Streszczenie • Abstract

Uzgodnienie negacji w polskim

Raport niniejszy poświęcony jest formalnej, szczegółowej i wyczerpującej analizie zjawiska uzgodnienia negacji w języku polskim. Oparta jest ona na potraktowaniu uzgodnienia negacji jako tzw. zależności nieograniczonej; uzgodnienie to może oddziaływać poprzez dowolną liczbę poziomów zagnieżdżenia. Rozpatrujemy również nietypowe zachowanie uzgodnienia negacji i tzw. dopełniacza negacji w kontekście grup czasownikowych. Na podstawie tego zachowania wnioskujemy, że grupy czasownikowe składające się z czasowników niezanegowanych mają strukturę płaską, zaś grupy, w których występują czasowniki zanegowane charakteryzują się strukturą hierarchiczną. Analiza ta osadzona jest w formalizmie Head-driven Phrase Structure Grammar (leksykalistycznej teorii gramatycznej opartej na ograniczeniach) i — dzięki osiągniętemu stopniowi formalizacji — może ona stanowić część komputerowego analizatora składniowego.

Negative Concord in Polish

In this report, we present a formal, explicit and exhaustive analysis of Negative Concord in Polish. We analyse Negative Concord as an unbounded dependency showing that it can cross an arbitrary number of phrasal boundaries, although it also exhibits island constraints typical of unbounded dependencies. We also investigate exceptional behaviour of both Negative Concord and so-called Genitive of Negation in the context of verb clusters and, on the basis of this behaviour, argue for a flat structure of verb clusters in the absence of verbal negation, and for a hierarchical structure when some of the verbs in the cluster are negated. We formalize our analysis in Head-driven Phrase Structure Grammar, a highly lexicalized, constraint-based grammatical theory. The degree of formalization achieved makes the account immediately computer-implementable.

Contents

1 Introduction

Recent years have witnessed some resurgence of interest in syntactic negation within generative paradigm, which was started by the seminal article of Pollock (1989).[1] Pollock was the first to try to account for a range of syntactic phenomena in French and English by postulating an "articulated" INFL(ection) node, split into various "functional nodes," among them Neg(ation) node. Soon works on other languages have appeared discussing (usually supporting) the need to introduce additional functional categories in those languages.[2] An interesting stream of research within this paradigm concerns the so-called Negative Polarity Items (NPIs) and Negative Concord (NC).[3]

The aim of this article is to contribute to this line of research by presenting a detailed analysis of Negative Concord in Polish, a language which differs in this respect from those described in the literature (cf. section 2). In what follows, we will take into account a much broader range of data than those usually considered in connection with NC; thus, we will investigate various locality constraints (section 3), the behaviour of NC in verb clusters (section 5) and its interaction with case assignment.

The framework in which we will set our analysis is Head-driven Phrase Structure Grammar (Pollard and Sag, 1994, 1987), an eclectic linguistic formalism which inherits from GPSG, GB, LFG and Categorial Grammar, albeit, in most of the article (with the exception of section A), we will not assume any prior knowledge of HPSG.

2 Negative Concord in Polish

2.1 Basic Data

The basic facts concerning Polish NC are astonishingly simple: whenever any dependent of a verb, be it a subject, an object or a modifier, is a negative phrase (is or contains a negative pronoun),[4] the verb has to be preceded by the

[1] Apart from many articles on the topic, two monographes have appeared recently, Progovac (1994) and Haegeman (1995).

[2] Cf. e.g. Śpiewak and Szymańska (1995) and Witkoś (1996) for some discussion on Polish.

[3] See, e.g., Haegeman and Zanuttini (1990, 1991), Bayer (1990), Ladusaw (1992), Aranovich (1993).

[4] Throughout this paper, we call the n-words triggering verbal negation *negative pronouns*. We also avoid the term Negative Polarity Items as the distribution of negative pronouns in Polish is much more restricted than the distribution of such NPIs as English *any* or *ever*.

negation marker *nie* (Saloni and Świdziński, 1985, p.197):[5]

(1) a. Nikt *(nie) *przyszedł.*
nobody not came
'Nobody came.'

b. *Marysia* niczego *(nie) *dała Jankowi.*
Mary nothing not gave John
'Mary didn't give John anything.'

c. *Marysia* *(nie) *dała* nikomu *książki.*
Mary not gave nobody book
'Mary didn't give anyone a/the book'.

(2) a. Nigdy *(nie) *prosił o pomoc.*
never not asked-he about help
'He never asked for help.'

b. *Z* nikim *(nie) *przechadzałem się wczoraj po Hradčanach.*
with nobody not strolled-I SELF yesterday on Hradčany
'I didn't stroll with anybody at Hradčany yesterday'.

Examples (1)[6] show that a negative pronoun in an argument (subject or object) position obligatorily triggers verbal negation, while examples (2) show that this behaviour extends to adverbials and prepositional modifiers. This kind of NC, in which "a distinguished negative element shows up in all sentences that contain a negative expression" (van der Wouden and Zwarts, 1993) is sometimes called *negative doubling* (cf. e.g. den Besten (1986) and van der Wouden and Zwarts (1993)).

Polish also exhibits *negative spread*, i.e., loosely speaking, distribution of the negative feature over any number of expressions within the scope of negation. This is exemplified in (3a–b), both of which have a Negative Concord reading, rather than a Double (multiple) Negation one.

(3) a. Nic nikomu *(nie) *powiedziałem.*
nothing to nobody not said-I
'I didn't tell anybody anything.'

[5]We argue for an affixal status of the verbal marker *nie* in Kupść and Przepiórkowski (1997).

[6]In the examples, **(nie)* means that the sentence is judged grammatical with *nie*, but ungrammatical without it.

b. *Nikt* nigdy nikogo niczym *(nie) *uszczęśliwił.*
Nobody$_{nom}$ never nobody$_{gen}$ nothing$_{ins}$ not made happy
'Nobody has ever made anybody happy with anything.'

Finally, neither negative doubling nor negative spread depends on the position of negative phrases with respect to the verb:

(4) a. Żaden *z zaproszonych gości* *(nie) *przyszedł.*
none of invited guests not came
'None of the invited guests came.'

b. *(Nie) *przyszedł* żaden *z zaproszonych gości.*

(5) a. *Janek* *(nie) *dawał* nikomu żadnej *książki.*
John not gave to nobody none book
'John didn't give any book to anybody.'

b. *Janek* żadnej *książki* nikomu *(nie) *dawał.*

It should be also noted that the negative affix *nie* leads a life of its own: it is used to express sentential negation.

(6) *Janek* nie *pomaga ojcu.*
John not helps father
'John doesn't help his father.'

2.2 Comparison with Other Languages

It is interesting to compare Polish NC to that discussed in the literature in the context of Romance (French, Italian, Spanish, Catalan) and Germanic (West Flemish, Bavarian) languages. The first striking difference is that in many of those languages, but not in Polish, negative doubling depends either on grammatical function or on the pre-/post-verbal status of the negative phrase:[7]

(7) Italian:

a. *Mario* *(non) *ha visto* nessuno.
Mario not has seen nobody
'Mario hasn't seen anybody.'

b. Nessuno (*non) *ha visto Mario.*
nobody not has seen Mario
'Nobody has seen Mario.'

[7] The data come from Rizzi (1982), Bayer (1990), Haegeman and Zanuttini (1991), Ladusaw (1992) and Aranovich (1993).

(8) Spanish:

a. Ninguno *de mis amigos fumó en la terraza.*
'None of my friends has smoked on the deck.'

b. *En la terraza *(*no*) fumó* ninguno *de mis amigos.*
'None of my friends has smoked on the deck.'

(9) Catalan:

a. Ningú *(*no*) ha vist en Joan.*
'Nobody has seen Joan.'

b. **(*No*) m'ha telefonat* ningú.
'Nobody has called me.'

(10) West Flemish:

a. *... da Valère* niemand *(*en-*)kent.*
that Valère nobody (*en*-)knows
'... that Valère does not know anyone.'

b. *... da Valère (**en*)-klaaptige* over niets.
that Valère *en*-talked about nothing
'... that Valère talked about NOTHING.'

(11) Bavarian:

a. * *das* koa *Hund an Bosdboon* ned *beisd.*
that no dog_{nom} the postman_{acc} not bites

b. *das an Bosdboon* koa *Hund* ned *beisd.*

Thus, in Italian (7), Spanish (8) and Catalan (9), postverbal negative subject or object triggers the verbal negation marker, while preverbal subject either forbids it, or allows it optionally. In West Flemish (10), on the other hand, the difference is more subtle: sentential negation phrases license *en*, but not if they are extraposed. In Bavarian (11) facts are less clear, as a negative subject does not normally allow the negative marker on the verb, although this rule has multiple exceptions. Bayer (1990) argues that only elements originated in VP can trigger the verbal negation marker. Finally, in French (12) the difference between negative items in subject and object positions surfaces only in the case of licensing negative marker *ne* on the matrix verb across a subordinate clause boundary:[8]

(12) French:

a. *? Je* n*'ai exigé qu'ils arrêtent* personne.
I neg have required that they arrest nobody

b. ** Je* n*'ai exigé que* personne *soit arrêté.*
I neg have required that nobody be arrested

It should be also noted that in many languages it is the verbal negation marker which requires a (clausemate) negative phrase, rather than the other way round, as in Polish. This is true of at least French,[9] Spanish and West Flemish (but not Italian).

Another difference concerns the range of contexts which can license negative phrases. In some languages (including non-standard English dialects described in Labov (1972)) negative phrases have similar pattern to such English Negative Polarity Items (NPIs) as *anybody*, i.e., apart from sentential negation contexts, they can appear also in interrogative contexts, cf. Italian (13) below.

(13) Italian:

a. *Mi chiedo se* nessuno *abbia poi contattato Gianni.*
I wonder whether anybody has eventually contacted Gianni

b. *Mi chiedo se Gianni abbia poi contattato* nessuno.
I wonder whether Gianni has eventually contacted anybody

(14) Polish:

*Zastanawiam się, czy ktoś/**nikt *skontaktował się z*
wonder-I SELF whether somebody/nobody contacted SELF with
Janem.
John

'I am wondering if anybody got in touch with John.'

[8]This difference is analysed in Kayne (1981) in terms of ECP violation at LF. However, as noted in (Recourcé, 1995, p.113) such examples are only marginally acceptable.

[9]However, as noted in (Milner, 1982, p.186) and (Muller, 1987), apart from expletive usage of *ne* which does not concern us here, there are some lexical exceptions where *ne* alone can express sentential negation, e.g., *je ne peux* 'I cannot', *je ne sais* 'I don't know', etc.

Polish not only does not allow negative items in non-negative interrogative contexts (cf. (14) above), but also it does not allow NC across clausal boundaries (cf. section 3.2 below). This contrasts with languages such as Italian (15), French (12) and Spanish (16):

(15) Italian:

a. Non *pretendo [che tu arresti* nessuno*].*
(I) neg require that you arrest nobody
'I don't require that you arrest anybody.'

b. Non *pretendo [che* nessuno *ti arresti].*
(I) neg require that nobody you arrest
'I don't require that anybody arrest you.'

(12) French:

a. *? Je* n*'ai exigé [qu'ils arrêtent* personne*].*
I neg have required that they arrest nobody

(16) Spanish:

a. No *quiero [que visites a* ninguno *de sus amigos].*
'I do not want you to visit any of their friends.'

b. *Jorge* no *dista mucho [de comprender* ninguna *teoría].*
'Jorge isn't far from understanding any theory.'

Although West Flemish (17) shows locality constraints similar to those in Polish, it allows negation marking on the matrix verb if the negated phrase is scrambled from the subordinate clause (18).

(17) West Flemish:

a. * ... *da Valère* en-*wist da zen voader* geen geld *oat.*
that Valère *en*-knew that his father no money had

b. * ... *da Valère* an niemand *zei da Marie ziek* en-*was.*
that Valère to nobody said that Marie ill *en*-was

(18) West Flemish:

Niets en-*peinzen-k da ze wilt doen.*
nothing *en*-think-I that she wants do
'I think there is nothing she wants to do.'

As we will see in section 3.2 below, this is not possible in Polish.

