

Towards Licensing of Adverbial Noun Phrases in HPSG

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1 Introduction

Apart from adjectives, adverbs, relative and adverbial clauses, many languages use bare noun phrases for the purpose of modification (cf. (1)).

- (1) a. I will visit you *next week*.
b. Do it *that way*.

Adverbial NPs (AdvNPs) have particularly high frequency and a wide spectrum of uses in inflectional languages such as Polish, a language on which we will focus in this paper.

According to Szober (1969) among others, genitive, dative, accusative and instrumental NPs are possible in the adverbial function in Polish. While dative AdvNPs usually denote benefactors, genitive AdvNPs are used for expressing temporal relations, and accusative AdvNPs for specifying measure and time as well, instrumental AdvNPs are truly polyfunctional. Particularly many semantic uses have relational instrumentals obligatorily taking genitive complements (e.g. *celem* ('for the purpose of'), *drogą* ('by way of'), *kosztem* ('at the expense of'), *względem* ('because of'), etc.) In the Polish traditional linguistic literature, relational instrumentals used in the adverbial function are considered as secondary prepositions.¹ We will argue, however, for their categorical status as nouns.

In syntactic contexts such as those in (1), NPs such the italicized NPs in (1) clearly act as adjuncts, however, they are not prototypically modifiers.² Typically, they are used in syntactic structures as subjects and objects. This variation of NP uses have to be captured by the grammar.

In this paper, we will attempt to treat this subject/complement–adjunct alternation of noun phrases within the framework of HPSG taking Polish AdvNPs as examples. Based on empirical observations, we will formulate an underspecification-based lexical constraint licensing both non-adverbial and adverbial nouns and we will provide a principle for percolation of semantic information. The objective is to ensure a licensing of AdvNPs without any lexical rules and without an extension of the standard HPSG geometry of Pollard and Sag (1994).

2 Empirical Generalizations

To determine syntactic and semantic properties distinguishing ordinary NPs from AdvNPs, we have applied to them a number of tests involving 1) determination and quantification, 2) modification, 3) realization of complements (if existent), 4) pluralization, 5) pronominalization, 6) control of pronouns. To capture possible variations in syntactic and/or semantic behavior of AdvNPs that are determined by case and/or lexical-semantic class, we have tested genitive (2a), dative (2b), accusative (2c) and (2d) and instrumental (2e)–(2h) AdvNPs on the one hand, and representatives of diverse lexical-semantic types on the other hand (AdvNPs referring to time, benefactor, measure, space, means, manner, goal, etc.).³

- (2) a. Jan odjechał ostatniej nocy. (time)
John left last_{gen} night_{gen}
'John left last night.'
- b. Maria podarowała Piotrowi różę. (benefactor)
Mary gave Peter_{dat} rose
'Mary gave Peter a rose.'
- c. Maria płakała całą godzinę. (time)
Mary cried whole_{acc} hour_{acc}
'Mary was crying for a whole hour.'

¹Cf. Milewska (2003) as well as the most important grammars and dictionaries of contemporary Polish.

²Here, we use the terms *adjunct* and *modifier* synonymously.

³We focus in this paper on AdvNPs modifying VPs exclusively.

- d. Jan zobaczył Marię niecały metr przed sobą. (measure)
 John saw Mary short_{acc} meter_{acc} in_front_of him.
 ‘John saw Mary short meter in front of him.’
- e. Piotr uciekł lasem. (space)
 Peter escaped forest_{instr}
 ‘Peter escaped through the forest.’
- f. Jan czyta wieczorem. (time)
 John reads evening_{instr}
 ‘John reads in the evening.’
- g. Maria zabiła pająka gazetą. (means)
 Mary killed spider newspaper_{instr}
 ‘Mary killed the spider with a newspaper.’
- h. Piotr odszedł wolnym krokiem. (manner)
 Peter went slow_{instr} step_{inst}
 ‘Peter went slowly.’
- i. Jan wyjechał celem odpoczynku. (goal)
 John left purpose_{instr} recreation_{gen}
 ‘John left for the purpose of recreation.’

