A Lexicalist Approach to the Syntactico-Functional Variation of Polish Noun Phrases

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Apart from adjectives, adverbs and relative and adverbial clauses, many languages use bare noun phrases for the purpose of modification (cf. the English and German examples).

(1) a. I will visit you *next week*.

b. Do it *that way*.

(2) a. Ich besuche dich *nächste Woche*.

I visit you next week

‘I will visit you next week.’

b. Er hat *den ganzen Weg* geschlafen.

he has the whole way slept

‘He slept the whole way.’
AdvNPs in Polish

Adverbial noun phrases (AdvNPs) have particularly high frequency and a wide spectrum of uses in inflectional languages such as Polish.

According to (Szober 1969) and (Urbańczyk 1978), among others genitive, dative, accusative and instrumental NPs are possible in the adverbial function in Polish.

Exemplary denotations of Polish AdvNPs:
- temporal relations (expressed by genitive and accusative AdvNPs);
- possessors, benefactors (denoted by dative AdvNPs);
- measure (specified by accusative AdvNPs);
- there are particularly many semantic uses associated with instrumental AdvNPs and especially with relational instrumentals which necessarily take genitive complements, such as
  - *celem* ‘for the purpose of’,
  - *drogą* ‘by way of’,
  - *kosztem* ‘at the expense of’,
  - *względem* ‘because of’, etc.
Genitive, Dative and Accusative AdvNPs

(3) a. Jan odjechał \textit{ostatniej nocy}.
    Jan left \textit{last} \textit{night} \\
    ‘Jan left last night.’ (time)

b. Maria wypiła \textit{koledze} \textit{piwo}.
    Maria drank \textit{colleague} \textit{beer} \\
    ‘Maria drank colleague’s beer.’ (possessor)

c. Jan zauważył Marię \textit{metry} \textit{przed} \textit{sobą}.
    Jan noticed \textit{Mary} \textit{one meter in front of him} \\
    ‘Jan noticed Mary one meter in front of him.’ (measure)

d. Maria płakała \textit{całą} \textit{godzinę}.
    Maria cried \textit{whole} \textit{hour} \\
    ‘Maria was crying for a whole hour.’ (time)
Instrumental AdvNPs

(4) a. Piotr uciekł lasem.
   Piotr escaped forest_instr
   ‘Piotr escaped through the forest.’ (space)

b. Jan czyta wieczorem.
   Jan reads evening_instr
   ‘Jan reads in the evening.’ (time)

c. Maria zabiła pająka gazetą.
   Maria killed spider newspaper_instr
   ‘Maria killed the spider with a newspaper.’ (means)

d. Piotr odszedł wolnym krokiem.
   Piotr went slow_instr step_instr
   ‘Piotr went slowly.’ (manner)

e. Jan wyjechał celem odpoczynku.
   Jan left purpose_instr recreation_{gen}
   ‘Jan left for the purpose of recreation.’ (goal)
The Problem for Grammatical Theory

In syntactic contexts such as those above, NPs such as the italicized NPs clearly act as adjuncts, although, they are not prototypical modifiers. Typically, they are used in syntactic structures as subjects and objects.

The variation between the syntactic function of subject/object and the syntactic function of adjunct indicates two different sets of syntactic and especially semantic properties:

While adverbial NPs (AdvNPs) are assumed to act as semantic functors, as all modifiers do, non-adverbial NPs are usually considered as semantic arguments.

The question: How to capture these two sets of features properly in grammatical theory?
Licensing AdvNPs and Non-Adverbial NPs

There are several possibilities to treat NPs showing syntactico-functional variation in the grammar:

- One could assume two lexical entries providing appropriate features for each genitive, dative, accusative and instrumental noun that can appear both in adverbial and non-adverbial context. The problem:

  This strategy would lead to redundancies in the lexicon.

- Depending on formal foundations of the grammar framework assumed one could
  - define appropriate lexical rules deriving AdvNPs from non-adverbial NPs or vice versa or
  - provide appropriate lexical constraints licensing AdvNPs and non-adverbial NPs.
In this paper we will attempt to treat the subject/object–adjunct variation of Polish NPs within the framework of Head-Driven Phrase Structure Grammar in the tradition of (Pollard and Sag 1994).

