constituents in a head-adjunct structure, is coded lexically within the lexical head of a potential adjunct phrase. This kind of mixture of lexical and combinatorial information leads to heterogeneous lexical entries criticised above and renders it impossible to express a possible grammatical generalisation about meaning composition in head-adjunct structures.

Looking ahead to the underlying conception of adjuncts in standard HPSG, some further problems arise. Although it is the modifier that bears the lexically anchored combinatorial power, an additional structural condition – ID-Schema 5 (cf. (1)) – is necessary to guarantee the informational transfer between the participants of the modifying relation. In chapter 3 and 4, we will make a suggestion wherein lexical information of potential adjunct categories lacks any information about their factual use in the grammatical context as predicative, modifier or argument. We regard the combinatorial power as being founded solely in a structural schema.

Another shortcoming of the adjunct treatment in standard HPSG results from the conception of *semantic heads*, which is rather unmotivated, to our opinion. This notion seems to be inserted in the theory to simplify the content of the *Semantics Principle*. Indeed, we think that this mechanism of semantic percolation must be traced back to a technical problem. Even if we would seek for a lexically guided analysis of adjunction it would be preferable to have the modifier figuring both as

semantic and syntactic head of the adjunction structure. This would yield a conceivable simple formulation of the Semantics Principle. In this case, the modifier would function as a kind of *semantic governor* that mediates its restrictions to the selected phrase. But this direction of informational transfer cannot be realised, simply because in the lexical approach the union of the respective restriction values must be anchored in the selectional feature; but the result of the union operation is not unifiable with the actual restriction value of the selected element because this element itself brings in one component of the operation.<sup>3</sup>

Further empirical problems of the adjunct analysis in standard HPSG become clear when looking at some more data. P&S take it for granted that the mode of semantic combination in head-adjunct structures is constant irrespective of, e.g., the syntactic base position of the adjunct. This corresponds to the prevailing assumption about the semantic contribution of adjuncts, which must be rejected however in view of sentences like the representative selection given in (4):

- (4) a. Yesterday, the Irish soccer team defeated the Italian team in New York at 1: 0  
b. The tourists left the little jungle village in a motor-boat.  
c. In the USA, soccer is a rather unpopular sport.

In all three examples a locative adverbial is combined with a verbal phrase in an adjunct structure. But in each case the locative modifier makes a different contribution to the overall meaning. Simplifying it somewhat, the semantic contribution can be characterised as follows (cf. Maienborn 1993 for detailed discussion): In (4.a) the locative adverbial locates the situation denoted by the VP in a spatial region. This semantic contribution of a locative VP-adjunct is the only variant that is commonly registered in the relevant literature. In (4.b), however, the contribution of the locative adverbial does not consist in locating the whole situation of leaving a little jungle village, but in further specifying the corresponding situation and elaborating in this case the means of transport. Finally, in (4.c) the locative adverbial again does not locate a situation but restricts spatially the range wherein the proposition holds true. This kind of meaning variability of locative modifiers is systematic in nature. It cannot be traced back to idiosyncratic properties of the lexemes involved. Thus, contrary to the widely held assumption, meaning composition of (locative) adverbials and verbal phrases in adjunct structures cannot be determined constantly and uniformly, but is subject to different modes of semantic combination.<sup>4</sup>

Meaning variability of adjuncts as exemplified above poses severe problems for standard HPSG. Since the integration of the semantic contents of adjunct and head is fixed within the lexical head of the adjunct, further duplication of lexical entries for potential adjunct categories would be necessary in order to accommodate the data presented above. Each type of modification calls for an additional lexical entry comprising the correspondingly appropriate semantic content. At this point, the disadvantages of explicitly fixing combinatorial information within the lexicon

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<sup>3</sup> For a formal treatment of set unification, see Pollard & Moshier (1990).