2.3 The Problem of Polysemy

Negative pronouns can be classified according to the part of speech they represent: nominal pronouns *nikt* 'nobody' and *nic* 'nothing', the possessive pronoun *niczyj* 'nobody's', the determiner (called numeral pronoun by Klemensiewicz (1986) and considered an adjective by Andrejewicz (1996)) *żaden* 'none', and adverbial pronouns *nigdzie* 'nowhere', *nigdy* 'never', *bynajmniej*, *wcale* 'not-at-all', *nijak* 'nohow', *donikąd* 'to nowhere' and *znikąd* 'from nowhere'. Note that the only common features of these words are their quantifier-like character and the 'negation triggering' properties: they are heterogeneous syntactically as well as morphologically.[10]

Some of these pronouns, namely *nic* 'nothing', *nikt* 'nobody', *niczyj* 'no one's', *donikąd* 'to nowhere' and *znikąd* 'from nowhere' have also other, positive meanings (examples (a) below) apart from the negative ones (examples (b)).

(19) 'nikt'

a. *Ten facet jest nikim.*
this guy is nobody
'This guy is nobody.'

b. *Jan* nikim **(*nie*) pogardza.*
John nobody not scorns
'John doesn't scorn anybody.'

(20) 'nic'

a. *Coraz więcej pisze się książek o niczym!*
more and more writes SELF books about nothing
'There are more and more books about nothing!'

b. *Książki o* niczym **(*nie*) są równie fascynujące jak książki o Afryce.*
books about nothing not are as fascinating as books about Africa
'There are no books as fascinating as these about Africa.'

(21) 'niczyj'

a. *To pióro jest niczyje, możesz je wziąć.*
this pen is nobody's may-you it take

[10] Not all of negative pronouns derive from the negative marker *nie*, e.g., *żaden*, and some that do have lost their negative meaning, e.g., *niejeden* 'some', literally: 'not one'.

'This is nobody's pen, you can take it.'

b. *(Nie) *piszę* niczyim *piórem, używam własnego.*
not write-I nobody's pen use-I my own
'I am not writing with anybody's pen, I am using mine.'

(22) 'donikąd'

a. *Ta droga prowadzi donikąd.*
this road leads to nowhere
'This road leads nowhere. (This road doesn't look promising.)'

b. Donikąd *(nie) *poszedłem, byłem cały czas w domu.*
to nowhere not went-I was-I all time in home
'I didn't go anywhere, I was at home all the time.'

(23) 'znikąd'

a. *Ten człowiek przyszedł znikąd.*
this man came from nowhere
'This man came from nowhere. (Nobody knows where he came from.)'

b. *(Nie) *było* znikąd *odzewu.*
No was from nowhere response.
'There was no response from anywhere.'

Thus, *nikt* in (19a) means 'somebody unimportant', *nic* in (20a) means 'with no real substance, meaningless,[11] *niczyj* (21a) — 'without apparent owner, abandoned,' etc. In this case, these pronouns do not imply negative context.

Of course, the existence of such polysemous variants should not worry us, similar facts show up in English: for example, see glosses of (19a) or (23a), or consider such well-known polarity dependent idioms as *lift a finger*. However, since some of the differences in meaning might be difficult to grasp (especially in the more complex examples of the following section), negative pronouns not showing this kind of ambiguity will tend to be overrepresented in the examples below.

[11] Some of the negative elements mentioned above have also other homonyms, cf. e.g. (Andrejewicz, 1996, p.185).

2.4 Side Remark on Structurality of *nic*

Przepiórkowski (1996a, 1995) argues for structural vs. lexical case dichotomy in Polish. In short, nominative, accusative and genitive of negation (cf. section 5.1 below) are argued to be structural cases resolved in the syntax by the Case Principle, while all other cases are assigned in the lexicon by particular lexical items. One of the arguments in favour of such a division is the behaviour of *dużo*-phrases, i.e., numeral phrases headed by indefinite numerals such as *dużo* 'a lot', *mało* 'little' and *trochę* 'a little'. Surprisingly, these phrases can be used in the nominative and accusative positions, as well as **in some** genitive positions, namely only as genitive of negation. With this lexical vs. structural dichotomy in hand, this difference is easily modelled by postulating a single lexical entry for each of these numerals, whose case is marked as structural (i.e., to be resolved in the syntax).

It turns out that the distribution of *nic* strongly resembles that of *dużo*-phrases:

(24) Nic nie *spadło.*
nothing$_{nom}$ not fell
'Nothing fell down.'

(25) *O* nic nie *pytam.*
about nothing$_{acc}$ not ask-I
'I am not asking any questions.'

(26) a. Nic nie *widziałem.*
nothing$_{gen}$ not saw-I
'I haven't seen anything.'

b. * Nic *się* nie *boję.*
nothing$_{gen}$ SELF not fear-I
'I am not afraid of anything.'

c. * Nie *pomoże* *mu* *pisanie* nic.
not will-help him writing nothing$_{gen}$
'Writing anything won't help him. (Nothing that he writes will help him.)'

A few comments are in order. First of all, as examples (24) and (25) show, *nic* can be an exponent of nominative and accusative NPs respectively. However, as it is clear from examples (26), only some genitive positions allow *nic*, cf. (26a) as opposed to (26b–c).[12] The difference between these genitive positions is that *Nic* in (26a) is in the Genitive of Negation position: *widziałem* is a transitive verb subcategorizing for an accusative object. On the other hand, both *boję się* and *pisanie* expect a lexical genitive complement, a requirement which apparently cannot be fulfilled by *nic*. Thus, since *nic* can be found exactly in nominative, accusative and genitive of negation positions, we assume that, just like *dużo*-type indefinite numerals, it can be assigned only structural case.

3 Long Distance Negative Concord

More often than not, analyses of NC are constrained to clauses. If they take account of NC across maximal projections at all, they are usually limited to subordinate indicative clauses, as in Rizzi (1982) and Haegeman and Zanuttini (1991).[13] The main point of this section is to show that there is much more to the issue of locality of Negative Concord.

3.1 NPs and PPs

Note first that although negative pronouns *niczyj* 'nobody's' and *żaden* 'none' are not direct arguments of the verb, they still imply its negation, cf. (27):

(27) a. Niczyje *prośby mnie *(*nie*) wzruszają.*
nobody's requests me not move
'I'm indifferent to anybody's requests.'

b. **(*Nie*) chciałem* żadnej *książki.*
not wanted-I none book
'I didn't want any book.'

Although this behaviour could be attributed to the special status of determiners by assuming a DP analysis of noun phrases or by arguing that they 'agree' with $\bar{\mathrm{N}}$ with respect to 'negative polarity', no such explanation can be reasonably put forward to account for examples such as (28) below.[14]

[12] Examples (26b–c) become acceptable if *nic* is understood as an adverbial-particle 'not at all' rather than as a negative nominal pronoun.
[13] A slightly wider range of locality data is considered in Aranovich (1993). A comprehensive study of French NC can be found in Recourcé (1995).
[14] Capital letters mark heavy stress here.

(28) *Moje stopy *(*nie*) tolerują butów z* NICZEGO *(i muszę chodzić*
my feet not tolerate shoes from nothing (and must-I go
boso).
barefoot)
'My feet can't stand shoes made of anything (so I have to walk barefooted).'

Moreover, there does not seem to be any constraint on the distance of Negative Concord (apart from processing difficulties, but these can be dealt with by putting some additional stress, as marked in the examples). For example, in (29a), NC takes place across 6 NP and PP boundaries, while in (29b) it crosses 8 such boundaries.

(29) a. **(*Nie*) lubię smaku konfitur z owoców z* niczyjego *ogrodu,*
not like-I taste of preserves from fruits from nobody's garden,
oprócz własnego.
apart my own
'I don't like the taste of preserves made of fruit from anybody's garden, apart from (these made of fruit from) my own.'

b. *Gazety z plotkami o żonach władców państw*
Newspapers with rumours about wives of rulers of countries
ŻADNEGO *KONTYNENTU *(*nie*) są tak interesujące, jak te*
of none continent not are so interesting as those
z plotkami o żonach władców państw afrykańskich.
with rumours about wives of rulers of countries African
'No newspapers with gossip about wives of rulers of countries of any continent are so interesting, as those containing gossip about wives of rulers of African countries.'

Thus, it seems that nominal and prepositional items simply pass the 'negation requirement' introduced by the negative pronoun higher up the tree, until it is bound by a negated verb.[15]

3.2 Subordinate Clauses

Subordinate clauses are in general boundaries for Negative Concord, i.e., if an argument of the lower verb is (or contains) a negative pronoun, then the verbal

[15]Note that since our analysis is set up in a "highly lexicalized" grammatical theory, our generalizations are formulated in terms of lexical items (nouns, prepositions, verbs) rather than phrases or syntactic nodes. This remark applies throughout the text.

negation has to be realized on the lower, rather than on the higher verb. This does not depend on the kind of subordinate clause,[16] may it be an indicative clause, (30)–(31), a subjunctive clause, (32)–(34), an indirect question, (35)–(37), or a relative clause, (38). Note, that it is not finiteness that stops the 'negation percolation,' cf. (33).

(30) a. *Jan powiedział, że* niczego **(*nie*) widział.*
John said that nothing not saw
'John said that he didn't see anything.'

b. * *Jan* nie *powiedział, że* niczego *widział.*
John not said that nothing saw

(31) a. *Jan narzekał, że *(*nie*) poinformowano go o* niczym.
John complained that not informed_{impers} him about nothing
'John complained that he was informed about nothing.'

b. * *Jan* nie *narzekał, że poinformowano go o* niczym.
John not complained that informed_{impers} him about nothing

(32) a. *Jan chciał, żeby Marysia* niczego **(*nie*) kupowała.*
John wanted that Mary nothing not bought
'John wanted Mary to buy nothing.'

b. * *Jan* nie *chciał, żeby Marysia* niczego *kupowała.*
John not wanted that Mary nothing bought

(33) a. *Jan prosił, żeby* niczego **(*nie*) ruszać w jego pokoju.*
John asked that nothing not touch_{inf} in his room
'John asked not to touch anything in his room.'

b. * *Jan* nie *prosił, żeby* niczego *ruszać w jego pokoju.*
John not asked that nothing touch_{inf} in his room

(34) a. *Ojciec kazał Marysi, by się z* nikim **(*nie*) spotykała.*
Father ordered Mary, that SELF with nobody not met.
'The father ordered Mary not to meet anybody.'

b. * *Ojciec* nie *kazał Marysi, by się z* nikim *spotykała.*
Father ordered Mary, that SELF with nobody not met.

[16]We deal with unmarked infinitival complements in section 5.

(35) a. *Jan zapytał, jakiej muzyki* nikt **(*nie*) lubi.*
John asked what music nobody not likes
'John asked what kind of music nobody likes.'

b. * *Jan* nie *zapytał, jakiej muzyki* nikt *lubi.*
John not asked what music nobody likes

(36) a. *Jan zastanawiał się, kto* nikogo **(*nie*) spotkał.*
John wondered SELF who nobody not met
'John wondered who hadn't met anybody.'

b. * *Jan* nie *zastanawiał się, kto* nikogo *spotkał.*
John not wondered who nobody met

(37) a. *Nauczyciel wiedział, kiedy* nikt **(*nie*) był przygotowany do lekcji.*
Teacher knew when nobody not was prepared to lesson
'The teacher knew when nobody was prepared for the lessons.'

b. * *Nauczyciel* nie *wiedział, kiedy* nikt *był przygotowany do lekcji.*
Teacher not knew when nobody was prepared to lesson

(38) a. *Człowiek, który* nikomu **(*nie*) ufał, został prezydentem.*
man who nobody not trusted became president
'The man who trusted nobody became a president.'

b. * *Człowiek, który* nikomu *ufał,* nie *został prezydentem.*
man who nobody trusted not became president

On the basis of the examples above we conclude that verbs do not let the 'negation requirement' percolate higher up the tree. That is, non-negated verbs expect all their dependents to be positive, while negated verbs 'bind' the negation introduced by any of its dependents.

