Proceedings of the 13th International Conference on Head-Driven Phrase Structure Grammar

Linguistic Modelling Laboratory,
Institute for Parallel Processing,
Bulgarian Academy of Sciences,
Sofia,
Held in Varna

Stefan Müller (Editor)

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Editor's note

The 13th International Conference on Head-Driven Phrase Structure Grammar (2006) was held in Varna and organized by the Linguistic Modelling Laboratory of the Institute for Parallel Processing of the Bulgarian Academy of Sciences in Sofia.

The conference featured 2 invited talks, 16 papers, and 4 posters selected by the program committee (Anne Abeillé, Raul Aranovich, Emily Bender, Gosse Bouma, António Branco, Chan Chung, Ann Copestake, Berthold Crysmann, Elisabeth Engdahl, Anna Feldman, Dan Flickinger, Howard Gregory, Daniele Godard, Erhard Hinrichs (chair), Jong-Bok Kim, Valia Kordoni, Ania Kupsc, Shalom Lappin, Robert Levine, Stefan Müller, Tsuneko Nakazawa, Petya Osenova, Gerald Penn, Luisa Sadler, Ivan Sag, Manfred Sailer, Gautam Sengupta, Jan-Philipp Soehn (chair), Jesse Tseng, Nathan Vaillette, Stephen Wechsler, Eun-Jung Yoo, Larisa Zlatic).

A workshop about *Regularity and Irregularity in Grammar and Language* was attached to the conference. It featured one invited talk and 5 papers, selected by the program committee.

In total there were 39 submissions to the main conference and submissions to the workshop. We want to thank the respective program committee for putting this nice program together.

Thanks go to Kiril Simov and Petya Osenova, who were in charge of local arrangements.

As in the past years the contributions to the conference proceedings are based on the five page abstract that was reviewed by the respective program committees, but there is no additional reviewing of the longer contribution to the proceedings. To ensure easy access and fast publication we have chosen an electronic format.

The proceedings include all the papers except those by Stefan Müller, Shravan Vasishth, and Frank van Eynde.

Part I
Contributions to the Main Conference

The syntax of comparative correlatives in French and Spanish

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Abstract

Comparative correlative (CC) constructions have received much attention in recent years. Major issues have been whether they involve special constructions and whether they have symmetric or asymmetric structures. Evidence from Romance suggests that they require special constructions and that they may be either symmetric or asymmetric. French has a single construction which is asymmetric for some speakers and symmetric for others. Spanish has two distinct constructions, one asymmetric and the other symmetric with quite different properties. The facts can be accommodated in a straightforward way within construction-based HPSG.

Introduction

Long neglected as part of the "periphery", comparative correlatives (CC) have been much studied recently.[↑] Culicover & Jackendoff (1999) propose (for English) that they are a special construction with a symmetric syntax and an asymmetric semantics. Borsley (2004) argues that they are one of a number of non-standard head-adjunct structures (in which the first clause is a syntactic adjunct). Den Dikken (2005) proposes a universal syntactic analysis of CCs as involving a subordinate (relative) clause adjoined to a main clause and claims that no special construction is needed.

We present here some new data from Romance languages showing that CCs require special constructions and that two syntactic patterns are available: an asymmetric pattern, as in English, Spanish (1a) or Italian (2a), and a symmetric pattern, as in Spanish (1b), or Italian (2b),

(1) Spanish
  a Cuanto más leo, (tanto) más entiendo
  how-much more I-read, (that-much) more I understand
  'The more I read, the more I understand'
  b Más leo (y) más entiendo
  more I-read (and) more I-understand
  'The more I read, the more I understand'

(2) Italian
  a Quanto più leggo, (tanto) più capisco
  how-much more I-read, (that-much) more I-understand
  'The more I read, the more I understand'

[↑] We want to thank for their comments the audience of the HPSG Conference, and especially Olivier Bonami, Danièle Godard, François Mouret, Petya Osenova, Carl Pollard, and Ivan Sag. We also thank for their judgements Paul Cappeau, Annie Delaveau, Marianne Desmets, Claire Blanche-Benveniste, Ángel Gallego, Brenda Laca, Sergio García, Oscar Garcia-Marchena, Jaume Mateu, Georges Rebuschi, Louisa Sadler, Marie-José Savelli, and Dan Van Raemdonck.

b Più leggo (e) più capisco
more I-read (and) more I-understand
'The more I read, the more I understand'

In contrast, French appears to have only one construction (3), but, depending on the speakers, it can be analysed as belonging to the symmetric or the asymmetric pattern.