<sup>4</sup> Maienborn (1993) gives evidence that, in German, there are different syntactic base positions for (locative) adjuncts that correlate with specific modes of semantic combination, which are responsible for the three types of modification sketched above. On this basis, she provides a compositional semantics for locative adjuncts of verbal phrases that rests on invariant lexical entries for locative adverbials .

become all too obvious. Therefore, we will provide an alternative solution within the HPSG framework that strictly distinguishes lexical and combinatorial information. The aim to be pursued in the following consists of developing lexical specifications for our sample categories, locative prepositions, that prove to be neutral w.r.t. potential modes of combination of locative adverbials. Afterwards we describe their interaction with grammatical principles that are responsible for semantic composition in head-adjunct structures, predicative constructions, and head-complement structures.

## 2. Basic semantic assumptions

The theory of modification we use for semantic composition in adjunct structures is based upon the proposal of Higginbotham (1985) and further developments in Bierwisch (1988). According to Higginbotham, the functor-argument schema is no suitable means to model the semantics of adjuncts. Phrasal signs in adjunct position behave syntactically and semantically neither as "passive" arguments, which are selected by other categories, nor as "active" functors that demand for certain arguments and determine their semantic contribution.<sup>5</sup> Instead, Higginbotham proposes to model semantic composition in adjunct structures by conjunctive association of modifier and modificandum, thus establishing a balanced relationship between the two parts. Therefore, the mode of semantic combination corresponds to the notion of set union employed in P&S, but, in contrast to standard HPSG, it is not fixed lexically but licensed structurally. Speaking in terms of HPSG, there is a *Modification Schema*, which determines semantic composition in adjunct structures.

Within the framework of Higginbotham (1985) and Bierwisch (1988), the interface between syntax and semantics is given with the argument structure of lexical items. The differentiation of argument types in *referential*, *external*, and *internal arguments* allows to establish a fine-grained correspondence between syntactic and semantic structure. The referential argument denotes the referent of the semantic representation. Within the neo-Davidsonian paradigm, besides nouns, whose referential argument typically represents an object referent, also verbs have a referential argument, which denotes a situation; cf. Kamp (1981), Higginbotham (1985), Bierwisch (1988). The current version of HPSG does not provide a referential argument for verbs. While nouns are linked to their referent via the PARA-attribute (*parameter*), verbs lack any comparable attribute and therefore do not refer to a situation, but establish a relation (RELN) between their arguments. In ch. 3, we will propose an alternative semantic specification for lexical items that provides referential arguments as well for verbs.<sup>6</sup>

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<sup>5</sup> Interestingly enough, Pollard & Sag (1987) originally favoured an adjunct analysis that tightly follows the treatment of arguments. In this view, a phrasal head selects for its admissible adjuncts. Because of problems that arise when attempting to supplement this analysis with an adequate semantics, P&S rejected the "argument approach" in favour of the "functor approach" sketched in ch.1.

<sup>6</sup> The semantic specification of verbs in the current version of HPSG turns out to be problematic even for the standard HPSG adjunct analysis proper. As we have seen in ch. 1, this approach requires identifying the PARA-values of head and adjunct. It thus presupposes, in conflict with the current modelling, that verbs have a referential argument, too.

The distinction of external vs. internal arguments, which rests on the work of Williams (1981), reflects that among the non-referential arguments, there is a syntactically as well as a semantically designated argument – namely the external argument – that is subject to particular structural conditions; cf. Bierwisch (1988).

Having sketched the relevant distinction of argument types so far, we are now in the position to give a prose version of the *Modification Schema* advocated here, whose task consists in licensing semantic composition in head-adjunct structures; cf. Bierwisch (1988: 52). (Due to lack of space, we dispense with a detailed motivation of that Schema, whose content nonetheless should become clear subsequently in the course of illustrating our proposal; cf. Maienborn (1993) for more details.)

#### (5) Modification Schema

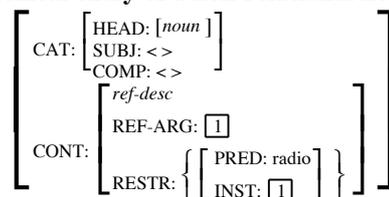
In a head-adjunct structure, the external argument of the modifier is identified with the referential argument of the modifcandum and their semantic contents are conjoined.