Advantages of HPSG: HPSG is a

- comprehensive (it is possible to encode generalizations about all linguistic representation levels simultaneously, thereby accounting for a possible interaction between the particular levels),
- lexicalist (it offers the possibility to determine the properties of both words and phrases on the word level),
- fully formalized (cf. (Richter 2000)),
- computer-applicable linguistic formalism.

Crucial property of HPSG: It is a non-derivational constraint-based grammar framework.
Objectives

Our objectives are:

- on the empirical level →
  To find out what syntactic and semantic properties AdvNPs share with the non-adverbial NPs and – based on these observations –

- on the theoretical level →
  To provide a strictly lexicalist constraint-based treatment of NPs which non-redundantly describes both their adverbial and non-adverbial usages and captures the syntactic, lexico-semantic as well as combinatorial properties of adverbial and non-adverbial NPs.
Overview

Empirical generalizations

- We will give a short overview of morphological cases in Polish and say which cases can mark adverbial NPs.
- We will examine a number of AdvNP with respect to various linguistic phenomena in order to find out how the AdvNPs differ from non-adverbial NPs and to what extent they share syntactic and semantic properties with them.

The Analysis

- Lexical licensing: Based on the empirical generalizations, we will provide a lexical constraint for licensing AdvNPs and non-adverbial NPs.
- Structural licensing: We will demonstrate how AdvNPs are structurally licensed within the standard HPSG framework of Pollard and Sag (1994).

We will sum up the discussion.
There are seven morphological cases in contemporary Polish:

- nominative,
- genitive,
- dative,
- accusative,
- instrumental,
- locative and
- vocative.

The nominative case is mainly used on subjects and predicative complements.

The locative case appears not freely, but only as a prepositional object.

The vocative case has a special, non-sentential status.

The genitive, dative, accusative and instrumental cases can be assigned to both argument NPs and adverbial NPs.
### Morphological Cases in Polish: Examples

<table>
<thead>
<tr>
<th>Case</th>
<th>Example 1</th>
<th>Example 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>nominative</strong></td>
<td>Jan śpi.</td>
<td>Jan odjecha tej nocy.</td>
</tr>
<tr>
<td></td>
<td>‘Jan is sleeping.’</td>
<td>‘Jan left that night.’</td>
</tr>
<tr>
<td><strong>genitive</strong></td>
<td>Maria zażądała pieniędzy.</td>
<td>Jan odjecha tej nocy.</td>
</tr>
<tr>
<td></td>
<td>‘Maria demanded money.’</td>
<td>‘Jan left that night.’</td>
</tr>
<tr>
<td><strong>dative</strong></td>
<td>Piotr dedykował swój doktorat rodzicom.</td>
<td>Maria wypila Janowi piwo.</td>
</tr>
<tr>
<td></td>
<td>‘Piotr dedicated his thesis parents’</td>
<td>‘Maria drank John’s beer.’</td>
</tr>
<tr>
<td><strong>accusative</strong></td>
<td>Jan zobaczy Marie.</td>
<td>Maria plakała całą godzinę.</td>
</tr>
<tr>
<td></td>
<td>‘Jan saw Maria.’</td>
<td>‘Maria was crying for a whole hour.’</td>
</tr>
<tr>
<td><strong>instrumental</strong></td>
<td>Jan posłużył się nożem.</td>
<td>Piotr uciekł lasem.</td>
</tr>
<tr>
<td></td>
<td>‘Jan used a knife.’</td>
<td>‘Piotr escaped through the forest.’</td>
</tr>
<tr>
<td><strong>locative</strong></td>
<td>Jan jest teraz w szkole.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘Jan is in school now.’</td>
<td></td>
</tr>
<tr>
<td><strong>vocative</strong></td>
<td>Mamo, poczekaj!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘Wait, mama!’</td>
<td></td>
</tr>
</tbody>
</table>

→ How the two uses of genitive, dative, accusative and instrumental NPs should be captured by the grammar?
Previous Approaches to AdvNPs

Transformational approaches focus particularly on the aspects of case assignment to AdvNPs:

- (Emonds 1976), (Bresnan and Grimshaw 1978) and (McCawley 1988) treat AdvNPs as being embedded in a PP headed by a null preposition assigning case to those NPs.