(3) French Plus je lis (et) plus je comprends
more I read (and) more I understand
'The more I read, the more I understand'

We will look first at French and then consider Spanish. We will not discuss Italian, which does not seem to differ from Spanish in any substantial way.

1. The syntactic properties of French CC

1.1 The internal structure of each clause

In each clause, the fronted phrase can be AP, AdvP, NP or PP and must begin with a comparative form (*plus, moins, mieux, meilleur, moindre, pire*), or a predicative preposition (*en, de*):

(4) a [Plus brillante]$_{AP}$ est l' interprétation, [plus profond]$_{AP}$ est
more brilliant is the interpretation, more deep is
le ravissement de l' auditeur
the feelings of the listener
'The more brilliant the interpretation is, the deeper the listener's feelings are'

b [Plus vite]$_{AdvP}$ vous diagnostiquez, [meilleur médecin]$_{NP}$
more quickly you diagnose, better doctor
vous êtes
you are
'The faster you diagnose, the better a doctor you are'

c [Plus] tu te reposes, [en meilleure forme]$_{PP}$ tu seras à ton
more you you rest in better shape you will-be on your
retour
return
'The more you rest, the better, you feel when you return'

It cannot begin with a determiner (5a) or a non predicative preposition (5b):

(5) a *[Plus vite]$_{AdvP}$ vous diagnostiquez, [un meilleur médecin]$_{NP}$
more fast you diagnose, a better doctor
vous êtes
you are

b * [Plus] tu sors, [avec plus de gens]$_{PP}$ tu parles
more you go-out, with more of peole you talk

Fronted *plus* (or *moins*) can exhibit 'quantification at a distance' over an NP or AP, like other French degree adverbs (*combien, tant, beaucoup*...cf. Obenauer 1983) :

(6) a Plus l' interprétation est [brillante]$_{AP}$, plus le ravissement
more the interpretation is brilliant, more the feelings
est [profond]$_{AP}$
is deep
'The more brilliant the interpretation is, the deeper the listener's feelings are'

b [Moins d'argent]$_{NP}$ vous avez, [plus de mal]$_{NP}$ vous avez
less of money you have, more of trouble you have
pour vivre
for living
'The less money you have, the more trouble you have for living'

c Moins vous avez [d' argent]$_{NP}$, plus vous avez [de mal]$_{NP}$
less you have of money more you have of trouble
pour vivre
for living
'The less money you have, the more trouble you have for living'

In both clauses, the fronted constituent can be analysed as a filler, (as in English, cf. Ross 1967, Culicover and Jackendoff 1999, Borsley 2004), as shown by the possibility of an unbounded dependency, as in (7a), and by the possibility of stylistic nominal subject inversion, as in (7b), where '__' marks a gap :

(7) a Plus vous voulez avoir [de calme], [plus loin] il faut
more you want have of calm, more far it must
que vous alliez __
that you go
'The more quietness you want to-have, the further you have to go'

b Plus il voudra avoir de calme, [plus loin] devra
more he will-want have of calm more far will-have
partir __ Jean
go Jean
'The more quiteness he wants to have, the further Jean will have to go'

As in English, both clauses must be finite:

(8) a Je crains que plus je mange, plus je grossisse
I fear that more I eat more I get-fat
'I fear that the more I eat, the more I get fat'
b *Je crains de plus manger, plus grossir
I fear of more eat more get-fat

The internal structure of each clause is quite similar to what we find in English. However, French allows future morphology in the first clause, as shown in (7b), but does not allow a determiner before the comparative word.[1]

1.2. The relationship between the two clauses

As noted by Beck (1997), and Culicover & Jackendoff (1999) with regard to English, CC are interpreted like conditional sentences, which means that a sentence such as (3) can be paraphrased as 'Si je lis plus, alors je comprends plus' (If I read more, then I understand more).