The *Modification Schema* determines the genuinely combinatorial part of semantic structure in head-adjunct configurations. It therefore figures as a presumably universal grammatical principle that licenses adjunct structures. In chapters 3 and 4, we will outline an HPSG analysis of adjuncts that is based upon the theory sketched here.

### 3. Lexical information

Integrating the basic assumptions sketched in the last chapter into our analysis of adjuncts, we will enrich the lexical information of verbs (as well as that of nouns) with information about their referential argument. Referential arguments may differ w.r.t. the types of entities they represent. Minimally, we assume a type  $r$  for referential objects and a type  $s$  for situations. We will start our illustrations by showing a sample entry for a noun without argument structure (cf. fig. 2).

**Fig. 2: Lexical entry of a non-relational noun (*radio*)**



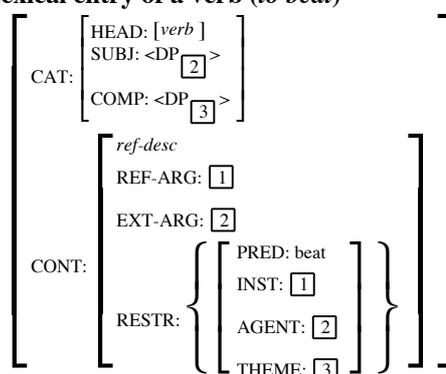
All referential descriptions (type *ref-desc*) have an attribute REF-ARG (referential argument), which corresponds to the attribute PARA used in standard HPSG exclusively for nouns. Similar to the original conception, the identification of the REF-ARG value and the INST value indicates that the referent represented by the nominal description fulfils the specified property (here: belonging to the set of radios). Furthermore, due to our theoretical semantic environment, we will substitute the original attribute RELN with an attribute PRED for predicates with an arbitrary arity.

Considering now lexical items with a non-empty argument structure, we assume that one argument may be designated w.r.t. its prominence. To get an adequate explanation for a number of phenomena, it is assumed in a lot of current HPSG work that one of the complements of a lexical item is selected via a special SUBJ(ECT) list; cf. Borsley (1987, 1989), P&S: ch. 9, Kiss (1993). Supporting a finer grained view of the syntax-semantics interface in HPSG, we supplement the syntactic SUBJ

feature with an additional feature EXT-ARG (external argument), which represents the semantic part of the designated argument. This modelling gives us explicit facilities to handle syntactic as well as semantic peculiarities of the most prominent argument in a lexical representation within the HPSG framework.

The next sample entry shows a transitive verb. In HPSG, thematic relation between a verb and its arguments is implemented by structure sharing between the role value in the verb's semantics (e.g. AGENT) and the referential parameter (here: REF-ARG) of the subcategorised-for complement (abbreviated by a lowered tag).<sup>7</sup> The value of the EXT-ARG attribute is co-indexed with a role specification that is instantiated with the REF-ARG value of a role filler in the course of grammatical composition.

**Fig. 3: Lexical entry of a verb (to beat)**



The element on the SUBJ list and the instance of the EXT-ARG attribute are correlated in the following way: An HPSG subject always refers to what the external argument refers to. But this relation is not necessarily reversible as will be shown below when we introduce potentially modifying categories.<sup>8</sup>

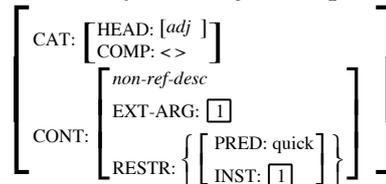
In contrast to verbs and nouns, adjectives and prepositions do not figure as heads of a referring projection and therefore do not exhibit a referential argument in the outer shell of their semantic representation. In a strongly typed grammar formalism like HPSG (cf. Carpenter 1992), differences in attribute specifications must be reflected by different types. We assume a type *content*, which introduces the RESTR attribute

<sup>7</sup> We analyse nominal structures as being headed by a functional head DET; cf. Abb 1994. The referential information of a DP contains information about the reference variable of a certain type (including the referring status w.r.t. binding theoretical conditions), a reference type (explicated by the determiner) and inherent object-identifying information (INDEX). In general, referential arguments are split into several subtypes and thus state an important semantic condition for the composition process. We renounce to discuss how the respective referential information of other types of referents will look like.