3.3 Participial Phrases

3.3.1 Adverbial Participles

Imperfective and perfective adverbial participles behave in a similar way to subordinate clauses discussed above, i.e., they constitute boundaries for Negative Concord:

(39) a. *Uciekł z więzienia,* nic nikomu **(*nie*) mówiąc.*
escaped-he from prison nothing to nobody not saying

'He escaped from the prison without saying anything to anybody.'

b. * Nie *uciekł z więzienia,* nic nikomu *mówiąc.*
not escaped-he from prison nothing to nobody saying

(40) a. *Bank zlikwidował wszystkie konta,* *(nie*) poinformowawszy*
bank liquidated all accounts not having informed
nikogo.
nobody
'The bank closed all accounts without having informed anybody.'

b. * *Bank* nie *zlikwidował wszystkich kont, poinformowawszy* nikogo.
bank not liquidated all accounts having informed nobody

(41) a. *Janek,* niczego *(nie*) przeczytawszy, zasnął.*
John nothing not having read fell asleep
'John fell asleep having read nothing.'

b. * *Janek, przeczytawszy* niczego, nie *był tak znużony, jak*
John, having read nothing, not was so weary, as
przeczytawszy „Wojnę i pokój".
having read war and peace
'Reading "War and peace" made John more weary than reading anything else.'

3.3.2 Adjectival Participles

Facts are less clear here. It seems that adjectival participles behave in a different way than any of the categories considered above, i.e., they **optionally** 'bind negation'. In other words, if an argument of an adjectival participle is (or contains) a negative pronoun, either the participle, or the verb has to be negated.

(42) a. *Lingwiści* *(nie*) piszący o* niczym *marnują państwowe*
linguists not writing about nothing waste national
pieniądze.
money
'Linguists who don't write about anything waste national funds.'

b. *Lingwiści piszący o* NICZYM *(nie*) są tak nudni, jak ci*
linguists writing about nothing not are as boring as these
piszący o negacji.
writing about negation

'Linguists writing about anything else are not as boring as those writing about negation.'

(43) a. *Czy istnieją książki *(*nie*) napisane przez* nikogo*?*
QUES exist books not written by nobody
'Are there books written by nobody?'

b. **(*Nie*) lubię książek napisanych przez* ŻADNEGO *z tych autorów*
not like-I books written by none of these authors
(ale chętnie czytam Lema).
(but eagerly read-I Lem)
'I don't like books written by any of these authors (but I like reading Lem).'

3.4 Gerunds

Also here facts are not very clear, but — again — it seems that gerunds[17] optionally behave like verbs or nouns, 'binding negation' or letting it percolate to be bound higher up:

(44) a. **(*Nie*)pisanie* żadnych *książek zagraża karierze każdego naukowca.*
not writing none books threatens career every scientist
'Not writing any books poses a threat to every scientist's career.'

b. *Pisanie* żadnych *książek mu *(*nie*) pomoże.*
Writing none books him not help
'Writing any books won't help him.'

3.5 Summary

As we have shown above, sentential clauses and adverbial participle phrases constitute a single class in that only they are able to uniformly block Long Distance Negative Concord (henceforth, LDNC). The behaviour of adjectival participle and gerundial phrases is less clear: it seems that they can optionally let negation percolate to the higher verb, although such examples are usually less acceptable than instances of negation being bound by the participle or the gerund. On the other hand, noun and preposition phrases always let negation through.[18]

We will try to account for these facts in the subsequent sections.

[17] By gerunds we mean here products of verbal nominalization, e.g., *pisanie* ('writing', from *pisać*, 'to write'), *jedzenie* ('eating', from *jeść*, 'to eat'), etc.
[18] An exception is mentioned in section 4.3 below.

4 Towards an Account

In this chapter we outline the basics of our analysis of Polish LDNC. See, however, section A for HPSG details.

4.1 NC as Unbounded Dependency

One might view the facts presented above from the following perspective:

- LDNC is a kind of Unbounded Dependency Construction (UDC; cf. Gazdar (1981) and ch.4 of Pollard and Sag (1994)) in that it works across a number of phrasal boundaries that cannot be in principle limited (though, of course, as in all kinds of UDC, island constraints are observed);
- negative pronouns such as *nic*, *nigdy* and *żaden* introduce the dependency (in this case 'negation requirement');
- some categories, like nouns, prepositions and non-negated gerunds simply pass this dependency higher up the tree;
- other categories like negated verbs, negated participles and negated gerunds cancel (satisfy, license) the dependency;
- yet other categories, such as non-negated verbs, create islands: they neither satisfy the dependency nor pass it higher up; rather they simply do not allow arguments with unbound 'negation requirement.'

Of course, Polish LDNC differs in many respects from such "classical" UDCs as topicalization or *wh*-questions. First of all, the so-called *wh*-movement is a UDC in the sense that the dependency extends across arbitrarily many clause boundaries, although NP boundaries usually create islands. In case of NC, the opposite seems to be true: LDNC crosses any number of NP and PP boundaries but it cannot in general cross a clausal boundary. Also, there is no "missing constituent" in LDNC, what is "missing" is rather a "licenser" of a negative pronoun. Finally, unlike in topicalization or *wh*-questions, satisfying the dependency does not involve introducing an additional overt constituent (such as topicalized phrase or *wh*-phrase).[19] In this respect, LDNC rather

[19]The negative marker *nie* might be thought to be just such an "overt constituent" (Krzysztof Czuba, p.c.). However, as argued in Kupść and Przepiórkowski (1997), *nie* should be analysed as an affix, so we do not consider this option here.

resembles *weak* UDCs (in the terminology of Pollard and Sag (1994)) such as *tough* 'movement'.[20]

4.2 Lexical Approach to UDCs

In what follows, we will build on the lexical approach to unbounded dependency constructions (UDCs) of Sag (1996b,a). The main idea of that approach is that most lexical entries are specified as inheriting the dependencies of all their arguments, thus, e.g., if a verb subcategorizes for a clause with a gap, then the verb itself is considered to introduce the gap. This is expressed as 'Lexical Amalgamation of SLASH' (simplifying, in HPSG SLASH contains the information about the kind of constituents that are missing, if any):[21]

(45) Lexical Amalgamation of SLASH:

$$\begin{bmatrix} \text{ARG-S} & \langle[\text{SLASH } \boxed{1}],\ldots,[\text{SLASH } \boxed{n}]\rangle \\ \text{SLASH} & \boxed{1} \uplus \ldots \uplus \boxed{n} \end{bmatrix}$$

Moreover, 'SLASH Inheritance Constraint' takes care of percolating the value of SLASH from such lexical signs to their maximal projections.

(46) SLASH Inheritance Constraint (SIC; informally):

The SLASH value of a head-valence-phrase is identical to the SLASH value of the phrase's head daughter.

For example, in the sentence *John, I think she likes*, the verb *likes* is missing the object, so its SLASH contains information about one missing NP[acc]; this information is percolated to the phrase *she likes* through SIC (46), so the phrase's SLASH is the same as that of the verb *likes*; also, since *she likes* is one of the arguments of *think* and because the SLASH value of *I* is empty (*I* does not bring any unbounded dependencies), the SLASH value of the verb *think* is, in accordance with (45), the same as the SLASH value of the phrase *she likes*, i.e., the same as the SLASH value of the verb *likes*, so it contains the information about one missing NP[acc]. Again, according to (46), this information is passed to the maximal projection of *think*, i.e., to the phrase *I think she likes.* Now, a special rule (head-filler schema) takes care of realizing this missing constituent as a topicalized phrase *John.* Thus, the joint effect of these two principles is an

[20] As pointed to us by Anne Abeillé (p.c.), also in French nominal negative phrases were analysed as introducing unbounded dependency, cf. (Milner, 1982, p.191) and (Recourcé, 1995).

[21] '$\uplus$' designates disjoint set union here.

HPSG analogue of GB's 'Move α': they allow percolation of information about missing constituents up the tree.

One advantage of this approach over any purely syntactic treatment of UDCs is that, since 'Lexical Amalgamation of SLASH' (45) is a matter of lexical stipulation,[22] there may be lexical items not satisfying this constraint. This allows to account for weak UDCs easily, i.e., for those cases in which information about a missing constituent is discharged lexically. The classical example are *easy*-adjectives (cf. e.g. Flickinger and Nerbonne (1992)), e.g.:

(47) *I_i am easy to please* $\_\_{i}$.

In sentences such as (47), the missing object of the lower verb is nowhere to be found; the nominative subject, *I*, cannot be the missing object, although it is understood as coreferential with it. In the framework sketched above, this can be easily accounted for by positing that *easy*-adjectives are exceptional in that they do not satisfy the principle of Lexical Amalgamation of SLASH, but rather remove one element from the sum of SLASH values of their arguments (so that it cannot be overtly realized) and coindex this element with their subject.[23]

4.3 The Analysis of LDNC

The approach sketched above seems to be particularly well suited for our needs because 'negation requirement' is always cancelled by lexical items rather than through syntactic processes (such as HPSG's head-filler schema). For example, negated verbs discharge 'negation requirement,' while nouns do not. Moreover, this approach makes it easier to account for lexical exceptions from general rules, and, in fact, at least one such surprising exception exists in Polish, namely the preposition *bez* 'without'. This preposition, unlike other prepositions in Polish, binds negation:

(48) a. *Zaczął bez* żadnych *wstępów.*
started-he without none introductions
'He started straight away.'

b. *I bez* niczyich *wskazówek wiem jak to zrobić.*
and without nobody's hints know-I how this do$_{inf}$
'I don't need anybody's hints to be able to do this.'

c. *Został bez* niczego.
stayed-he without nothing

[22]'Stipulation' does not mean here that generalizations are lost; in HPSG they can be expressed with the aid of the sort hierarchy.

[23]See Grover (1995) for an interesting alternative account.

'He was left broke.'

In the remainder of this section we will rather informally flesh out our lexical analysis of LDNC in Polish. The formal account will be presented in section A.

First of all, we introduce a non-local attribute akin to SLASH but responsible only for Long Distance Negative Concord, NEG-CONC. Since it does not matter what kind of negative pronouns initiate the negation, nor does it matter from exactly how many arguments negation percolates, the information which has to be percolated upwards[24] is binary: either there are some negative pronouns or there is none. Thus, we will assume that the only values of this attribute are '+' and '−'.

4.3.1 Introducing Negation Requirement

The 'negation requirement' is always introduced by negative pronouns. This is done lexically by positing that such pronouns have the value of NEG-CONC set to '+' in the lexicon.

4.3.2 Percolation

Percolation of the 'negation requirement' takes place in two steps. First of all, the lexical items which allow percolation of negation specify the value of their NEG-CONC as '+' if at least one of their arguments (or, in general, dependents) is NEG-CONC+, and as '−' otherwise. So, for example, if any of the arguments of a noun is a negative pronoun (i.e., NEG-CONC+), the noun will be NEG-CONC+. This is analogous to Sag's Lexical Amalgamation of SLASH (45).

The second step ensures percolation of the NEG-CONC value along the head projection from the lexical item to its maximal projection. This is done with the aid of Negation Inheritance Constraint (NIC), a constraint analogous to the SLASH Inheritance Constraint (46).

(49) Negation Inheritance Constraint (NIC; informally)

The NEG-CONC value of any phrase is identical to the NEG-CONC value of the phrase's head daughter.

[24]As usual in such cases, it has to be mentioned that HPSG inherited from GB its directional 'transformational' language, although the analysis itself is non-directional and 'constraint-based'.

4.3.3 Cancellation

The lexical items which cancel negation percolation have '$-$' set up in the lexicon as the value of their NEG-CONC. Note that it does not matter what the values of NEG-CONC of their arguments are. If they are all '$-$' (i.e., no arguments bring 'negation requirement'), then there is no negation percolation, and the value of lexical item's NEG-CONC should be '$-$'. On the other hand, when one of the arguments brings 'negation requirement,' this requirement is satisfied by the lexical entry at hand (such as preposition *bez* or a negated verb), so it does not percolate any further, and hence, the lexical entry's NEG-CONC should be '$-$' again.

4.3.4 Islands

Intuitively, a lexical item creates an island if it satisfies two conditions: 1) it does not tolerate arguments which bring a dependency and 2) it is specified as not triggering a dependency itself. In terms of the NEG-CONC feature, this means that such lexical items have to 1) require all their dependents to be NEG-CONC$-$ and 2) be NEG-CONC$-$ themselves.