We will call the first clause C1 and the second clause C2. These two clauses have a fixed ordering, like if-then clauses (cf Borsley 2004), but their syntax is quite different from that of conditional sentences.

First, as already noted, C1 can have future morphology (9a), which is not possible with an if-then clause (9b).

(9) a Plus Jean courra, plus il sera fatigué
more Jean will-run more he will-be tired
'The more Jean will run, the more he will be tired'
b *Si Jean courra, alors il sera fatigué
if Jean will-run then he will-be tired

Second, C2 cannot be an imperative or a question in CC (10a-b), whereas this is possible with an if-then clause (11):

---

[1] As noted by Savelli, the item 'au' (which is an amalgam of the preposition *à* 'to' and the determiner *le* 'the') can precede the comparative in non standard varieties of French : *Au plus tu lis, au mieux tu comprends* (the more you read, the better you understand).

(10) a *Plus tu lis, plus apprends!
more you read more learn!
b *Plus tu lis, plus comprends-tu?
more you read more understand you
c Est-ce que plus on lit, plus on apprend?
is it that more one reads, more one learns?
'Is it the case that the more one reads, the more one learns?'

(11) a Si tu cours, alors ne te fatigue pas!
if you run then not you get-tired not
'If you run, don't get tired'
b Si Jean court, alors qui l' aidera?
if Jean runs then who him will-aid
'If Jean runs, who is going to help him?

The only way to ask a question is to embed the whole CC under an interrogative marker (*est-ce que*), as in (10c) (cf Savelli 1993). We do not want to discuss Beck's semantic analysis here, we simply want to add the constraint, using Ginzburg and Sag (2000)'s distinction between sentence types, that French CC clauses must be declarative clauses.

We are still left with the question of whether C1 is a subordinate clause or not in French. An answer to this question has been proposed by Den Dikken (2005) who claims that CC universally consist of a subordinate clause adjoined to a main clause. In his approach, C1 is analysed as a free relative clause, and the syntax of a CC is equivalent to something like: *However much I read, that much I understand*. As we show elsewehere (Abeillé and Borsley in prep), it is clear that C1 in French does not bear any similarity with a free relative. Free relatives in French must have the complementizer *que* after the fronted wh- element, and must have subjunctive morphology :

(12) a Où que tu ailles, je serai content,
where that you go-subj, I will-be happy
'Wherever you go, I will be happy'
b *Où tu ailles, je serai content
where you go-subj, I will-be happy
c *Où (que) tu vas, je serai content
where that you go-ind, I will-be happy

Den Dikken's answer is thus incorrect, but we still have to test whether C1 is some other kind of subordinate clause in French. For this, we use three syntactic tests: clitic subject inversion, extraction, and verbal mood. Clitic subject inversion is ruled out in subordinate clauses (13a), but it is possible in C1 (13b):

(13) a *Je pense que peut-être viendra-t- il
I think that maybe will-come he

b (Paul a peu de temps). Aussi plus vite commencera-t-il,
Paul has little of time so more fast will-begin he
plus vite aura-t- il fini
more fast will-have he finished
'Paul doesn't have much time. So the faster he starts, the faster he is done.'

If C2 is a main clause (and C1 an embedded clause), it is also expected that one can extract a complement out of C2 without extracting anything out of C1 (cf 14a). Extraction is indeed possible out of French CCs (cf 14a), but only out of both clauses simultaneously (14b):

(14) a C'est un livre, que si tu veux, je lirai __
it is a book that if you want I will-read

b C'est un livre que plus tu lis __, plus tu apprécies __
it is a book that more you read more you like
'It is a book that the more you read, the more you like'

c *C'est un livre dont plus tu le lis, plus tu te
it is a book of-which more you it read more you you
souviens __
remember

d *C'est un livre dont plus tu te souviens __, plus tu
it is a book of-which more you you remember more you
l' apprécies.
it like