<sup>8</sup> Nouns with an argument structure may also designate an argument as being the external one. In *Cesars destruction of Rome*, e.g., the external argument is connected with the subject complement of the destroying event, i.e. the agent Cesar. One may also assume that the argument of a (non-derived) relational noun figures as subject (cf. *Cäsars son*) or that nouns without a regular argument structure may have a possessor subject (cf. *Cäsars car*). If this analysis holds true then all types of constructions with prenominal genitives can be viewed as raising structures, where an empty determiner has attracted the most prominent argument of the matrix noun (see Abb 1994 for more details).

and ramifies into two subtypes, *ref-desc* (*referential description*) and *non-ref-desc* (*non-referential description*) depending on the presence or absence of the REF-ARG attribute. Nouns and verbs are of type *ref-desc*, adjectives and prepositions are of type *non-ref-desc*. Fig. 4 shows a sample entry of an adjective.

**Fig. 4: Lexical entry of an adjective (*quick*)**



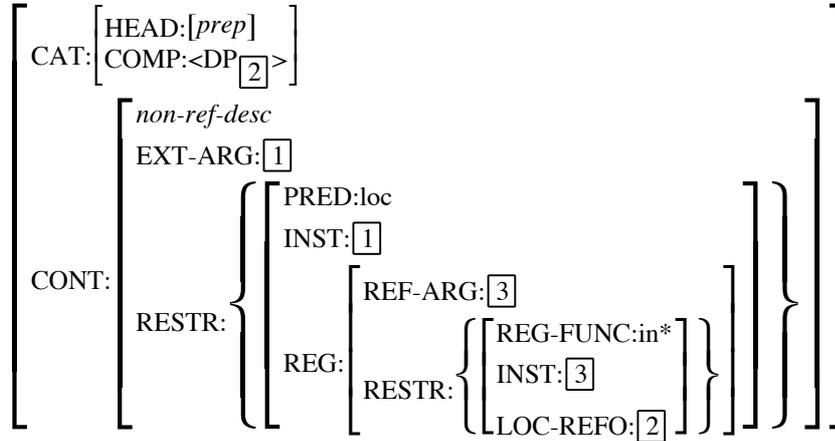
In contrast to standard HPSG, we assume that adjectives as well as prepositions have non-polymorphic lexical entries, thus lacking features like MOD or PRD. The specific semantic role of a non-referring expression is determined by the binding of the external argument through a variety of composition processes: complementation, predication or adjunction. Focusing on adjunct structures, we will show in chapter 4 how the different forms of grammatical combination are licensed by general structural principles. Since the various licensing mechanisms will be illustrated with locative adverbials, the lexical specification of these categories will be discussed in some more detail in the remainder of this chapter.

Like adjectives, prepositions are equipped with an external argument. Locative prepositions assign their external argument the property of being located in a spatial region. More precisely, locative prepositions express a relation of localisation (*loc*) between a located entity and a spatial region. The spatial region (REG) results from applying a region-constituting function (REG-FUNC) corresponding to the particular preposition (e.g. *in\**, *at\**) to the spatial reference object (LOC-REFO) given by the referential argument of the DP-complement; cf. Bierwisch (1988), Wunderlich (1991).<sup>9</sup> Fig. 5 shows a sample entry of a locative preposition.

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<sup>9</sup> Therefore, the semantic structure of locative adverbials internally refers to a referential object of type *region*, which might be picked up and specified further by other linguistic expressions, for instance, dimensional adjectives.

**Fig. 5: Lexical entry of a locative preposition (*in*)**



Let us summarise the discussion of lexical structure by stating three crucial points where our approach differs from standard HPSG: 1. Not only nouns, but also verbs are referring categories (REF-ARG) 2. Prominence of one argument is represented syntactically (SUBJ) and semantically (EXT-ARG). 3. Potential adjunct categories are equipped with a single lexical entry (without MOD and PRD).