It is interesting to note that the above amounts to saying that island-creating items are simply 'percolating' and 'cancelling' items at the same time: they are NEG-CONC$-$ because they are 'cancelling items', and their NEG-CONC is '$+$' if and only if at least one of the arguments is '$+$' because they are 'percolating items'. But since the last condition is equivalent to: "their NEG-CONC is '$-$' if and only if all the arguments are '$-$', these two conditions together mean that both the lexical item and all its arguments have to be NEG-CONC$-$.

4.3.5 Summary

To sum up, the Negation Inheritance Constraint takes care of percolation of negation from a phrase's head to its maximal projection, while percolation of negation from arguments (dependents) to functors is taken care of by individual lexical entries. And thus, NEG-CONC values of individual lexical entries are determined as follows:

A negative pronouns: NEG-CONC = '$+$';

B all verbs (both negated and non-negated), negated gerunds, all adverbial participles, negated adjectival participles, preposition *bez*: NEG-CONC = '$-$';

C non-negated verbs, non-negated participles, non-negated gerunds, nouns (apart from negative pronouns), prepositions (apart from *bez*): NEG-CONC = '+' iff they have an argument, whose NEG-CONC is '+'; otherwise NEG-CONC = '−'.

Note that the intersection of the last two classes consists of non-negated verbs and non-negated adverbial participles. As the preceding sections show, exactly these items create islands for LDNC.

4.4 An Example

We will illustrate this analysis with example (50).

(50) *Janek* nigdy **(*nie*) lubił* niczyjego *chrapania.*
John never not liked nobody's snoring
'John has never liked anybody's snoring.'

There are three dependents of the verb: the subject *Janek*, the adverbial modifier *nigdy*, and the object *niczyjego chrapania.* Let us start with the object. Its head is the non-negated gerund *chrapania.* As stated in C above, the value of NEG-CONC of non-negated gerunds is '+' if and only if any of its arguments are NEG-CONC+. The only argument of *chrapania* is *niczyjego*, *niczyjego* is a negative pronoun and hence (see A) NEG-CONC+, so *chrapania* is also NEG-CONC+. Now, according to NIC, this value percolates to the maximal projection, so the whole phrase *niczyjego chrapania* is NEG-CONC+. Turning to the subject, *Janek* is a noun, so, according to C again, the value of its NEG-CONC is '+' if and only if any of its dependents is NEG-CONC+. Since *Janek* has no dependents, it is NEG-CONC−, and so is its maximal projection. Finally, the third dependent of the verb is the adverbial modifier *nigdy*, whose NEG-CONC has the value '+' (see A).

Let us first consider the non-negated version of (50), i.e., * *Janek nigdy lubił niczyjego chrapania.* The verb *lubił* is, according to B, NEG-CONC−. Since it is a non-negated verb, C also applies, so it is NEG-CONC+ if and only if any of its arguments is NEG-CONC+. As we have seen above, two of its arguments, namely *nigdy* and *niczyjego chrapania*, have '+' as values of NEG-CONC. This means that according to C the value of the verb's NEG-CONC is '+'. However, as already noted, according to B this value is '−', so we get a contradiction and the phrase *Janek nigdy lubił niczyjego chrapania* is correctly predicted to be ungrammatical.

Let us now consider the negated version of (50). Our reasoning is analogous, the only difference being that now C above does not apply because the verb is negated. This means that no feature clash ensues and that the verb is, according to B, NEG-CONC−. Now NIC applies and this value of NEG-CONC is projected to the top of the clause. As a result, we get a NEG-CONC− sentence, i.e., a sentence with no undischarged 'negation requirement.'

5 Verb Clusters

We turn now to an interesting issue of interaction between Negative Concord, Genitive of Negation (GoN; cf. section 5.1 below) and verb clusters. We use the last term (usually denoting syntactic clusters of verbs in languages such as German and Dutch) to describe groups of verbs in constructions such as the following:

(51) a. *Piotrek* **wolał** **wracać** *do domu.*
Peter preferred return$_{inf}$ to home
'Peter preferred to go back home.'

b. *Marysia* **mogła** *chyba* **chcieć** **być** *sama.*
Mary might perhaps want$_{inf}$ be$_{inf}$ alone
'Perhaps Mary might have wanted to be alone.'

As we hope to show below, carrying this term over to Polish is to some extent justified.

5.1 Verb Clusters and Genitive of Negation

The so-called Genitive of Negation is a phenomenon of case variation: if a transitive verb is negated, its normally accusative object changes its case into genitive. As GoN is relatively widespread, it is a well-known phenomenon, though its productivity differs cross-linguistically: in Polish, unlike, e.g., in Russian, it is a fully productive mechanism.

One interesting property of verb clusters in Polish is that negating any of the verbs triggers GoN on the lowest verb:

(52) a. *Jan chciał kupić ten dom.*
John wanted buy$_{inf}$ this$_{acc}$ house$_{acc}$
'John wanted to buy this house.'

b. *Jan* nie *chciał kupić tego domu.*
John not wanted buy this$_{gen}$ house$_{gen}$

c. *Jan chciał* nie *kupić tego domu.*
John wanted not buy this$_{gen}$ house$_{gen}$

(53) a. *Mogę chcieć to napisać.*
may-I want$_{inf}$ this$_{acc}$ write$_{inf}$
'I might want to write this.'

b. Nie *mogę chcieć tego napisać.*
not may-I want$_{inf}$ this$_{gen}$ write$_{inf}$

c. *Mogę* nie *chcieć tego napisać.*

d. *Mogę chcieć tego* nie *napisać.*

Two kinds of analyses of this interaction are possible: one in which the information of negation somehow percolates down to the lowest verb, where the case is assigned, and another in which objects of the lowest verb are raised to the negated verb, and case is assigned there. We explore the latter possibility in sections 6 and A, while the former, which seems better suited for true phrase structure grammars (rather than highly lexicalized constraint-based grammars like HPSG) is considered in Przepiórkowski and Świdziński (1997).

5.2 Verb Clusters and Negative Concord

Also the way in which 'negation requirement' is realized in verbal clusters has this 'existential flavour'. As the examples below show, if the object of the lowest verb is (or contains) a negative pronoun, then at least one of the verbs in the cluster has to be negated, not necessarily the lowest one:

(54) a. *Jan chciał* niczego **(*nie*) kupować.*
John wanted nothing not buy$_{inf}$
'John wanted not to buy anything.'

b. *Jan *(*nie*) chciał* niczego *kupować.*
John not wanted nothing buy$_{inf}$
'John didn't want to buy anything.'

(55) a. *Jan *(*nie*) chciał próbować* nikogo *pokochać.*
John not wanted try$_{inf}$ nobody love$_{inf}$
'John didn't want to try to love anybody.'

b. *Jan chciał *(*nie*) próbować* nikogo *pokochać.*

c. *Jan chciał próbować* nikogo **(*nie*) pokochać.*

(56) a. *Chciano *(*nie*) pisać do* nikogo *listów.*
wanted$_{impers}$ not write$_{inf}$ to nobody letters$_{gen}$
'One wanted not to write letters to anybody.'

b. **(*Nie*) chciano pisać do* nikogo *listów.*

In contrast, negative pronoun in the subject position requires negation on the highest verb only:

(57) Nikt *(nie*) chciał kupić tego domu.*
nobody not wanted buy$_{inf}$ this$_{gen}$ house$_{gen}$
'Nobody wanted to buy this house.'

(58)* Nikt *chciał* nie *kupić tego domu.*

6 Extending the Account

The analysis of section 4 makes wrong predictions when it comes to verbal clusters. To see the problem consider example (54b), repeated below for the reader's convenience.

(54) b. *Jan* *(nie*) chciał* niczego *kupować.*
John not wanted nothing buy$_{inf}$
'John didn't want to buy anything.'

As things stand now, non-negated verbs, i.e., also *kupować*, create islands, that is require their arguments to be NEG-CONC−. On the other hand, the negative pronoun *niczego*, which is an argument of *kupować* is lexically specified as NEG-CONC+, which results in a clash of feature values. That is, the analysis presented above does not account for the fact that any verb in the verb cluster can bind 'negation requirement' introduced by arguments of the lowest verb, not necessarily just the lowest verb itself.

We will explore two ways of formalizing this observation below.

6.1 Attempt 1: Finiteness

One way of dealing with the problem would be to modify the way NEG-CONC is determined so that non-negated infinitival verbs can pass it higher up to be bound by a higher verb. More precisely:

- verbs which are negated or finite (was: all verbs): NEG-CONC = '−';
- non-negated verbs (just as before): NEG-CONC = '+' iff they have an argument whose NEG-CONC is '+'; otherwise NEG-CONC = '−'.

This change implies that now it is only the **finite** non-negated verbs which create islands for Negative Concord, while infinitival non-negated verbs simply let the 'negation requirement' through.

Even though it works well for verbal clusters of the kind considered so far, there are a couple of problems with this solution. First of all, nothing stops negation percolation out of subjunctive infinitival clauses, thus predicting the ill-formed sentences like (33b) (repeated below) to be grammatical.

(33) b. * *Jan* nie *prosił, żeby* niczego *ruszać* *w jego pokoju.*
John not asked that nothing touch$_{inf}$ in his room

Solving this problem would require positing an additional constraint to the effect that complementizers stop negation percolation. This, however, would result in some redundancy as negation percolation out of finite subordinate clauses would be blocked by two independent principles.

A similar problem occurs in connection with imperative infinitival utterances:

(59) a. Niczego *mi tu* nie *ruszać!*
Nothing$_{gen}$ me here not touch$_{inf}$
'Don't touch anything here!'

b. * Niczego *mi tu ruszać!*

Again, sentences such as (59b) would have to be blocked by a separate constraint. This constraint would have to be non-trivial in the sense that it is not enough to state that utterances have to be NEG-CONC−: *nikt* 'nobody' or *żaden* 'none' are perfectly grammatical utterances (e.g., as answers to *Kto to zrobił?* 'Who did that?' and *Który chłopiec to zrobił?* 'Which boy did that?' respectively), while they are clearly NEG-CONC+.

Another problem this attempt faces is caused by periphrastic forms of future tense. In Polish, analytical future tense forms consist of the future auxiliary (a future form of the copula *być*) and either an infinitive or a past form of the verb, cf. (60a).[25]

(60) a. *Będę* *kończyć/kończył* *ten artykuł.*
AUX$_{1st,sg}$ finish$_{inf/past,3rd,sg,masc}$ this article
'I'll be finishing this article.'

b. Nie *będę* niczego *kończyć/kończył.*
not AUX$_{1st,sg}$ nothing$_{gen}$ finish$_{inf/past,3rd,sg,masc}$
'I won't be finishing anything.'

[25] Periphrastic future tense forms (auxiliary *być* plus main verb) are sometimes considered morphological word forms, cf. (Świdziński, 1992, p.233). In view of the fact that the auxiliary does not have to immediately precede the verb, cf. (60b), we do not regard this option as feasible.

As (60b) shows, since both forms of the verb let the negation percolate to the higher verb, it seems that past tense forms should be allowed to pass 'negation requirement' through. This, however, would require positing some additional constraints disallowing such a percolation of negation through past tense forms in all other contexts.

A more reasonable solution to this problem might be to analyse forms such as *kończył* above as participles, pace Borsley and Rivero (1994), and to put them on par with infinitivals as far as NC properties are concerned. This would nicely account for examples such as (60) above, as well as put both alternating forms implied by the future auxiliary, i.e., infinitival *kończyć* and participle *kończył* in a natural class of the non-finite verbs.

The final difficulty with the analysis of negation percolation in verb clusters in terms of finiteness is that, apparently, it does not make accounting for the Genitive of Negation facts of section 5.1 any easier. However, a connection between GoN and NC could be established by analysing genitive direct objects of transitive verbs (i.e., verbs normally subcategorizing for accusative complements) as Negative Polarity Items akin to negative pronouns, i.e., specified as NEG-CONC+. A number of technical problems would have to be solved when pursuing this line of thought.[26]

6.2 Attempt 2: Complex Predicate Formation

As we have shown above, in order to pursue the first attempt, we would have to solve some additional problems, which would impair the overall analysis. Moreover, we would have to give up the intuitions that both Negative Concord and Case Assignment are basically local mechanisms, i.e., relations holding between a word and its immediate dependents.[27] Below we present an analysis, which supports these intuitions and which seems to be both more elegant and empirically superior to the one above.