- (Larson 1985) assumes that AdvNPs are bare NPs. However, since they are not governed by a case marking element, (Larson 1985) proposes the feature specification \([+F]\) for nouns heading adverbial NPs. In the case a NP cannot be structurally case marked (because it does not appear in a position governed by a case marking element), it is assigned its case from the case assigning feature specification \([+F]\).

- (Jaworska 1986) suggests a possibility that AdvNPs in English have no case at all, since they never show any morphological variation, nor do they have any other properties that might be related to case.

- For Polish data (Jaworska 1986) assumes a specification of the form \([\text{CASE, INST}]\), \([\text{CASE, GEN}]\), and \([\text{CASE, ACC}]\) in the lexical entry of each noun that can head an adverbial NP (no statement about the dative case). This strategy, however, leads to redundancies in the lexicon.

- The constraint-based approach of (Kasper 1997) discusses mainly combinatorial aspects of modifying and non-modifying NPs.

- In our approach an analysis of NPs will be offered which captures their syntactic, lexico-semantic as well as combinatorial properties.
Empirical Investigations

In order to make appropriate generalizations about the distribution of Polish NPs in adverbial contexts, we will examine a range of AdvNPs with respect to
determination and quantification,
modification,
pluralization and
referentiality.

The objective is to specify a set of syntactic and semantic properties that AdvNPs share with ordinary, non-adverbial NPs, and to determine properties that AdvNPs provide in contrast to ordinary NPs.

We will focus exclusively on AdvNPs that modify VPs, leaving AdvNPs modifying NPs for a future work.
In Polish, in contrast to English or German, there is no obligatory determination and quantification. NPs can occur in a sentence in a bare form. However, they are permitted to combine with determiners and quantifiers.

We will examine the ability of AdvNPs to select a determiner and a quantifier in order to find out whether they behave analogically to non-adverbial NPs in this respect.
(5) a. Jan odjechał *(tej/pewnej) nocy.
   John left this/some night
   ‘John left that/some night.’

b. Maria wypiła (temu/jakimujś/każdemu) koledze piwo.
   Mary drank this/some/every colleague beer
   ‘Mary drank this/some/every colleague’s beer.’

c. Maria uczyła się (tę/każdą) godzinę w domu.
   Mary studied RM this/every hour at home
   ‘Mary studied for that/every hour at home.’

d. Piotr uciekł (tym/jakimś) lasem.
   Peter escaped this/some forest
   ‘Peter escaped through this/some forest.’
AdvNPs can occur both as bare NPs as well as in combination with determiners and quantifiers, and in this respect they behave like non-adverbial NPs. Only genitive AdvNPs show a behavior which is somewhat atypical for Polish NPs, not only permitting but requiring a determiner or a quantifier. In fact, genitive AdvNPs in Polish do not necessarily require a determiner or a quantifier. The presence of a modifier, such as następny ‘next’ or pół ‘half’, will also ensure the grammaticality of the sentence (cf. (Szober 1969) and (Jaworska 1986)).
Adjectival/Participial Modification

We will examine whether AdvNPs can be modified by adjectives and adjectival participles, as are non-adverbial NPs.
Adjectival/Participial Modification: Examples

(6) a. Jan odjechał *(ostatniej/minionej) nocy.
   John left last/past night

   ‘John left last/past night.’

b. Maria wypiła (niemieckiemu/spragnionemu) koledze piwo.
   Mary drank German/thirsty colleague beer

   ‘Mary drank the German/thirsty colleague’s beer.’

c. Maria uczyła się (całą/minioną) godzinę w domu.
   Mary studied RM whole/past hour at home

   ‘Mary studied for the whole/past hour at home.’

d. Piotr uciekł (gęstym/ciemnym) lasem.
   Peter escaped dense/dark forest

   ‘Peter escaped through the dense/dark forest.’
Genitive, dative, accusative and instrumental AdvNPs all allow adjectival and participial modification and that they behave like typical NPs in this respect. As already mentioned, genitive AdvNPs require a determiner or quantifier and/or a modifier.