If C2 is a main clause it is also expected that its verbal mood is selected (in embedded contexts) independently of the verbal mood of C1 (15b). We thus test CC embedded under a verb triggering the subjunctive mood (16). It is not possible to have the selected subjunctive form in C1 only (16a), which means that it is not the case that C1 is a main clause and C2 an embedded clause. With respect to subjunctive in C2, there is variation among speakers. Some speakers accept it only when there is also a subjunctive form in C1 as in (16c) (and reject 16b), while others can have subjunctive in C2 only as in (16b) (and reject 16c):

(15) a Il faudrait que l'on reçoive / *reçoit des aides
it must that one receives(subj / * ind) some help
'One should receive help'

b Il faudrait que si on en a besoin, on reçoive des aides
it must that if one of-it has-ind need one gets-subj some help
'One should, if one needs it, get help'

(16) a *Il faudrait que plus on en ait besoin, plus on
it must that more one of-it has-subj need more one
reçoit d' aides
gets-ind of help

b %Il faudrait que plus on en a besoin, plus on reçoive
it must that more one of-it has-ind need more one gets-subj
d'aides
of aids
'One would like that the more one needs it, the more help one gets.'

c %Il faudrait que plus on en ait besoin, plus on reçoive
it must that more one of-it has-subj need more one gets-subj
d'aides
of aids
'One would like that the more one needs it, the more help one gets'

We call speakers who require the same mood in both clauses speakers A, and those who don't speakers B. Speakers B may also accept the conjunction *et* between the two clauses in this context (although not all of them do). However**,** it is clear that (16b) cannot be analysed as a type of unlike coordination. It is true that one can coordinate a subjunctive clause and an indicative clause in French, as in the following example:

(17) a Jean a dit qu' il avait raison et qu' on aille
Jean has said that he has-ind right and that one goes-subj
au diable
to-the devil
'Jean said that he was right and that we should go to hell'

b Jean a dit qu'il avait raison
'Jean said that he was right'

c Jean a dit qu'on aille au diable
'Jean said that we should go to hell'

However, (17a) is only allowed because *dire* ('say') is a verb that takes both an indicative and a subjunctive complement clause in French (cf 17b, c). The situation is different with the French verb *falloir* ('must')**,** which only allows the subjunctive (cf 15). So we conclude that (16b) can only receive an asymmetric interpretation, with C1 as a subordinate clause and C2 as a main clause.

Some speakers (usually speakers B) also accept a clause with a fronted comparative as an adjunct clause, after an ordinary clause, outside CC constructions:

(18) %Ça risque d'empirer, plus le temps passe
'Things may get worse, the more time is passing'

In this case, as in the 'reversed' CC construction in English, it is clear that the second clause is a subordinate clause, while the first clause is just an ordinary main clause, with a comparative meaning but no comparative fronting.

Now let us return to speakers A. For them, as for all speakers, the conjunction *et* ('and') is optional, and each clause cannot stand alone as an independent clause. Thus, this is different from ordinary clausal coordination. Another difference from ordinary coordinate constructions (Savelli 1995) is that gapping is impossible:

(19) a Plus Paul lit Proust, (et) plus Marie lit Balzac.
'The more P reads Proust, the more M reads Balzac'
b *Plus Paul lit Proust (et) plus Marie Balzac
more Paul reads Proust, more Marie Balzac

If one analyzes gapped constituents as syntactic fragments (and thus non finite, cf. Culicover and Jackendoff 2005), one can capture this ungrammaticality by a contraint saying that in a CC each clause must be finite.

We conclude that the syntax of French CC is symmetric with respect to clitic inversion and to extraction, for all speakers. For A speakers, the syntax is completely symmetric and can be analysed as a subtype of coordinate phrase (with some specific constraints). For B speakers, the syntax is less symmetric: there can be syntactic asymmetry based on verbal mood, and the CC can be analysed as a subtype of head-adjunct phrase (with some specific constraints).

2. Spanish Comparative Correlatives

In Spanish, we find two distinct syntactic patterns for CC, more clearly than in French. We rely on Sánchez (2005)'s data for the asymmetric pattern, and on our informants for the symmetric pattern (which Sánchez ignores).