This attempt will take over the analysis of Negative Concord of section 4 almost unchanged, i.e., instead of modifying the way 'negation requirement' is percolated, we will concentrate on the issue of proper treatment of verb clusters in Polish. The solution presented below is based on the observation that whenever one of the verbs in the cluster is negated, arguments of lower verbs behave as if they were really arguments of the negated verb. That is, any analysis of verb clusters in which arguments of lower verbs are raised to

[26]A solution along these lines is presented in Przepiórkowski and Świdziński (1997).

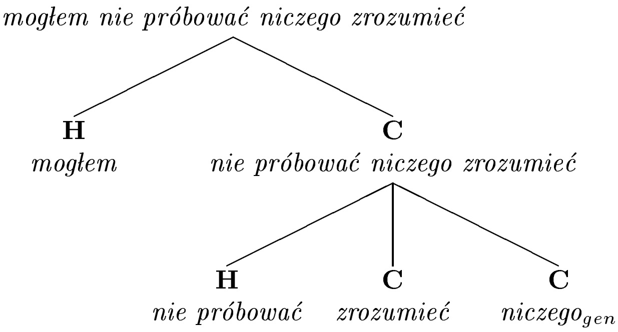
[27]Of course, NC is unbounded in the sense that it can cross an arbitrary number of NP and PP boundaries. However, it seems to be local in the sense that verbal projections in general constitute boundaries for negation percolation.

the nearest negated verb in the cluster (if any) will simultaneously account for both GoN and Negative Concord facts.

Before proceeding to the actual analysis, we will illustrate its prominent features with an example.

(61) *Mogłem* nie *próbować* niczego *zrozumieć.*
might-I not try$_{inf}$ nothing$_{gen}$ understand$_{inf}$
'I could have not tried to understand anything.'

Since we postulate that arguments of lower verbs should be raised to the negated verb, the schematic tree structure of (61) is as in (62).[28]

(62)


Note that *niczego*, originally an argument of *zrozumieć*, has been raised to *nie próbować.* At this point raising has been blocked by the negated verb and *niczego* could not be raised to *mogłem.* In other words, *niczego* has been **realized** as an argument of *nie próbować*, while it is an **unrealized** (raised) argument of *zrozumieć.*

It should not be a contentious issue that in raising constructions of this kind the behaviour of 'realized' arguments can differ from the behaviour of 'unrealized' ones, i.e., the relation between a verb and its realized arguments is different than the relation between this verb and its unrealized arguments. This has been claimed with respect to case assignment in Przepiórkowski (1996b): the process of syntactic (structural) case assignment to an argument of a verb is sensitive to the features of the verb from which the argument has been realized. Thus, in (61) case marking of *niczego* is genitive (GoN) because *niczego* is realized as an argument of *nie próbować*, a negated verb (cf. (62)). It does not matter here that it is also an argument of the non-negated verb *zrozumieć*: it is

[28] **H** and **C** represent here heads and complements, respectively.

only an unrealized argument of this verb, so it does not count for the purposes of case assignment.

Also the way Negative Concord percolates should be made sensitive to the 'realized' status. For example, in (61) above, the NEG-CONC+ value of *niczego* should not be allowed to percolate to *zrozumieć*, but should rather percolate to *nie próbować* and get discharged there. This requires changing the characteristics of the 'percolating' lexical items (given in section 4.3.5, page 26) to the following one:

- non-negated verbs, non-negated participles, non-negated gerunds, nouns (apart from negative pronouns), prepositions (apart from *bez*): NEG-CONC = '+' iff they have a **realized** argument, whose NEG-CONC is '+'; otherwise NEG-CONC = '–'.

A technical problem we have to face is how to ensure that any verb's arguments are raised only to the nearest negated verb in the verb cluster, e.g., that arguments of *kupić* in (52b) (repeated below) are raised, while arguments of *nie kupić* in (52c) are not.

(52) b. *Jan* nie *chciał kupić tego domu.*
John not wanted buy this$_{gen}$ house$_{gen}$
'John didn't want to buy this house.'

c. *Jan chciał* nie *kupić tego domu.*

A first approximation would be to postulate that negated verbs which take a verbal (unmarked) complement (e.g., *nie chciał*) are argument inheritance verbs,[29] while non-negated verbs (e.g., *chciał*) are never argument inheritance verbs. This works for verb clusters of length at most 2, but not for longer ones, cf. (53b):

(53) b. Nie *mogę chcieć tego napisać.*
not may-I want$_{inf}$ this$_{gen}$ write$_{inf}$
'I cannot want to write it.'

If we simplistically assume that only negated verbs are argument raising verbs, then, even though the argument of *chcieć*, i.e., *tego napisać*, will be raised to *nie mogę*, *tego* will remain an argument of a non-negated verb *napisać*, and hence — according to the Case Principle — will be predicted to be accusative.

[29] Argument inheritance verbs are these verbs which subcategorize for a lexical item and raise all the arguments of this item, cf. Hinrichs and Nakazawa (1990, 1994).

The crucial observation for an account dealing with verb clusters of any length is that it is exactly non-negated verbs, whose arguments are raised, and it is exactly negated verbs, which are 'barriers' to further raising. In other words, any verb that subcategorizes for a non-negated (unmarked) verbal complement must be an argument inheritance verb (i.e., this non-negated verbal complement in fact has to be lexical), while any verb that subcategorizes for a negated verbal complement cannot be an argument inheritance verb (i.e., it subcategorizes for a negated verbal phrase).[30]

We will illustrate the analysis above with example (61) (repeated below), this time in a more detailed way.

(61) *Mogłem* nie *próbować* niczego *zrozumieć.*
might-I not try_{inf} nothing_{gen} understand_{inf}
'I could have not tried to understand anything.'

- *mogłem* is a verb which subcategorizes for a negated infitival phrasal complement *nie próbować niczego zrozumieć*, i.e., no argument inheritance occurs here;
- *nie próbować* is a verb which subcategorizes for a non-negated infinitival lexical complement *zrozumieć* and raises complements of *zrozumieć*, in this case *niczego*;
- *zrozumieć* subcategorizes for *niczego*, but this argument is not realized by *zrozumieć*; instead, it is raised by *nie próbować* and realized as its argument;
- *zrozumieć* is a non-negated verb, so it is an island for negation, i.e., it requires all its realized arguments to be NEG-CONC−; this requirement is satisfied because *zrozumieć* has no realized arguments at all;
- *nie próbować* is a negated verb, so it is specified as NEG-CONC− regardless of what its arguments are; hence, 'negation requirement' introduced by *niczego* is cancelled here;
- NEG-CONC− percolates from *nie próbować* to *nie próbować niczego zrozumieć* via Negation Inheritance Principle (NIC, cf. page 25);

[30]This seems to suggest that for any verb subcategorizing for a verbal complement we will have to postulate two completely different lexical items. As will be shown in section A.4.6, these two lexical entries can be given a succinct description.

- *mogłem* is a non-negated verb, i.e., it creates an island for LDNC, so it is NEG-CONC− and also all its realized arguments have to be NEG-CONC−; this is satisfied because *nie próbować niczego zrozumieć* is NEG-CONC−;

- NEG-CONC− percolates from *mogłem* to *mogłem nie próbować niczego zrozumieć* via NIC.

6.3 Discussion

In the foregoing section, we have argued for the "argument composition" treatment of Polish verb clusters suggesting that verbal negation acts as a "barrier" for argument raising. In this way we were able to uniformly account for apparent exceptions to the locality of both Negative Concord and Case Assignment.

In this section, we will examine how the analysis of verb clusters developed above fares with respect to word order, coordination and binding facts of Polish.[31]

6.3.1 Word Order

One argument which might be put forward against the 'argument raising' analysis of verb clusters above is based on examples such as (63) below.[32]

(63) *Pisać list chciał Janek.*
write$_{inf}$ letter$_{acc}$ wanted John$_{nom}$
'John wanted to write a letter.'

The argument goes like this: since *pisać list* can be preposed, it is probably a constituent and, hence, the verb *chcial* subcategorizes for a VP rather than (as the analysis above would predict) for a V (*pisać*) and its complement (*list*).

Such facts should, however, be considered in a broader context. First of all, it is not only the "VP" that can be preposed, but also the verb or the complement alone:

(64) a. *Pisać chciał Janek list.*
write$_{inf}$ wanted John$_{nom}$ letter$_{acc}$

b. *List chciał Janek pisać.*

[31] We wish to thank Bob Borsley for his comments which inspired parts of this section.

[32] In Polish, word order is normally used to convey the information structure. Investigation of these matters is well beyond the scope of this paper, cf. however King (1995) for an account of information structure in Russian.

Moreover, it seems that each permutation of words in (63) will do, with differing information structure interpretations and various markedness.

This freedom of word order is parallel to that observed in the case of ditransitive verbs:

(65) a. *Janek dał Marysi cukierka.*
John$_{nom}$ gave Mary$_{dat}$ candy$_{acc}$
'John gave Mary a candy.'

b. *Marysi cukierka dał Janek.* (cf. (63))

c. *Marysi dał Janek cukierka.* (cf. (64a))

d. *Cukierka dał Janek Marysi.* (cf. (64b))

We conclude then that examples like (63) do not provide an argument against our analysis. What they seem to suggest is rather the opposite: since extraposing elements out of clauses and nominal phrases is extremely restricted, and no such restrictions are observed in examples (63)–(64), verb clusters must have the flat structure suggested by our analysis.

Unfortunately, this is not necessarily the right conclusion either. First of all, as examples such as (66) attest, VP is generally not a barrier for scrambling in Polish.

(66) *Janek Marysi cukierka podarował.*
John$_{nom}$ Mary$_{dat}$ candy$_{acc}$ gave

More importantly, similar scrambling occurs in cases in which, as our analysis predicts, no argument composition occurs (because it is blocked by intervening negation):

(67) a. *Janek chciał* nie *pisać listu.*
John$_{nom}$ wanted [not write$_{inf}$ letter$_{gen}$]
'John wanted not to write a/the letter.'

b. Nie *pisać listu chciał Janek.* (cf. (63))

c. Nie *pisać chciał Janek listu.* (cf. (64a))

d. *Listu chciał Janek* nie *pisać.* (cf. (64b))

This, however, should not worry us either: as already noted, VP in general does not constitute a barrier for scrambling.[33]

[33] If, for some reason, we wanted to postulate that verbal phrases are barriers for scrambling in Polish, two ways of dealing with the data in (67) would still be open to us: a linearization approach to word order à la Reape (1994, 1996) and Kathol (1995), or an 'existential' approach to NC and Case Assignment similar to the binding analysis of Manning and Sag (1995); Manning *et al.* (1996) (although the last move would amount to loosening the intuition of strict locality of NC and Case Assignment).

6.3.2 Coordination

Another objection to the analysis of section 6.2 might concern coordination facts:

(68) *Janek chciał pójść do kina lub spotkać się ze znajomymi.*
John wanted go$_{inf}$ to cinema or meet$_{inf}$ SELF with colleagues
'John wanted to go to the cinema or to meet friends.'

Coordination is often used as a constituency test, i.e., it is claimed that only constituents can be coordinated.[34] It is well known, however, that this test is not flawless, to say the least: examples of Non-Constituent Coordination (NCC) such as (69) have been extensively discussed in the literature.[35]

(69) *Mary gave Susan a book on Monday and Alice a record on Tuesday.* ((20d) in Dowty (1988))

What is perhaps less known is that the coordinated non-constituents do not have to be parallel, i.e., violations of both same category and constituent requirements on coordination can co-occur:

(70) *Janek kupił wczoraj kota a we wtorek psa.*
John bought [yesterday]$_{\mathrm{AdvP}}$ cat and [on Tuesday]$_{\mathrm{PP}}$ dog
'John bought a cat yesterday and a dog on Tuesday.'

(71) *Janek zażądał od Ewy wyjaśnień, a od Marii, żeby wyszła z pokoju.*
John demanded from Eve [explanations]$_{\mathrm{NP}}$ and from Mary [that$_{subj}$ she-left from room]$_{\mathrm{S[żeby]}}$
'John asked Eve to explain herself and Mary to leave the room.'

Whatever analysis is given for (70)–(71), will also account for examples like (68) above.