(Jaworska 1986) claims that accusative AdvNPs, similar to genitive AdvNPs, must contain modifiers, such as *cały* `whole’. However, examples such as those below show that this requirement does not hold.

\[
(7) \quad \begin{align*}
\text{a. } & \text{ Maria pracowała } \text{godziny.} \\
& \text{Mary worked hour}_{\text{acc}} \\
& \text{‘Mary worked for an hour.’} \\
\text{b. } & \text{ Piotr przebywał } \text{miesiąc w szpitalu.} \\
& \text{Peter stayed month}_{\text{instr}} \text{ in hospital} \\
& \text{‘Peter stayed in a hospital for a month.’}
\end{align*}
\]
If no formal and/or lexico-semantic restrictions are present, nouns can be pluralized in an straightforward way. Below we will test whether this holds for AdvNPs as well.
(8) a. *Jan odjechał ostatnich nocy.
Jan left last nights

b. Maria wypiła kolegom piwo.
Mary drank colleagues beer
‘Mary drank the colleagues’ beer.’

c. Maria uczyła się całe godziny w domu.
Mary studied RM whole hours at home
‘Mary studied for entire hours at home.’

d. Piotr uciekał lasami.
Peter escaped forests
‘Peter escaped through forests.’
Pluralization: Observations

- Dative, accusative and instrumental AdvNPs can occur in plural form.
- In contrast, the occurrence of genitive plural AdvNPs seems to be either very restricted in Polish or not possible at all (to our knowledge, there are no detailed studies on this issue so far).

→ The ungrammaticality of sentences with genitive plural AdvNPs can possibly be explained by the incompatibility of the semantic contribution of the adverbial genitive NPs themself, as a point in time, and the semantics of plural.
We will investigate AdvNPs with regard to referentiality.

As an indication for referentiality, we will consider the ability of a NP to control pronouns.

The ability of AdvNPs to control relative and personal pronouns will be tested.
Control of Relative Pronouns

(9) a. Jan odjechał tej nocy, której przybyła Maria.
    'John left this night which arrived Mary'

  genitive

b. Maria wypiła piwo koledze, którego nie lubi.
    'Mary drank beer colleague whom not likes'

dative

c. Maria płakała godzinę, która wydawała się nie mieć końca.
    'Mary was crying for an hour, which seemed not to end.'

acc

d. Piotr uciekł lasem, który dobrze znał.
    'Peter escaped forest which well knew'

instrumental
Genitive, dative, accusative and instrumental AdvNPs are capable of controlling relative pronouns introducing relative clauses. This fact indicates that AdvNPs are referential.
Control of Personal Pronouns: Examples

John left this night was it dark and rainy

‘John left this night. It was dark and rainy.’

b. Maria wypiła koleżę piwo. Dlatego był on zły.  
Mary drank colleague beer that’s why was he angry

‘Mary drank the colleague’s beer. That’s why he was angry.’

c. Maria płakała godzinę. Wydawała się ona nie mieć końca.  
Mary cried hour seemed it not have end

‘Mary was crying for an hour. It seemed not to end.’

d. Piotr uciekł lasem. Zнал go dobrze.  
Peter escaped forest knew it well

‘Peter escaped through the forest. He knew it well.’
Genitive, dative, accusative and instrumental AdvNPs are capable of controlling personal pronouns. This fact confirms the assumption that AdvNPs are referential.
Summary of Empirical Investigations

<table>
<thead>
<tr>
<th></th>
<th>determination/quantification</th>
<th>modification</th>
<th>pluralization</th>
<th>control</th>
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</thead>
<tbody>
<tr>
<td>genitive</td>
<td>+</td>
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</tr>
<tr>
<td>dative</td>
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<td>+</td>
</tr>
<tr>
<td>accusative</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>instrumental</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Except for genitive AdvNPs, which always seem to require a determiner, a quantifier or an adjective, all other AdvNPs can occur both as bare NPs and NPs containing determiners, quantifiers and adjectives, and do not differ in this respect from non-adverbial NPs.

All examined AdvNPs can appear in the plural form.

Every AdvNP can control pronouns.
Empirical Generalizations

- AdvNPs share their syntactic features with non-adverbial NPs.

- Since AdvNPs can act as controllers as their non-adverbial counterparts do, they are referential objects.

- The crucial difference between adverbial and non-adverbial NPs seems to relate to their selectional and lexico-semantic properties.

→ The next step will be the formalization of the empirical generalizations within the HPSG grammar framework.
According to the HPSG paradigm in the tradition of (Pollard and Sag 1994) linguistic objects are sets of phonological, morphological, syntactic, semantic and pragmatic information modeled by feature structures.