The applied tests yielded the following results:⁴

- Except for genitive AdvNPs, that require a determiner, a quantifier or/and an adjective, all AdvNPs can occur both as bare NPs as well as NPs containing determiners, quantifiers and adjectives and with respect to that, do not differ from non-adverbial NPs.
- Relational AdvNPs realize their complements obligatorily. At first glance, this would imply a contrast with ordinary relational non-adverbial NPs. However, relational AdvNPs require their complements when used in the same meaning in non-adverbial contexts as well. Thus, there is no difference in behavior of AdvNPs and non-adverbial NPs with respect to the argument realization.
- Except for relational instrumental AdvNPs, all AdvNPs allow a plural form. However, since the plural formation in the case of relational NPs of a corresponding meaning is not possible in other syntactic contexts either, we assume no discrepancies between AdvNPs and their non-adverbial counterparts with respect to pluralizability.⁵
- Except for datives, non-relational instrumental AdvNPs denoting space as well as non-relational instrumentals of means, neither of AdvNPs can be pronominalized.⁶
- Each AdvNP can control pronouns.

We can thus conclude that AdvNPs share their syntactic features with non-adverbial NPs.⁷ The second generalization is that AdvNPs are all referential (since they can act as controllers). However, since they cannot be pronominalized, they must differ in some way from ordinary non-adverbial NPs.⁸ We assume that this contrast relates to a difference in a semantic type. In the next section, we will provide an HPSG account to AdvNPs that reflects these generalizations.

⁴In the full paper, we will provide appropriate examples.

⁵Note that plural genitive AdvNPs can occur as ad-nominal adjuncts rather than as ad-verbal ones.

⁶Possibly, the pronominalizability of dative, local instrumentals and instrumentals of means is an evidence for their non-adverbial status. Particularly dative and instrumentals of means are often analyzed as indirect objects rather than adjuncts.

⁷Only genitive AdvNPs contrast with their non-adverbial counterparts by requiring a determiner, a quantifier or/and an adjective.

⁸Non-pronominalizability argues clearly against the analysis of AdvNPs as embedded in a PP headed by a null preposition (cf. Emonds (1976), Bresnan and Grimshaw (1978) or McCawley (1988)).

3 The Analysis

3.1 Lexical Licensing

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 appropriated for the sort *substantive* and thus 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 noticed above, Polish NPs can occur both as adjuncts and as non-adjuncts⁹, 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 lexical entries for nouns, we will provide a lexical constraint licensing adverbial and non-adverbial nouns on the basis of a description with an underspecified MOD value (cf. Figure 1).¹⁰

∀ **1** ∀ **2** ∀ **3** ∀ **4**

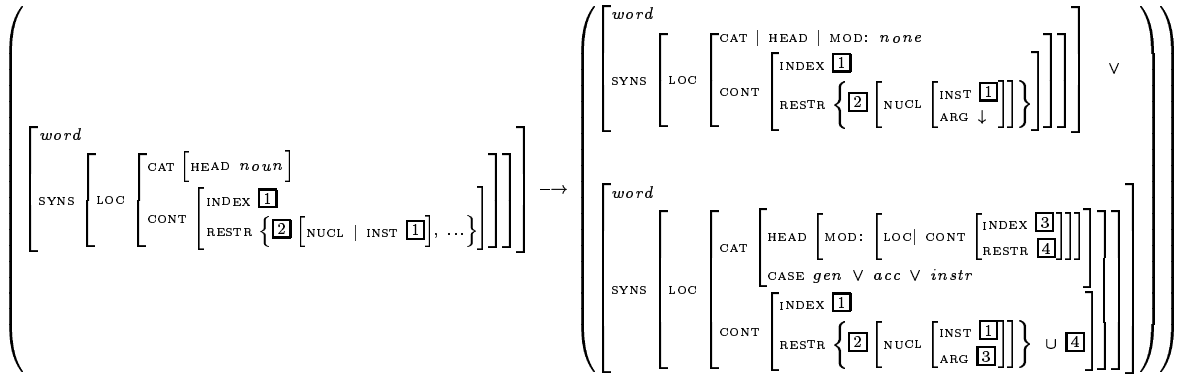


Figure 1: Lexical Constraint for Licensing Adverbial and Non-Adverbial Nouns

Owing to the above principle, MOD values of the two disjuncts in the consequence get 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).

Note that the architecture of the *content* value of the modified object (see the second disjunct) corresponds to that assumed in Pollard and Sag (1994) for nominal objects but not for verbs. According to Pollard and Sag (1994), the CONTENT value of verbs is of type *psoa*. However, adopting the standard representation of the CONTENT value for verbs (*psoa*) and assuming the standard constraint for percolation of semantic information (the SEMANTICS PRINCIPLE) appear highly problematic for the following reason: It will be predicted that CONTENT values of VPs modified by AdvNPs are of sort *nominal-object*.¹¹ This is clearly not the result we expect.