[34] It is sometimes also assumed that only same categories can be coordinated, but see, e.g., Sag *et al.* (1985). Clear cases of different category coordination are also attested for Polish, cf. e.g. (Saloni and Świdziński, 1985, p.133), (Bobrowski, 1988, pp.145–149) and (Kallas, 1993, p.106).

[35] See, e.g., Sag *et al.* (1985), Dowty (1988) and Milward (1994) for analyses of NCC, as well as (Bobrowski, 1988, pp.145–149) and (Kallas, 1993, pp.78–88) for some Polish data.

6.3.3 Binding

Also Polish binding facts do not uniformly support the analysis of verb clusters presented above.

A rough approximation of binding principles in Polish is that anaphora are subject-oriented, cf. (72a), and clause-bound, cf. (72b). However, the case of verbs making up verb clusters is more complex: any subject, sentential or clause internal, can be the antecedent of an anaphora, cf. (72c).

(72) a. *Jan$_i$ opowiadał Marii$_j$ o sobie$_{i/*j}$.*
John told Mary about self
'John told Mary about himself/herself.'

b. *Jan$_i$ powiedział, że Maria$_j$ opowiedziała o sobie$_{*i/j}$.*
John said that Mary talked about self
'John said that Mary told about herself.'

c. *Jan$_i$ kazał Marii$_j$ opowiadać o sobie$_{i/j}$.*
John ordered Mary tell$_{inf}$ about self
'John ordered Mary to talk about herself/himself.'

If the binding theory of Iida *et al.* (1994); Manning and Sag (1995) were adopted for Polish (cf. Marciniak and Kupść (1997)), i.e., if it were assumed that an anaphora has to be locally o-commanded (HPSG's analogue of GB's local c-command relation, cf. (Pollard and Sag, 1994, ch.6)) in **some** argument structure, the argument raising analysis of verb clusters presented in section 6.2 would actually nicely account for the ambiguity of (72c): the anaphora *o sobie* is present on argument structures of both verbs (although it is realized from the higher).

Alas, this line of thought is not available for us: since verbal negation blocks argument raising, we would expect sentences such as (73) below to be unambiguous, i.e., coindexation of *o sobie* with the higher subject should be ruled out. Although for many speakers this coindexation is markedly worse than in non-negated cases, it is still acceptable.

(73) *Jan$_i$ kazał Marii$_j$ nie opowiadać o sobie$_{?i/j}$.*
John ordered Mary not tell$_{inf}$ about self
'John ordered Mary not to talk about him/herself.'

However, it is far from clear whether anaphora can be bound only by subjects present on the same argument structure. For example, in sentences such as (74) below, the anaphora can be bound either by the sentential, or by the nominal subject.[36]

(74) *Maria$_i$ była dumna z [jego$_k$ miłości do siebie$_{i/k}$].*
Maria was proud of his love to self
'Mary$_i$ was proud that he$_j$ loved her$_i$/himself$_j$.'

Since there is no sense in which *do siebie*, an argument of the noun *miłości*, belongs to the argument structure of the verbal construction *była dumna*, we conclude that binding theory in Polish cannot be formulated on the basis of argument structure alone and that binding facts seem not to provide counterevidence for our analysis of NC and verb clusters in Polish.

6.3.4 Summary

In this section, we were trying to answer possible criticisms which might be put forward against the analysis of NC in the context of verb clusters developed in the preceding sections. We examined possible interactions of our analysis with word order, coordination and binding facts and, although these phenomena do not provide additional arguments for the analysis of section 6.2, they crucially do not provide arguments against it. Thus, in view of the fact that the argument raising approach allows to account for NC and Case Assignment (GoN) in the context of verbal clusters in an elegant and uniform way, this approach should be adopted as a zero hypothesis for further research.

7 Concluding Remarks

7.1 Summary

The aim of this paper is to present an explicit analysis of verbal negation in Polish. The main syntactic issue we deal with is the so-called Negative Concord, i.e., obligatory verbal negation triggered by negative pronouns. This phenomenon occurs not only if a negative pronoun is a direct argument of the verb but also if it is embedded in such an argument. We show that this 'negation requirement' can cross any number of NP and PP boundaries,[37] but

[36] See Willim (1989) and Reinders-Machowska (1990) for more examples of this kind. Willim (1995) explicitly argues that possessor NPs should be analysed as NP-subjects in Polish. (74) is based on (3.64) in (Willim, 1989, p.73).

[37] We mention an exception to the rule that nouns and prepositions never bind negation, namely preposition *bez*.

it cannot percolate through subordinate clause and adverbial participle phrase boundaries. Facts are more complicated with respect to gerunds and adjectival participles, which seem to bind negation when they are negated (just as negated verbs do) but allow percolation when non-negated (while non-negated verbs create islands). As side issues, we also mention polysemy of negative pronouns and remark on structurality of pronoun *nic*.

Since Negative Concord is an unbounded dependency which is both introduced, percolated and discharged lexically, we provide a lexical UDC analysis of this phenomenon couched in terms of HPSG, akin to that of Sag (1996b,a).

We proceed to extend our approach to verb clusters. We investigate an interesting (and so far unnoticed) interaction of Negative Concord and Case Assignment (Genitive of Negation) in verb clusters and minimally modify our analysis using argument inheritance technique of Hinrichs and Nakazawa (1990, 1994) and case assignment analysis of Przepiórkowski (1996a,b). Finally, we defend our analysis of verb clusters against possible criticisms.

It should be noted that the analysis presented above dispenses with functional projections (such as NegP, AspP, AgrP, etc.) often assumed in contemporary generative linguistics. Indeed, we side with Kim and Sag (1996) in seeing no motivation for introducing such categories.

7.2 Further Research

The analysis presented in this paper, although accounting for a vast range of data, is by no means exhaustive. We do not discuss the behaviour of negation percolation in the context of adjectival and adverbial phrases, and only mention gerundial and participial phrases. Another interesting issue related to verbal negation which remained unexplored in this paper is the behaviour of negative conjunct *ani* 'nor', which, as a sentential (verbal) conjunct, triggers negation of all its sentential arguments, while in its nominal variety, requires the governing verb to be negated (Kallas, 1994).[38]

More importantly, we concentrated only on syntactic issues completely ignoring the semantic impact of verbal negation, a topic of much research. Moreover, although purely semantic account of the full range of data presented here seems to be excluded, it would be interesting to see to what extent analysis based on notions such as downward monotonicity (pace van der Wouden and Zwarts (1993) and Dowty (1994)) can capture the Polish data.[39]

[38]Unfortunately, any analysis of this phenomenon needs a formal account of coordination, which remains an underdeveloped area of HPSG.

[39]It is striking, for example, that in all Negative Concord languages we are aware of, the preposition 'without' can satisfy 'negation requirement.'

A Formal HPSG Analysis

This section provides a relatively formal and explicit HPSG description of the main ideas of the analysis developed in sections 4 and 6.2. It assumes basic knowledge of HPSG constructs (Pollard and Sag, 1994, 1987).

After introducing the basic sort hierarchy and principles commonly assumed in HPSG in section A.1, we present our treatment of argument structure in section A.2. Then we move to the account of Case Assignment employed in our analysis of interaction between Genitive of Negation and Negative Concord in verb clusters (section A.3) and to the formalization of our analysis of verbal negation (section A.4).

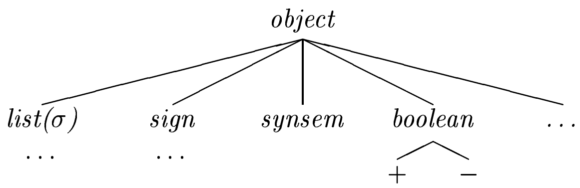
A.1 Basics

The part of sort hierarchy and appropriateness specifications presented here is essentially the same as in Pollard and Sag (1994). Three dots '...' in sort hierarchy (appropriateness specifications) mean that perhaps more sorts (attributes) should be added at this level.

A.1.1 Sort Hierarchy

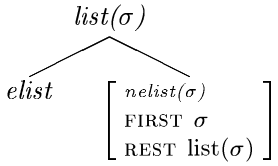
General There are at least the following subsorts of the most general sort, *object*: *list(σ)*, *boolean*, *sign*, *synsem*, *local*, *nonlocal*, *con-struc*, *valence*, *category* and *argument*, the last of which we introduce in A.2 below.

(75)



As in Pollard and Sag (1994), sort *list* is parametric, i.e., *list(σ)* is a list whose all elements are of sort σ.

(76)



Signs We do not deal with quantifiers here, so only attributes PHON and SYNSEM are taken into consideration as appropriate for *sign*. As in Pollard and Sag (1994), *sign*s are partitioned into *word*s and *phrase*s, the latter appropriate for an additional attribute, DAUGHTERS, expressing constituent structure of the sign (cf. (82) below).

(77)
$$\begin{bmatrix} \textit{sign} \\ \text{PHON list} \\ \text{SYNSEM synsem} \\ \ldots \end{bmatrix}$$

$$\textit{word} \qquad \begin{bmatrix} \textit{phrase} \\ \text{DAUGHTERS con-struc} \end{bmatrix}$$

The values of PHON contain all the phonological information of the sign, but we will do with orthographic abbreviations of such information. On the other hand, the SYNSEM attribute grouping all the syntactic and semantic information of a sign (both local and non-local) will play an important role here.

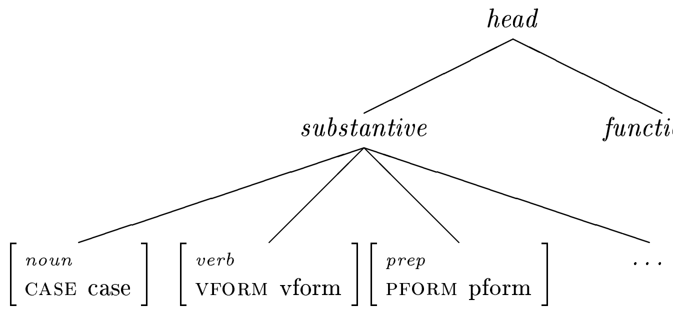
Syntax and Semantics

(78)
$$\begin{bmatrix} \textit{synsem} \\ \text{LOCAL} & \begin{bmatrix} \textit{local} \\ \text{CATEGORY} & \begin{bmatrix} \textit{category} \\ \text{VALENCE} & \begin{bmatrix} \textit{valence} \\ \text{SUBJECT list(synsem)} \\ \text{COMPS list(synsem)} \\ \ldots \end{bmatrix} \\ \text{HEAD head} \end{bmatrix} \\ \text{CONTENT content} \\ \text{CONTEXT context} \end{bmatrix} \\ \text{NONLOCAL nonlocal} \end{bmatrix}$$

As (78) shows, the syntactic part of *synsem* structures represents information about both subcategorization requirements (VALENCE, cf. section A.1.2 below) and morphosyntactic features (HEAD).

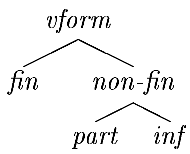
HEAD values differ greatly depending on the part of speech the sign represents. Thus, substantive (major) categories are partitioned into *noun*s (with case information, cf. section A.3 below), *verb*s (with verb form information, cf. (80) below) and prepositions (with prepositional form, cf. (81)) *inter alia*.

(79)

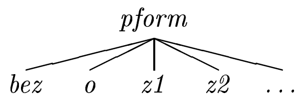


For Polish, the sort *vform* has two immediate subsorts, i.e., *fin*ite and *non-fin*ite. We follow Borsley and Rivero (1994) in assuming that periphrastic future forms are best analysed as an auxiliary plus a non-finite form, be it a participle or an infinite, see discussion around (60) in section 6.1, thus the subsorts of *non-fin*ite are *part*iciple and *inf*inite.[40]

(80)



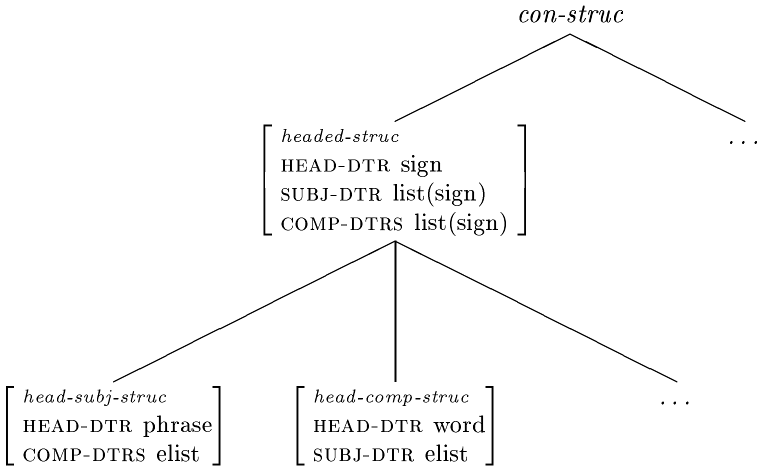
(81)



Constituent Structure As far as constituent structures are concerned (cf. (77) above), we limit our attention to *head-complement* and *head-subject* structures. The extension of our analysis to other headed sorts is trivial.