2.1. Internal structure of each clause

The fronted comparative begins with a comparative form (*más* 'more', *menos* 'less', *mejor* 'better', *menor* 'smaller', *mayor* 'bigger', *peor* 'worse') which can be premodified by *cuanto* 'how-much' (in C1), or *tanto* 'that-much' (in C2):[2]

[2] In the examples that follow *cuanto* 'how-much' and *tanto* 'that-much' show the required morpho-syntactic agreement.

(20) a (Cuantos) más libros leo, (tantas) más
(how-much-mpl) more books I-read (that-much-fpl) more
cosas entiendo
things I-understand
'The more books I read, the more things I understand'

b Cuanto más prescribas, [mejor médico]$_{NP}$ serás
how-much more you-prescribe better doctor you'll-be
'The more you prescribe, the better a doctor you will be'

The comparative phrase can begin with a preposition, but not with a determiner:

(21) a Cuanto más sales, [de mejor humor]$_{PP}$ te encuentras
how-much more you-go-out, of better mood you are
'The more you go out, the better you feel'

b *Cuanto más prescribas, [un mejor médico] serás
how-much more you-prescribe, a better doctor you'll-be

As in French and English, the fronted constituent can be analysed as extracted. It is indeed part of an unbounded dependency :

(22) Cuanto más uno quiere comprender, tanto más tiene
how-much more one wants learn that-much more has
que leer
that read
'The more one wants o understand, the more one has to read'

For *cuanto* and *tanto*, there are two options: they could be analysed as specifiers of comparatives, or as functional heads of each clause. The latter analysis is untenable, because it is clear that *cuanto* and *tanto* must occur inside the fronted comparative phrase. When the fronted phrase is a PP, they must occur after the Preposition:[3]

(23) a Con cuanta más gente hables, más vas a aprender
with how-much more people you-talk, more you-will-go to learn
'The more people you talk to, the more you will learn'

b *Cuanta con más gente hables, más vas a aprender
how-much with more people you-talk more you-will-go to learn

[3] Sanchez (2005) proposes that *tanto* is the functional head of the whole CC construction, taking C1 as a specifier and C2 as a complement. This analysis is untenable for the same reason.

c Cuanto más salgas, con tanta más gente
how-much more you-go-out with that much more people
hablarás
you-will-talk
'The more you go out, the more people you will talk to'

d *Cuanto más salgas, tanta con más gente
how-much more you-go-out, that-much with more people
hablarás
you-will- talk

We thus conclude that each clause in Spanish is a type of head-filler phrase, with a comparative phrase in the filler constituent. As in French and English, both clauses must be finite (24a). As in French, C1 can have future morphology (24b). C2 is normally a declarative clause. It may not be an imperative, but for some speakers it may be interrogative when C1 contains *cuanto*, and for some both clauses may be interrogative if *cuanto* is absent.

(24) a *Quisiera (cuanto) más leer, más comprender
I'd-like (how-much) more to-read more to-understand

b Cuanto más leerás, más entenderás
how-much more you-will-read more you-will-understand
'The more you read, the more you'll understand'

(25) a *Cuanto más comes, ¡más engorda!
how-much more you-eat, more you-get-fat-imp

b. %Cuanto más comes, ¿más engordas?
how-much more you-eat more you-get-fat
'The more you eat, the more you get fat?'

c. *¡Más come y más engorda!
more you-eat-imp and more you-get-fat-imp

d %¿Más comes y más engordas?
more you-eat and more you-get-fat
'The more you eat and the more you get fat?'

2.2 The relationship between the two clauses

In Spanish, two different CC constructions can be identified: the first one (with *cuanto*) disallows *y* ('and') insertion and displays asymmetry in mood or extraction, while the second one (without *cuanto*) permits *y*-insertion and requires syntactic similarities between the two clauses (same mood, and parallel extraction):

(26) a Cuanto más leo (*y) (tanto) más entiendo
how-much more I-read (*and) (that-much) more I-understand
'The more I read, the more I understand.'

b Más leo (y) más entiendo
more I-read (and) more I-understand

The *cuanto* clause is a subordinate clause, and can be used outside the CC as an ordinary adjunct clause in (27a). A plain comparative clause (with a fronted comparative but without *cuanto*) cannot (27b):

(27) a Entiendo más, cuanto más leo
I-understand more how-much more I-read
'I understand more, the more I read'
b *Entiendo más, más leo
I-understand more more I-read

Different verbal moods can occur in the asymmetric pattern (ex. (28a) is from Sánchez 2005), whilst the same mood is required in both clauses in the symmetric pattern (ex. 28b).