In contrast, working in Davidsonian style, i.e. introducing an event variable into the semantic representation of verbs¹², and assuming an architecture of the CONTENT value of verbs analogical to that of nouns¹³, we can avoid these technical and conceptual problems. Thus, the CONTENT value of a verb is assumed in our approach to be an object containing an (event) index (cf. the tag **3** in Figure 1) and a semantic restriction of this index (cf. the tag **4** in Figure 1). The value of the RESTR feature of an adverbial noun is thus a union of its own RESTR set and the RESTR set of the modified VP (cf. the RESTR value of the second disjunct in the consequence of the above constraint).

Consider also descriptions tagged by **2** in the Figure 1. While the ARG attribute is undefined for the relations associated with non-adverbial nouns (cf. the first disjunct), the ARG attribute is

⁹In fact, not all nouns in Polish can act as modifiers. However, since restrictions determining whether a noun can head an AdvNP are conditional on the lexical meaning of a given noun, which is not picked out as a central theme in this paper, we will ignore this issue here.

¹⁰The symbol \downarrow indicates that the attribute ARG is undefined (cf. the SRL formalization: $\neg(: \text{ARG} \approx: \text{ARG})$).

¹¹According to the SEMANTICS PRINCIPLE of Pollard and Sag (1994), the CONTENT value of the mother is token-identical to the CONTENT value of the adjunct daughter.

¹²Cf. Davidson (1967).

¹³Cf. Van Eynde (1998) or Sag and Wasow (1999) for a similar approach to the representation of the verbal semantics.

appropriate for the relations associated with adverbial nouns, thereby taking the INDEX value of the modified object as its value (see the second disjunct). This will presuppose a sort hierarchy for semantic relations associated with nouns such as in Figure 2, which in turn reflects the intuition that adverbial and non-adverbial nouns are of a different semantic type.

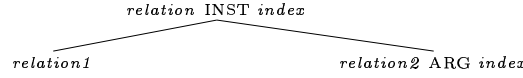


Figure 2: An exemplary sort hierarchy and feature declaration for semantic relations associated with nouns

3.2 Problems of Structural Licensing

By virtue of the lexical constraint provided in the previous section and the HEAD-ADJUNCT SCHEMA of Pollard and Sag (1994), adverbial nouns can be licensed that modify verbs (see Figure 3).

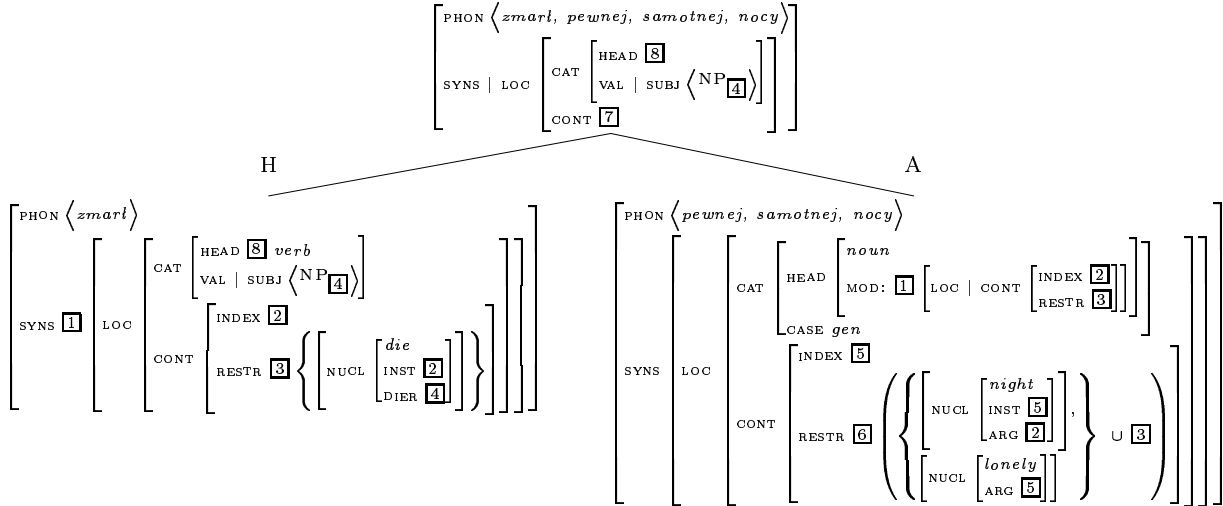


Figure 3: The structure of the VP *zmarl pewnej samotnej nocy* ('died some lonely night')