[40]This is only the first approximation of the *vform* hierarchy. It does not take into account, e.g., impersonal *-no*/*-to* forms.

(82)



A.1.2 Principles

Head Feature Principle Head Feature Principle (HFP) is responsible for identity of morphosyntactic information along the projection path. The formulation below is standard formalization of the HFP given in (Pollard and Sag, 1994, p.34):

(83) $\begin{bmatrix} \textit{phrase} \\ \textsc{dtrs}\ \text{headed-struc} \end{bmatrix} \rightarrow$

$$\begin{bmatrix} \textsc{synsem}|\textsc{loc}|\textsc{cat}|\textsc{head}\ \boxed{1} \\ \textsc{dtrs}|\textsc{head-dtr}|\textsc{synsem}|\textsc{loc}|\textsc{cat}|\textsc{head}\ \boxed{1} \end{bmatrix}$$

Schemata The Head-Subject Schema and the Head-Complement Schema are taken from (Pollard and Sag, 1994, p.402), with modifications resulting from introducing SUBJ and COMPS attributes:

(84) $$\textit{phrase} \rightarrow \begin{bmatrix} \textsc{synsem}|\textsc{loc}|\textsc{cat}|\textsc{val}|\textsc{subj}\ \langle\rangle \\ \textsc{dtrs}\ \text{head-subj-struc} \end{bmatrix} \vee$$

$$\begin{bmatrix} \textsc{synsem}|\textsc{loc}|\textsc{cat}|\textsc{val}|\textsc{comps}\ \langle\rangle \\ \textsc{dtrs}\ \text{head-comp-struc} \end{bmatrix} \vee$$

...

Valence Principle The two implicational constraints given below encode the Valence Principle of (Pollard and Sag, 1994, p.348), with signs_to_synsems expressing the relation between lists of *sign*s and corresponding lists of their *synsem*s. In section A.3.3 we slightly reformulate Valence Principle taking into consideration case assignment facts.

(85) $\begin{bmatrix} \textit{phrase} \\ \text{DTRS headed-struc} \end{bmatrix} \rightarrow$

$$\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT}|\text{VAL}|\text{COMPS} \ \boxed{1} \\ \text{DTRS} \begin{bmatrix} \text{HEAD-DTR}|\text{SS}|\text{LOC}|\text{CAT}|\text{VAL}|\text{COMPS} \ \boxed{2'} \oplus \boxed{1} \\ \text{COMP-DTRS} \ \boxed{2} \end{bmatrix} \end{bmatrix} \wedge \text{signs\_to\_synsems}(\boxed{2}, \boxed{2'})$$

(86) $\begin{bmatrix} \textit{phrase} \\ \text{DTRS headed-struc} \end{bmatrix} \rightarrow$

$$\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT}|\text{VAL}|\text{SUBJ} \ \boxed{1} \\ \text{DTRS} \begin{bmatrix} \text{HEAD-DTR}|\text{SYNSEM}|\text{LOC}|\text{CAT}|\text{VAL}|\text{SUBJ} \ \boxed{2'} \oplus \boxed{1} \\ \text{SUBJ-DTR} \ \boxed{2} \end{bmatrix} \end{bmatrix} \wedge \text{signs\_to\_synsems}(\boxed{2}, \boxed{2'})$$

A.2 Argument Structure

We used the term 'argument structure' throughout the main body of this article. In this section, we will flesh this notion out.

A.2.1 Historical Note

In (Pollard and Sag, 1994, ch.1–8), the SUBCAT attribute is used both to encode the valence properties of a sign and to provide locus for the binding theory. However, in chapter 9, Pollard and Sag (1994) follow Borsley (1987, 1989) in splitting this attribute into SUBJECT and COMPLEMENTS[41] (cf. (78) above), retaining SUBCAT for the sake of not having to reformulate their binding theory of chapter 6. SUBCAT is supposed to be present only on lexical signs and be equal to concatenation of SUBJECT, (SPECIFIER,) and COMPS.

In subsequent HPSG work, SUBCAT is renamed to ARGUMENT-STRUCTURE (abbreviated to ARG-S or ARG-ST; cf. e.g. Sag and Godard (1993), Sag and Fodor (1994), Manning and Sag (1995) and Manning *et al.* (1996)) and often

[41] Another valency attribute introduced in (Pollard and Sag, 1994, ch.9) is SPECIFIER.

assumed to be the concatenation of relevant VALENCE features only in the canonical case, some *word* objects possibly violating this requirement (cf. esp. Manning and Sag (1995)).

For the purpose of this analysis, we will assume that the ARG-S value is always equal to the concatenation of SUBJ and COMPS values.[42]

A.2.2 Lexical ARG-S

Subsorts of Category Even though ARG-S is assumed to be appropriate on lexical objects only, it is never specified how to ensure that it does not appear on phrases; there is not a straightforward solution to this problem because ARG-S is not actually appropriate for sort *word*, but rather for sort *category*, which does not distinguish between words and phrases.[43] Clearly, in order to make ARG-S appropriate only for lexical *category*, such a distinction should be posited.

(87)

$$\begin{bmatrix} \textit{category} \\ \text{HEAD head} \\ \text{VALENCE valence} \end{bmatrix}$$

$$\begin{bmatrix} \textit{word-category} \\ \text{ARGUMENT-STRUCTURE list(synsem)} \end{bmatrix} \qquad \textit{phrase-category}$$

Category Principle Having introduced two subsorts of *category*, i.e., *word-category* and *phrase-category*, we still have to ensure that the former appears only on lexical *sign*s and the latter only on phrasal *sign*s. This can be done in at least two ways. One is to introduce lexical vs. phrasal distinction on sorts *synsem* and *local* in the following way:

---

[42] This assumption has to be dropped when dealing with extraction via Complement Extraction Lexical Rule rather than via traces.

[43] As suggested by Höhle (1996), the simplest solution to this problem would be to give up the assumption that ARG-S is an attribute of *category* and make it appropriate for *word*s. The solutions pursued here are more conservative in that they do not change the overall feature geometry.

(88)

$$\begin{bmatrix} \textit{sign} \\ \textsc{synsem}\ \text{synsem} \\ \ldots \end{bmatrix}$$

$$\begin{bmatrix} \textit{word} \\ \textsc{synsem}\ \text{word-synsem} \end{bmatrix} \qquad \begin{bmatrix} \textit{phrase} \\ \textsc{synsem}\ \text{phrase-synsem} \end{bmatrix}$$

(89)

$$\begin{bmatrix} \textit{synsem} \\ \textsc{local}\ \text{local} \\ \ldots \end{bmatrix}$$

$$\begin{bmatrix} \textit{word-synsem} \\ \textsc{local}\ \text{word-local} \end{bmatrix} \qquad \begin{bmatrix} \textit{phrase-synsem} \\ \textsc{local}\ \text{phrase-local} \end{bmatrix}$$

(90)

$$\begin{bmatrix} \textit{local} \\ \textsc{category}\ \text{category} \\ \ldots \end{bmatrix}$$

$$\begin{bmatrix} \textit{word-local} \\ \textsc{category}\ \text{word-category} \end{bmatrix} \qquad \begin{bmatrix} \textit{phrase-local} \\ \textsc{category}\ \text{phrase-category} \end{bmatrix}$$

A disadvantage of this solution is that it unnecessarily increases the signature, i.e., it introduces sorts which have no empirical justification.

The other solution is positing constraints like those below:

(91) $\textit{word} \rightarrow \begin{bmatrix} \textsc{synsem}|\textsc{local}|\textsc{cat}\ \text{word-category} \end{bmatrix}$

(92) $\textit{phrase} \rightarrow \begin{bmatrix} \textsc{synsem}|\textsc{local}|\textsc{cat}\ \text{phrase-category} \end{bmatrix}$

A disadvantage of this solution is that it treats within the grammar proper a purely ontological problem, i.e., a problem, which should be rather dealt with in the sort hierarchy.

For the sake of concreteness, we adopt the latter solution, although nothing seems to hinge on this choice.[44]

[44] This remark applies also to fn.43.

A.2.3 ARG-S and Adjuncts

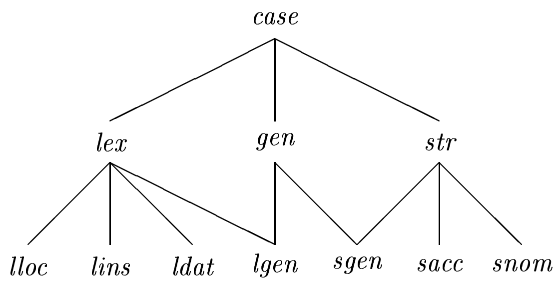
We follow the work of Miller (1992), Iida *et al.* (1994), van Noord and Bouma (1994) and others and assume that a lexical rule adds adjuncts to the lexical item's COMPS and ARG-S lists. Thus, all adjuncts modifying a verb belong to the verb's argument structure.

A.3 Case Assignment

A.3.1 Case Hierarchy

We take over the lexical vs. structural case dichotomy of Przepiórkowski (1996a, 1995) and assume nominative, accusative and genitive (in negated contexts) to be structural cases, hence assigned in the syntax, and locative, instrumental, dative and genitive (in other positions) to be lexical (inherent, in GB's terminology), i.e., assigned in the lexicon.

(93)



A.3.2 Realized Arguments

In Pollard and Sag (1994), values of ARG-S (i.e., SUBCAT), SUBJ and COMPS are assumed to be lists of *synsem*s. However, as argued in Przepiórkowski (1996b), in order to formalize in a non-configurational way case principles like those postulated in Heinz and Matiasek (1994) (for German), Yoo (1993) (for Korean), Pollard (1994) (for German), Grover (1995) (for English) and Przepiórkowski (1996a) (for Polish), these values have to be enriched with information on whether a given argument has been realized (cancelled off) from the given argument structure, as opposed to being raised to a higher argument structure. Hence, values of ARG-S, SUBJ and COMPS should be lists of *argument*s, rather than *synsem*s as in (78) and (87):

(94) $\begin{bmatrix} \textit{argument} \\ \text{ARGUMENT synsem} \\ \text{REALIZED boolean} \end{bmatrix}$

In the lexicon, the value of REALIZED of an argument is underspecified, i.e., of sort *boolean*. That means, that at this level it is still not known whether this argument will be realized from the given ARG-S, or raised to a higher verb in a cluster. This value gets resolved to '+' by the Valence Principle (see section A.3.3 below) and to '−' in the process of raising (cf. section A.4.6).

A.3.3 Valence Principle

In order for the REALIZED feature to get resolved properly, the Valence Principle on page 46 has to be slightly modified.