(28) a Es posible que cuantos más libros {lees/leas}
is possible that how-much more books you-read (ind/subj)
más {*sabes/sepas} del asunto.
more you-know (*ind/subj) of-the subject
'It is possible that the more books you read, the more you know on the subject'
b Es posible que más libros {*lees/leas} y más {*sabes/sepas} del asunto.
'It is possible that the more books you read, the more you know on the subject'

Extraction is posible out of C2 only, but not out of C1 only in the asymmetric pattern (ex. (29a,b) are from Sánchez 2005).

(29) a. Dime de quién$_i$ [[cuanto más lo conoces] menos
tell-me of whom how-much more him you-know less
te fías __ $_i$]
you-trust
'Tell me whom the more you know him, the less you trust'
b. *Dime a quién$_i$ [[cuanto más conoces __ $_i$] menos te fías
tell-me to whom how-much more you-know less you trust
de él]
of him

In contrast, extraction is not possible out of one clause only in the symmetric pattern (30a, b), but it is possible out of both clauses simultaneously (30c):

(30) a. *Dime de quién$_i$ más lo conoces y menos te fías __ $_i$
tell-me of whom more him you-know and less you trust

b. *Dime a quién$_i$ más conoces __ $_i$ y menos te fías de él
tell-me to whom more you-know and less you trust of him

c Este es [un tipo de aceite]$_i$ del que más uno compra __ $_i$
this is a type of oil of which more one buys
y más utiliza __ $_i$ en las ensaladas
and more one uses in the salads
'This is a type of oil which the more one buys, the more one uses in the salads'

We conclude that the symmetric CC in Spanish (without *cuanto*) is a non standard type of coordinate construction, and the asymmetric CC (with *cuanto*) is a non standard type of subordinate construction, with the *cuanto*-clause being the subordinate clause.

There are further differences between the two patterns. The order of both clauses is fixed with the symmetric pattern (for a given meaning) but, for some speakers, it is freer with the asymmetric pattern:

(31) a %(Tanto) más entiendo, cuanto más leo
that-much more I-read how-much more I-understand
'I understand more, the more I read'

b %Más me parezco a Scarlett Johansson,
more myself I-resemble to SJ,
cuanto más me maquillo
how-much more myself I-make-up
'I resemble more Scarlett Johansson, the more I make up'

Another difference is semantic. In the symmetric pattern the proposition denoted by C1 cannot be cancelled out, whereas in the asymmetric pattern it can:

(32) a. Más me maquillo y más me parezco a
more myself I-make-up and more myself I-resemble to
Scarlett Johansson (# pero no me maquillo)
SJ (but not myself I-make-up)
'The more I make up, the more I resemble Scarlett Johansson (#but I don't make up)'

b. Cuanto más me maquillo, más me parezco a
how-much more myself I-make-up more myself I-resemble to
Scarlett Johansson (pero no me maquillo)
SJ (but not myself I-make-up)
'The more I make up, the more I resemble Scarlet Johanson (but I don't make up)'

We conclude that Spanish has two CC patterns available: an asymmetric construction and a symmetric one, which differ both syntactically and semantically.