The HEAD-FEATURE PRINCIPLE and the HEAD-ADJUNCT SCHEMA ensure the percolation of the head and subcategorization information along the structure. However, the instantiation of the CONTENT value of the mother node (7) is disputable. According to the SEMANTICS PRINCIPLE of Pollard and Sag (1994), the CONTENT value of the mother is token-identical to the CONTENT value of the adjunct daughter. In the case of the VP in Figure 3, this would thus be the CONTENT value of the AdvNP *pewnej samotnej nocy* ('some lonely night'). According to our intuition, however, the entire VP denotes an event rather than a nominal object. The INDEX value of the entire VP seems thus token-identical to that of the head daughter. Yet, the collection of all semantic restrictions on that event is located within the adjunct daughter (cf. 6) and is expected to be present at the mother node. This observation indicates that the RESTR value of the mother has to be token-identical to that of the adjunct daughter.

Based on these observation, we suggest to modify the SEMANTICS PRINCIPLE of Pollard and Sag (1994) in a following way:

(3) SEMANTICS PRINCIPLE

In a headed phrase, the SYNSEM | LOCAL | CONTENT | INDEX value is token-identical to that of the head daughter and the SYNSEM | LOCAL | CONTENT | RESTR value is token-identical to that of the adjunct daughter if any and the head daughter otherwise.

According to (3), the CONTENT value of the VP in Figure 3 will have a form such as in Figure 4.

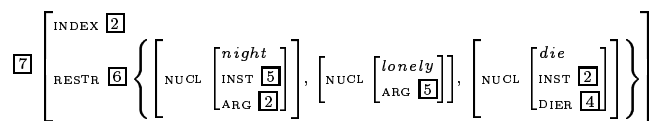


Figure 4: A description of the CONTENT value of the VP *zmarl pewnej samotnej nocy* ('died some lonely night')

Note that the SEMANTICS PRINCIPLE as defined above is motivated not only by the licensing of phrases whose adjunct daughters are AdvNPs. Apart from all other structures, it will make also right predictions about semantics of NPs such as *a written book*, which cannot be handled properly in the standard HPSG approach without additional stipulations (e.g. without appropriate lexical rules). It is obvious that this NP refers to a book object rather than to a writing event. However, the SEMANTICS PRINCIPLE of Pollard and Sag (1994) will provide an unexpected interpretation of this NP by instantiating the CONTENT value of the entire NP by the CONTENT value of the adjunct daughter, which refers to the event of writing. In contrast, the SEMANTICS PRINCIPLE proposed in this section will ensure identities between INDEX values of the mother and the head daughter and between RESTR values of the mother and the adjunct daughters, and thus license the expected denotation of the entire NP.¹⁴

4 Summary and Outlook

In this paper, we have discussed the licensing of adverbial NPs within the HPSG grammar framework. Based on the results of applying to Polish AdvNPs a range of syntactic and semantic tests, we have made the generalizations that AdvNPs share syntactic properties with non-adverbial NPs, secondly, that they are referential expressions as non-adverbial NPs are, and finally, that AdvNPs and non-adverbial NPs differ in a semantic type.

In Section 3, we have provided a lexical principle for licensing adverbial and non-adverbial nouns and discussed problems with the percolation of the semantic information along the complex structures involving AdvNPs in the HPSG approach of Pollard and Sag (1994). We have finally proposed a principle that ensures right semantic predictions. By the use of the lexical principle in Figure 1 and the SEMANTICS PRINCIPLE in (3), both adverbial and non-adverbial NPs can be licensed without the need for introducing lexical rules or extending the standard HPSG geometry.

In our paper, we have focused on syntactic and compositional-semantic aspects of the AdvNP grammar leaving lexical-semantic factors untouched. However, we assume that a number of lexical-semantic constraints will be needed to prohibit the grammar overlicensing.

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¹⁴An alternative approach for deriving correct interpretation was proposed by Kasper (1997). Based on the assumption that a semantic contribution of a modifier should be distinguished from its combinatorial semantics, he introduced into the HPSG architecture of Pollard and Sag (1994) two features: ECONT (external content) and ICONT (internal content) in addition to the CONT feature. In contrast, we have provided an approach that explains empirical data, and thereby, does not require any extensions of the standard HPSG geometry.