(95) $\begin{bmatrix} \textit{phrase} \\ \text{DTRS headed-struc} \end{bmatrix} \rightarrow$

$$\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT}|\text{VAL}|\text{COMPS} \ \boxed{1} \\ \text{DTRS} \begin{bmatrix} \text{HEAD-DTR}|\text{SS}|\text{LOC}|\text{CAT}|\text{VAL}|\text{COMPS} \ \boxed{2'} \oplus \boxed{1} \\ \text{COMP-DTRS} \ \boxed{2} \end{bmatrix} \end{bmatrix}$$
$$\wedge \ \text{signs\_to\_realized\_args}(\boxed{2},\boxed{2'})$$

(96) $\begin{bmatrix} \textit{phrase} \\ \text{DTRS headed-struc} \end{bmatrix} \rightarrow$

$$\begin{bmatrix} \text{SYNSEM}|\text{LOC}|\text{CAT}|\text{VAL}|\text{SUBJ} \ \boxed{1} \\ \text{DTRS} \begin{bmatrix} \text{HEAD-DTR}|\text{SYNSEM}|\text{LOC}|\text{CAT}|\text{VAL}|\text{SUBJ} \ \boxed{2'} \oplus \boxed{1} \\ \text{SUBJ-DTR} \ \boxed{2} \end{bmatrix} \end{bmatrix}$$
$$\wedge \ \text{signs\_to\_synsems}(\boxed{2},\boxed{2'})$$

The only difference is the relation mapping a list of *sign*s to the list of their *synsem*s. Since in our approach SUBJ and COMPS take lists of *argument*s as their values (cf. section A.2), the mapping relation has to be modified accordingly. Moreover, all the arguments cancelled via Valence Principle are marked as REALIZED+.

signs_to_realized_args(⟨⟩, ⟨⟩).

$$\text{signs\_to\_realized\_args}(\langle \begin{bmatrix} \textit{sign} \\ \text{SYNSEM} \ \boxed{1} \end{bmatrix} \rangle \oplus \boxed{2}, \langle \begin{bmatrix} \textit{argument} \\ \text{ARGUMENT} \ \boxed{1} \\ \text{REALIZED} \ + \end{bmatrix} \rangle \oplus \boxed{3}) :-$$
$$\text{signs\_to\_realized\_args}(\boxed{2},\boxed{3}).$$

A.3.4 Morphological Verbal Negation

As argued in Kupść and Przepiórkowski (1997), verbal negation should be treated in Polish as a morphological category. For this reason, we introduce attribute NEG, appropriate for sort *verb* (cf. (79) above):

(97) $\begin{bmatrix} \textit{verb} \\ \textsc{vform}\ \text{vform} \\ \textsc{neg}\ \text{boolean} \end{bmatrix}$

Note the role NEG plays in case assignment rules (99) and (100) below.

A.3.5 Case Principle for Polish

This is a simplified version of the Case Principle for Polish. For example, it does not take into account the case of numeral phrases in subject position or the case of arguments of prepositions and nouns. See Przepiórkowski (1996a, 1995) for discussion.

An important aspect of this formalization is that case assignment is sensitive to whether the given argument has been realized, i.e., the Case Principle does not assign case to arguments of a lower verb if they have been raised to a higher verb. Constraint (98) resolves case of verbs' subjects, (99) assigns accusative to structural objects of non-negated verbs, while (100) is responsible for Genitive of Negation.

(98) $\begin{bmatrix} \textit{word-category} \\ \textsc{head}\ \text{verb} \\ \textsc{arg-s}\ \left\langle \begin{bmatrix} \textsc{arg}\ \text{NP}[\textit{str}] \\ \textsc{realized}\ + \end{bmatrix} \right\rangle \oplus \boxed{1}_{\textit{list}} \end{bmatrix} \rightarrow$

$$\begin{bmatrix} \textsc{arg-s}\ \langle \begin{bmatrix} \textsc{arg}\ \text{NP}[\textit{snom}] \end{bmatrix} \rangle \oplus \boxed{1} \end{bmatrix}$$

(99) $\begin{bmatrix} \textit{word-category} \\ \textsc{head}\ \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ - \end{bmatrix} \\ \textsc{arg-s}\ \boxed{1}_{\textit{nelist}} \oplus \left\langle \begin{bmatrix} \textsc{arg}\ \text{NP}[\textit{str}] \\ \textsc{realized}\ + \end{bmatrix} \right\rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow$

$$\begin{bmatrix} \textsc{arg-s}\ \boxed{1} \oplus \langle \begin{bmatrix} \textsc{arg}\ \text{NP}[\textit{sacc}] \end{bmatrix} \rangle \oplus \boxed{2} \end{bmatrix}$$

(100) $$\begin{bmatrix} \textit{word-category} & \\ \textsc{head} & \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ + \end{bmatrix} \\ \textsc{arg-s} & \boxed{1}_{\textit{nelist}} \oplus \langle \begin{bmatrix} \textsc{arg}\ \text{NP}[\textit{str}] \\ \textsc{realized}\ + \end{bmatrix} \rangle \oplus \boxed{2}_{\textit{list}} \end{bmatrix} \rightarrow$$
$$\begin{bmatrix} \textsc{arg-s}\ \boxed{1} \oplus \langle \begin{bmatrix} \textsc{arg}\ \text{NP}[\textit{sgen}] \end{bmatrix} \rangle \oplus \boxed{2} \end{bmatrix}$$

(...)

A.4 Verbal Negation

A.4.1 *nonlocal* Sort

In section 4, we introduce a nonlocal attribute responsible for negation percolation, namely NEG-CONC. We do not deal with other types of unbounded dependencies.

(101) $$\begin{bmatrix} \textit{nonlocal} \\ \textsc{neg-conc}\ \text{boolean} \\ \ldots \end{bmatrix}$$

A.4.2 Introducing Negation

Negative pronouns introduce 'negation requirement,' i.e., they are NEG-CONC+:

(102) $$\begin{bmatrix} \textit{word} & \\ \textsc{phon} & \langle \text{nikt} \rangle \\ \textsc{synsem} & \begin{bmatrix} \textsc{loc}|\textsc{cat}|\textsc{head} & \begin{bmatrix} \textit{noun} \\ \textsc{case}\ \text{nom} \end{bmatrix} \\ \textsc{nonloc}|\textsc{neg-conc} & + \end{bmatrix} \end{bmatrix}$$

A.4.3 Negation Percolation

Negation percolation is similar to Lexical Amalgamation of SLASH (Sag, 1996a, p.15), but only REALIZED+ arguments are taken into account. This allows us to account for complex behaviour of Negative Concord in the context of verb clusters, cf. section 5.2 above and A.4.6 below.

(103) $$\begin{bmatrix} \textit{word} & \\ \textsc{ss}|\textsc{l}|\textsc{c} & \begin{bmatrix} \textsc{head}\ \text{noun} \vee \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ - \end{bmatrix} \vee \begin{bmatrix} \textit{prep} \\ \textsc{pform}\ \neg\text{bez} \end{bmatrix} \\ \textsc{arg-s}\ \boxed{1}\text{list(argument)} \end{bmatrix} \end{bmatrix} \rightarrow$$
$$\begin{bmatrix} \textsc{synsem}|\textsc{nonloc}|\textsc{neg-conc}\ \boxed{2} \end{bmatrix} \wedge \text{sum\_neg}(\boxed{1}, \boxed{2})$$

$$\text{sum\_neg}(\langle\rangle,\ -).$$

$$\text{sum\_neg}(\langle \begin{bmatrix} \text{ARG}|\text{NONLOC}|\text{NEG-CONC} & + \\ \text{REALIZED} & + \end{bmatrix} \rangle \oplus \text{list},\ +).$$

$$\text{sum\_neg}(\langle \neg \begin{bmatrix} \text{ARG}|\text{NONLOC}|\text{NEG-CONC} & + \\ \text{REALIZED} & + \end{bmatrix} \rangle \oplus \boxed{1},\ \boxed{2})\ \text{:-}$$

$$\quad \text{sum\_neg}(\boxed{1},\ \boxed{2}).$$

A.4.4 Negation Inheritance Constraint

Negation Inheritance Constraint (NIC) has been introduced in section 4.3.2. It is essentially analogous to the Slash Inheritance Principle and *Wh*-Inheritance Principle of Sag (1996a). (Note also similarity to the Head Feature Principle (83).)

(104) $$\begin{bmatrix} \textit{phrase} \\ \text{DTRS headed-struc} \end{bmatrix} \rightarrow \begin{bmatrix} \text{SYNSEM}|\text{NONLOCAL}|\text{NEG-CONC} & \boxed{1} \\ \text{DTRS}|\text{HEAD-DTR}|\text{SYNSEM}|\text{NONLOCAL}|\text{NEG-CONC} & \boxed{1} \end{bmatrix}$$

A.4.5 Discharging Negation

All verbs (negated or not), as well as preposition *bez*, are specified as NEG-CONC−.[45] If nothing more is said (as in the case of negated verbs and *bez*), this results in discharging negation. If, however, also negation percolation is assumed (as in the case of non-negated verbs, cf. section A.4.3 below), the total result is blocking negation.

(105) $$\begin{bmatrix} \textit{word} \\ \text{SYNSEM}|\text{LOC}|\text{CAT}|\text{HEAD verb} \end{bmatrix} \rightarrow \begin{bmatrix} \text{SYNSEM}|\text{NONLOC}|\text{NEG-CONC} & - \end{bmatrix}$$

(106) $$\begin{bmatrix} \textit{word} \\ \text{SYNSEM} \begin{bmatrix} \text{LOC}|\text{CAT}|\text{HEAD} \begin{bmatrix} \textit{prep} \\ \text{PFORM bez} \end{bmatrix} \\ \text{NONLOC}|\text{NEG-CONC} \ - \end{bmatrix} \end{bmatrix}$$

[45] Constraint (105) should be ideally understood as a constraint on the lexicon saying that all verbal lexical entries have to be NEG-CONC−. Alas, this cannot be expressed in pure HPSG, so we model this generalization by leaving the value of NEG-CONC underspecified on lexical entries and positing constraint (105), whose role is to resolve this value to '−'. These remarks apply also to (103).

Note that according to sections 3.3 and 3.4 also adverbial participles, negated adjectival participles and negated gerund forms should be analysed as 'negation cancelling' items. However, since data are less clear here, we will refrain from positing a formal constraint to this end. A similar remark applies to the negation percolation constraint (103) above.

A.4.6 Verb Clusters

$$\begin{bmatrix} \textit{word} \\ \textsc{phon}\ \langle \text{mogę} \rangle \\ \textsc{ss}|\textsc{l}|\textsc{c} \begin{bmatrix} \textit{cat} \\ \textsc{head} \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ - \end{bmatrix} \\ \textsc{v}|\textsc{comps}\ \left\langle \begin{bmatrix} \textit{argument} \\ \textsc{arg}|\textsc{l}|\textsc{c} \begin{bmatrix} \{_1 \textit{phrase-cat}, \textit{word-cat}\} \\ \textsc{head} \begin{bmatrix} \textit{verb} \\ \textsc{neg}\ \{_1 +, -\} \end{bmatrix} \\ \textsc{comps}\ \boxed{1} \end{bmatrix} \end{bmatrix} \right\rangle \oplus \boxed{1'} \end{bmatrix} \end{bmatrix} \wedge$$

raise($\boxed{1}$,$\boxed{1'}$)

The lexical entry above illustrates our 'argument inheritance' analysis of verb clusters in Polish. This entry employs named disjunction and it should be understood as a shorthand for two lexical entries: one in which the first element on SS|LOC|CAT|VAL|COMPS is phrasal (*phrase-cat*) and negated (NEG+), and another, in which it is lexical (*word-cat*) and non-negated (NEG−).

raise(⟨⟩, ⟨⟩).

$$\text{raise}(\left\langle \begin{bmatrix} \textit{argument} \\ \textsc{arg}\ \boxed{1} \\ \textsc{realized}\ - \end{bmatrix} \right\rangle \oplus \boxed{2}, \left\langle \begin{bmatrix} \textit{argument} \\ \textsc{arg}\ \boxed{1} \end{bmatrix} \right\rangle \oplus \boxed{3}) \text{ :-}$$

raise($\boxed{2}$, $\boxed{3}$).

A couple of remarks are in order here. First, note that argument inheritance is happening, i.e., the complements of the first element on the verb's COMPS list are appended to this list. Secondly, what is being raised is only the *synsem*s, rather than *argument*s: this is ensured by relation raise/2.[46] Thirdly, the raised arguments are marked as REALIZED− on the lower verb. This means that they will not be taken into consideration by the Case Principle (cf. section A.3) or

[46] As noted by Ivan Sag (p.c.), if in raising constructions *local* objects (rather than *synsem*) were raised, then the "realizedness" of an argument could be modelled in sort hierarchy (e.g., by dividing *synsem* objects into *realized-synsem* and *unrealized-synsem*) rather than via REALIZED attribute.

Negation Percolation (cf. sum_neg in section A.4.3) as arguments of the lower verb. (Of course, they will be taken into consideration by these principles operating on the higher verb, here *mogę*, unless these arguments are raised even further.)

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