3. An HPSG Analysis

3.1. The internal structure of each clause

We rely on an EDGE feature (cf. Bonami et al. 2004), which is part of SYNSEM and has two values LEFT and RIGHT (each with their own *left* and *right* values). We define a LEFT feature [CORREL *string*] to identify the comparative correlative forms in the lexicon, and to percolate the information on the left edge of the clause. We define the EDGE feature principle as a default principle (which can be violated by specific constructions such as CC):

(33) EDGE feature Principle:

$$\text{phrase} \Rightarrow \begin{bmatrix} \text{SYNSEM} & \begin{bmatrix} \text{LEFT} & /\,[1] \\ \text{RIGHT} & /\,[2] \end{bmatrix} \\ \text{DAUGHTERS} & \langle [\text{LEFT} / [1]], \ldots [\text{RIGHT} / [2]] \rangle \end{bmatrix}$$

The comparative forms in CC are specifiers or adjuncts to various categories (like other degree quantifiers) with a MOD feature selecting a scalar predicate (cf. Abeillé and Godard 2003), and a special feature [LEFT CORREL *compar*].We thus have the following forms for the adverb *plus* ('the more') and the predicative adjective *meilleur* ('the better') :

(34) a Lexical entry for correlative *plus*

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{adverb} \\ \text{MOD [CONT RELS } \{..[\textit{scalar - rel}]..\}\text{]} \end{bmatrix} \\ \text{LEFT} & [\text{CORREL } \textit{compar}] \end{bmatrix}$$

b Lexical entry for correlative *meilleur*

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{adjective} \\ \text{PRED} & + \end{bmatrix} \\ \text{LEFT} & [\text{CORREL } \textit{compar}] \end{bmatrix}$$

Other forms (with the same CORREL feature) are also defined for the specifier *plus* and the attributive adjective.[4]

We assume that the conjunction (*et*) and the predicative prepositions

4 For an HPSG analysis of quantification at a distance, see Abeillé et al. 2005.

inherit the LEFT CORREL feature from their complement.[5]

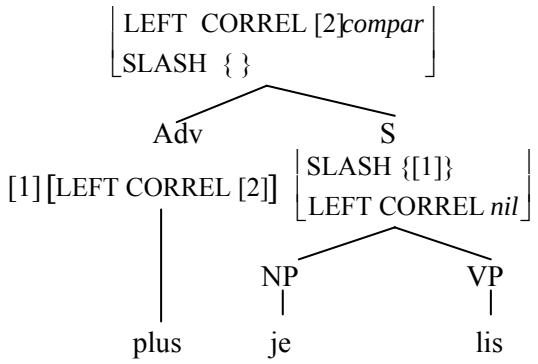
We also assume that comparative adverbs, like other French adverbs, can appear as complements in the ARG-ST list of the verb (cf Abeillé & Godard 2003) thanks to the Extended Argument Conservation Principle:

(35) Extended Argument conservation principle :

$$\textit{verb} \Rightarrow \begin{bmatrix} \text{HEAD}[0] \\ \text{VAL}\begin{bmatrix} \text{SUBJ} < [1] > \\ \text{COMPS}[2] + [3] - \text{list}(\textit{non - canon}) \end{bmatrix} \\ \text{ARG - ST} < [1] > + [2] + [3]\text{list}([\text{MOD}[\text{HEAD}[0]]]) \end{bmatrix}$$

Comparative adverbs can thus be extracted like ordinary complements.

We thus have the following representation for the first clause in (1) :



In Spanish, the comparative forms (e.g., *más* 'more') are similarly analysed as adverbs or specifiers, with a feature LEFT CORREL *compar*. As adverbs, they appear in the ARG-ST list of the verb and thus can be extracted. The markers *cuanto* 'how much' and *tanto* 'that much' are analysed as specifiers with two specific LEFT CORREL values. They both select a comparative phrase (by their SPEC feature), and are also (optionally) selected by the comparative forms (via their SPR features). We thus have the following lexical entries (with the sign 'v' for 'or'):

(36) a Lexical entry for correlative *más*

$$\begin{bmatrix} \text{HEAD [MOD [CONT RELS } \{...[\textit{scalar - rel}]...\}] \\ \text{VAL [SPR } < ([\text{FORM } \textit{cuanto} \text{ v } \textit{tanto}]) >] \\ \text{LEFT [CORREL } \textit{compar}] \end{bmatrix}$$

[5] We follow Abeillé 2003, 2005 in analysing coordinate conjunctions as weak syntactic heads with a CONJ feature.