#### 4. Grammatical composition

To cope with our analysis of adjuncts, we will introduce a new grammatical licensing condition for adjunct structures called *Modification Schema*.<sup>10</sup> This change in licensing will lead us to a reformulation of the *Semantics Principle* where we can dispense with the questionable concept of semantic heads.

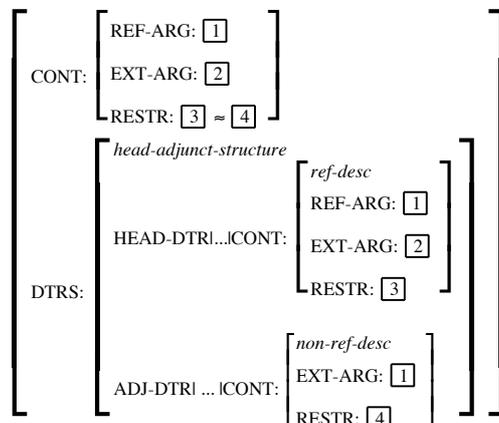
The *Modification Schema* (cf. fig. 6) licenses adjunct structures, whose head daughter is a referring category and whose adjunct daughter is a non-referring category.<sup>11</sup> If this structural configuration is at hand the external argument of the adjunct daughter and the referential argument of the head daughter are unified, provided that the sortal restrictions of the actual reference variables are compatible. Furthermore, the restriction set of the mother constituent of the resulting structure is defined as union of the restriction sets of head and adjunct daughter; cf. (5).<sup>12</sup> Here, the sum of semantic information is not already specified in one of the daughters itself, but melted in the target structure of the adjunction complex. This kind of modelling reflects that adjunct structures are semantically balanced w.r.t. their components.

<sup>10</sup> There is no need to specify both, a separate structure licensing condition (an ID-Schema) and a composition licensing condition (a principle).

<sup>11</sup> In Geißler (1993), a similar mechanism for the treatment of adjuncts is implemented as part of a reformulated *Semantics Principle*. But apart from a different semantic environment, Geißler makes use of an additional lexical selection feature for adjuncts.

<sup>12</sup> Note that, in contrast to the ID-Schema in standard HPSG (cf. (1)), this licensing schema gets along with a minimum of information. No more than the locally relevant semantic information (instead of the whole SYNSEM value) is used to guarantee the right compositional result.

**Fig. 6: Modification Schema**<sup>13</sup>



Due to the fact that semantic composition of adjuncts is performed by the *Modification Schema*, we can dispense with percolation of semantic information licensed by the *Semantics Principle*. This leads to a reformulation of the *Semantics Principle* restricting it to configurations where semantic information percolates along the syntactic projection line. Thus, the notion of semantic heads becomes redundant here.<sup>14</sup>

(6) Semantics Principle (revised version)

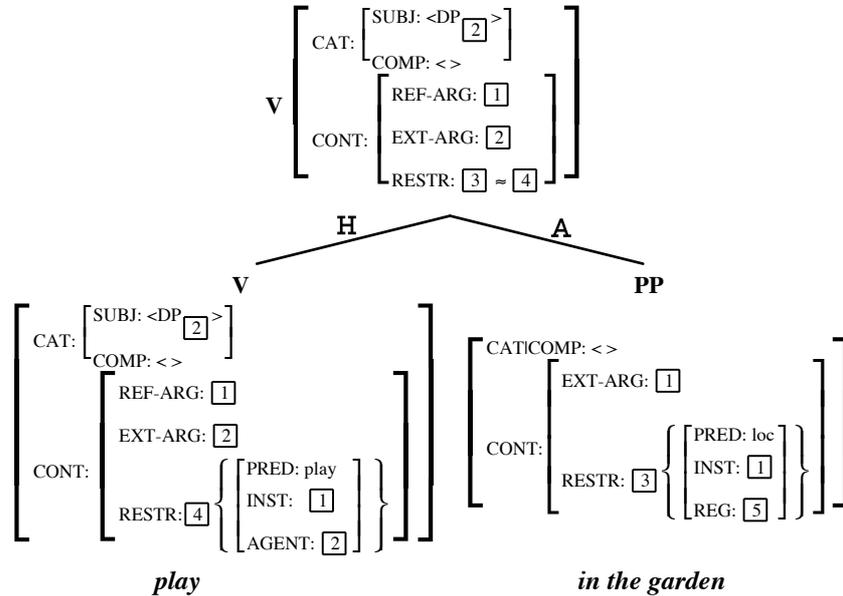
In a headed phrase, the CONTENT value *remains unchanged* if the DTRS value is of sort *head-adj-struc*, and is token-identical with that of the head daughter otherwise.