Feature structures are, generally speaking, representations of idealized linguistic objects and are (among others) described by AVMs (attribute-value matrices).
An AVM Description of Linguistic Signs according to (Pollard and Sag 1994)

- **PHONOLOGY**: phonological structure
- **SYNSEM**
  - **LOCAL**
    - **CATEGORY**: part of speech, etc.
    - **CONTENT**: semantic structure
    - **CONTEXT**: pragmatic information
  - **NONLOCAL**: non-local dependencies (extraction)
- **DAUGHTERS**: constituent structure
The AVM Description of the Pronoun *she*
The AVM Description of the Verb *sings*
The AVM Description of a Phrase *She sings*
The Tree Structure of the Phrase *She sings*
According to the standard HPSG approach of (Pollard and Sag 1994), adjuncts are treated as both syntactic and semantic selectors.

The selection proceeds via the MOD feature appropriate for all objects of type *noun*.

While the MOD feature’s value of adjuncts is of sort *synsem*, the MOD feature of non-adjuncts is valued as *none*.
As shown above, Polish genitive, dative, accusative, and instrumental NPs can occur both as adjuncts and as non-adjuncts, thus, the grammar must license nouns with the *synsem*-valued MOD attribute as well as nouns with the *none*-valued MOD attribute.

Instead of specifying two separate lexical entries for each noun, we postulate one lexical entry for each noun with underspecified information about the MOD value and partially underspecified information about the CONTENT value.

We provide then an implicational lexical constraint containing each lexical entry as its antecedent and a disjunctive consequence ensuring the licensing of adverbial and non-adverbial nouns.
Lexical Constraint for Licensing Adverbial and Non-Adverbial Nouns

∀ 1 ∀ 2

(word
  CAT [ HEAD noun ]
  INDEX 1

  CONT
  RESTR { 2 [ NUCL [ INST 1 ], ... ] ]
)

→

(word
  CAT [ HEAD MOD: none ]
  INDEX 1

  SS LOC
  CONT
  RESTR { 2 [ NUCL [ INST 1 ], ... ] ]
)

A Lexicalist Approach to the Syntactico-Functional Variation of Polish Noun Phrases – p.39
Explanation

According to the above principle, MOD values of the two disjuncts in the consequence become specified. While the MOD value of the first disjunct is specified as none (for licensing non-adverbial nouns), the MOD value of the second disjunct is a synsem object (for licensing adverbial nouns).

Since both adverbial and non-adverbial NPs are able to bind pronouns, we assume both to be nominal objects containing an index.

The psoa object in the RESTR set of the non-adverbial nouns differs from psoa object in the RESTR set of the adverbial nouns. While the relation associated with non-adverbial nouns does not introduce any additional arguments, the relation associated with adverbial nouns introduces an argument whose value is identified with the INDEX value of the modified VP. This reflects the intuition that adverbial nouns in contrast to non-adverbial nouns act as semantic functors. The value of the RESTR feature of an adverbial noun is a union of its own RESTR set and the RESTR set of the modified VP.

This analysis will presuppose a sort hierarchy for semantic relations associated with nouns of the following form.

```
relation inst index
```

```
relation1 ... relation2 ARG index ...
```
(Kasper 1997) shows that the standard treatment of modification does not correctly handle modifiers that contain embedded modifiers and he provides a theory of modification that enables to represent the common meaning shared by different uses of the same expression as a modifier and a non-modifier.

For nouns such as *day* in English, which can act as complements, as well as modifiers in syntactic structures, he provides a special lexical entry.

(11)  
  a. Kim enjoyed *the day before yesterday*.  
  b. Kim left *the day before yesterday*.  

A Lexicalist Approach: The Syntactico-Functional Variation of Polish Noun Phrases – p.41
The Lexical Entry for *day* according to (Kasper 1997):

The value of the MOD feature contains the feature ARG, which takes *synsem* as its value, the feature ICONT (internal content), which takes as its value the CONTENT value of the modifier’s maximal projection, and the feature ECONT (external content), whose value is the semantic result of the functor-argument combination. The CONT attribute represents the inherent content that is specified for the lexical item.
The essential idea of the proposal of (Kasper 1997) is to distinguish the inherent meaning of a word or phrase from its uses in different constructions.

In this theory the CONT attribute of a sign contains only its inherent semantic contribution. According to this approach, the CONT value of adverbial and non-adverbial nouns remains the same.

This assumption seems to be not quite consistent with the intuition about the lexical meaning of nouns used as time, place, measure or manner specifications versus those used to denote things or objects. This intuition seems to be supported by the following data:
Lexico-Semantic Restrictions

(12) a. Maria obejrzała (cały) godzinny/ czarno-biały/ polski/ panoramiczny/ 
Mary watched whole one-hour/ black_and_white/ Polish/ wide-screen/ 
pełnometrażowy film. 
film

‘Mary watched a (whole) one-hour/ black and white/ Polish/ wide-screen/ feature film.’

b. Maria płakała *(cały) godzinny/ #czarno-biały/ #polski/ #panoramiczny/ 
Mary cried whole one-hour/ black_and_white/ Polish/ wide-screen/ 
#pełnometrażowy film. 
film

‘Mary was crying the whole one-hour / #black and white / #Polish / #wide-screen / #feature film.’

(13) a. Jan uszkodził asfaltową/ #męcząca drogę. 
John demaged asphalt/ exhausting road
‘John damaged an asphalt/ # exhausting road.’

b. Jan spał całą tą #asfaltową/ męczącą drogę. 
Jan slept whole this asphalt/ exhausting road
‘John was sleeping the whole # asphalt/ exhausting trip.’
Generalizations about Semantic Relations

- The (un)acceptability of the sentences above seems to relate to the (in)compatibility of lexical meanings contributed by the adjectives and the nouns.

- Adverbial nouns introduce a different lexico-semantic meaning to their non-adverbial counterparts.

- Thus, unlike (Kasper 1997), who does not consider these lexical ambiguities, we find it reasonable to assume different semantic relations for adverbial and non-adverbial uses of a given noun, that is not to have one fix CONTENT value for each use of a given noun.

Given the Lexical Constraint for Licensing Adverbial and non-Adverbial NPs phrasal structures containing AdvNPs can be licensed.
The Structure of the VP *odjechał ostatniej nocy* (‘left last night’)

A Lexicalist Approach to the Syntactico-Functional Variation of Polish Noun Phrases – p.46
Explanation to the Tree Structure

The genitive noun *nocy* ‘night’ is licensed by the Lexical Constraint for Licensing Adverbial and Non-Adverbial Nouns.

By virtue of the restrictions on adverbial genitive nouns, the noun *nocy* ‘night’ combines with the adjective *ostatniej* ‘last’.

The genitive NP modifies the verb *odjechał* ‘left’ via the feature MOD in the way proposed in (Pollard and Sag 1994).

According to the SEMANTICS PRINCIPLE, the INDEX value of the entire VP *odjechał ostatniej nocy* ‘left last night’ is token-identical with the INDEX value of the head daughter, that is of the verb, and the RESTR value of the VP is token-identical with the REST value of the adjunct daughter, that is of the AdvNP.

The HEAD-FEATURE PRINCIPLE and the HEAD-ADJUNCT SCHEMA ensure the percolation of the head and subcategorization information along the structure.
Summary and Outlook

We have discussed various aspects of the licensing of Polish AdvNPs in the HPSG grammar framework.

Based on the results of applying a range of syntactic and semantic tests to Polish AdvNPs, we have made the generalization that AdvNPs share syntactic features and the property of referentiality with non-adverbial NPs but differ from them in selectional properties.

Based on empirical generalizations, an underspecification-based lexical implicational principle for licensing adverbial and non-adverbial nouns has been formulated.

By virtue of the provided constraint, both adverbial and non-adverbial NPs can be licensed without defining multiple lexical entries for nouns, introducing lexical rules or extending the standard HPSG geometry.

The analysis captures syntactic, lexico-semantic and combinatorial properties of NPs.

Outlook:

- The above investigations focused on syntactic and compositional-semantic aspects of the AdvNP grammar leaving lexico-semantic factors untouched. However, an additional lexico-semantic treatment of AdvNPs will be needed to exclude overlicensing.

- The developed NP grammar fragment should be implemented using a system for implementig HPSG-style grammars.
References