In the following, we will illustrate the suggested way of semantic composition by looking at a verbal structure that is modified by a locative adverbial. As we have seen above, the external argument of the locative preposition represents the entity to be located in a region REG. By application of the *Modification Schema*, this argument is unified with the verb's referential argument. The resulting representation expresses that the situation referent of the verb is located in the given region (cf. fig. 7). The illustrated composition works in the same way for all kind of adjunct structures, where the head is a referring category (verb or noun) and the adjunct a non-referring

<sup>13</sup> Assuming that syntactic structure is binary branching in general (cf. Kayne 1984, Haider 1993), we may dispense with the introduction of an empty COMP-DAUGHTER(S) node. The attribute COMP-DAUGHTER is introduced merely in structures of type *comp-head-structure*. The frame of this paper is too limited to specify any conditions on the linear precedence of complement and adjunct structures.

<sup>14</sup> We want to raise the question if it might be a general way to handle the percolation of semantic information in the corresponding ID Schema in any case. This would result in giving up the *Semantics Principle*, which in our view does not express any meaningful semantic generalisations.

Fig. 7: Verbal adjunct structure (... *play in the garden*)



category (adjective or preposition).<sup>15</sup> Summarising up to this point, we have presented an adjunct analysis for HPSG, where the semantic composition is licensed by means of structural conditions. Thus, the lexicon is kept free from genuine combinatorial information. In the remainder of this chapter, we will show how locative adverbials behave in predicative constructions and head-complement structures.

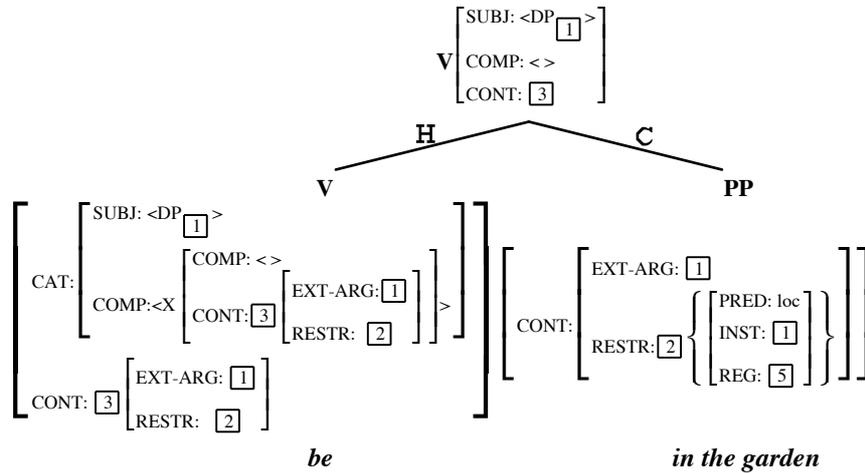
In the HPSG framework, predicative constructions often are analysed as syntactic raising structures; cf. Borsley (1987), P&S: ch. 3, Kiss (1993). Following the presentation in Kiss (1993), the copula raises the SUBJ element of its [PRD +] complement and takes over the predication as its own content. We want to offer an alternative proposal, which could be labelled as *semantic raising analysis*. That is, not the syntactic correlate of the designated argument (SUBJ) but its semantic correlate (EXT-ARG) figures as pivot of the analysis. In this view, the copula just makes use of the transfer of an external argument which is unified with its own external argument. The external argument of the copula, of course, is co-indexed with the referential argument of the copulas SUBJ element. Fig. 8 shows the corresponding structure of a locative predication. For the sake of clarity, the transfer of restrictions and of EXT-ARG information is presented separately.

Finally, locative adverbials may also be combined with a verb of position within a head-complement structure. The semantics of this verbs essentially comprises two meaning components: one predicate that specifies a mode of position (i.e. the distinctive component of *sit*, *stand*, *lie* and so on) and one predicate of localisation

<sup>15</sup> To accommodate the phenomena illustrated in (4), a further differentiation of adjunct structures would be necessary, depending on syntactic properties of the head. Adopting the analysis sketched above, the *Modification Schema* presented so far simply needs to be restricted to its appropriate syntactic configuration and supplemented with a second schema, see Maienborn (1993) for an extensive discussion.

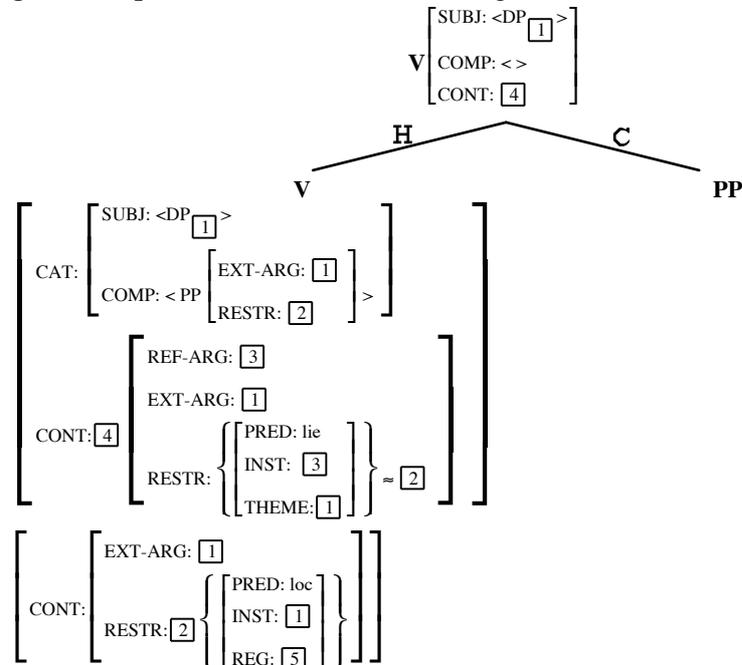
which is instantiated in the course of meaning composition by the locative argument; cf. Bierwisch (1988), Wunderlich (1991). The verb of position determines

**Fig. 8: Predicative construction (... be in the garden)**



that the property expressed by the locative adverbial, i.e. the property of being located in a certain spatial region, is assigned to the verb's external argument. Remember that in the case of locative VP-adjuncts, this property is assigned to the referential argument, i.e. the situation expressed by the VP. Fig. (9) illustrates this proposal of an analysis of locative verbs and their complements in the HPSG framework.

**Fig. 9: Complement structure (... lies in the garden)**



*lies*

*in the garden*

Notice that within the restriction set of the locative verb we make use of a lexically anchored set union, which is employed by P&S as a general means for handling adjuncts (cf. fig. (1)). But, in the case of a locative verb, we are dealing with a real head-complement structure, where the verb figures as semantic functor and determines how the semantic contribution of its argument is integrated. Regarding this point, the characteristic difference between head-complement structures and head-adjunct structures is, that meaning composition is specified lexically in the former configuration (at the lexical head), whereas it is licensed structurally in the latter. Whereas this crucial distinction is neglected in standard HPSG, it is accounted for explicitly in the model presented here.

Let us summarise: In standard HPSG, properties of potential structural surroundings for APs and PPs have penetrated into the lexicon, leading thus to an understanding of adjectives and prepositions as polymorphic categories. This view disregards that the structural configurations underlying adjunction, complementation, and predication, when separated from genuine lexical information, are extremely abstract and general in nature and therefore rather should be expressed by universal linguistic principles. We have made a proposal that provides a uniform lexical account of adjectives and prepositions and a fine-grained syntax-semantics interface. On this basis, semantic composition in head-adjunct structures can be accounted for by a general grammatical licensing principle.

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