b Lexical entry for correlative *cuanto*

$$\begin{bmatrix} \text{HEAD [FORM } \textit{cuanto}\text{]} \\ \text{SPEC} \begin{bmatrix} \text{HEAD} \neq \textit{prep} \\ \text{LEFT [CORREL } \textit{compar}\text{]} \end{bmatrix} \\ \text{LEFT [CORREL } \textit{cuanto}\text{]} \end{bmatrix}$$

c Lexical entry for correlative *tanto*

$$\begin{bmatrix} \text{HEAD [FORM } \textit{tanto}\text{]} \\ \text{SPEC} \begin{bmatrix} \text{HEAD} \neq \textit{prep} \\ \text{LEFT [CORREL } \textit{compar}\text{]} \end{bmatrix} \\ \text{LEFT [CORREL } \textit{tanto}\text{]} \end{bmatrix}$$

The ungrammaticality of examples (23b,d) above is captured by the ban on prepositional phrases in the SPEC features of *cuanto* and *tanto*. Other entries are needed for the use of these forms as determiners (with obligatory agreement with the following Noun).

For French B speakers and for Spanish asymmetric CC we define a special type of adjunct clause (with a specific MOD feature):

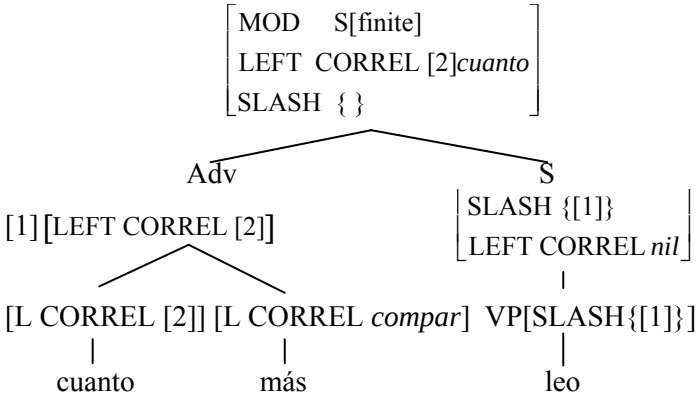
(37) a French B speakers

$$\textit{compar-clause} \rightarrow \begin{bmatrix} \text{SYNSEM} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{finite} \\ \text{MOD (S[} \textit{finite}\text{])} \end{bmatrix} \\ \text{LEFT CORREL } \textit{compar} \end{bmatrix} \\ \text{HD - DTR} < \text{[HEAD MOD non]} > \end{bmatrix}$$

b *cuanto*-clause $\rightarrow$

$$\begin{bmatrix} \text{SYNSEM} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{finite} \\ \text{MOD S[} \textit{finite}\text{]} \end{bmatrix} \\ \text{LEFT CORREL } \textit{cuanto} \end{bmatrix} \\ \text{HD - DTR} < \text{[HEAD MOD non]} > \end{bmatrix}$$

We thus have the following representation for the first clause in (2a):



3.2. The two types of CC constructions

We follow Borsley (2004) in assuming that CC belong to a family of specific correlative constructions which inherit from more general constructions of the language. Correlative constructions can be defined as binary clauses, each clause starting with a correlative phrase. We define a general (binary) correlative-clause type, that is suitable for CC and also for other correlative constructions, such as *as-so* constructions in English (cf Borsley 2004):[6]

(38) *correl-clause* → *declar*-clause &

$$\begin{bmatrix} \text{SYNSEM} & \begin{bmatrix} \text{HEAD } \textit{finite} \\ \text{LEFT CORREL nil} \end{bmatrix} \\ \text{DAUGHTERS} & < [\text{LEFT CORREL} \neq \text{nil}], [\text{LEFT CORREL} \neq \text{nil}] > \end{bmatrix}$$

This is a subtype of declarative clause, with two daughters with a non *nil* LEFT CORREL feature, and no passing up of the LEFT CORREL value of the Daughters.

CC inherit from the general syntax of correlative constructions. French and Spanish data show that CC have two subtypes:

• symmetric CC, which inherits from coordinate phrases (Spanish and French A speakers)

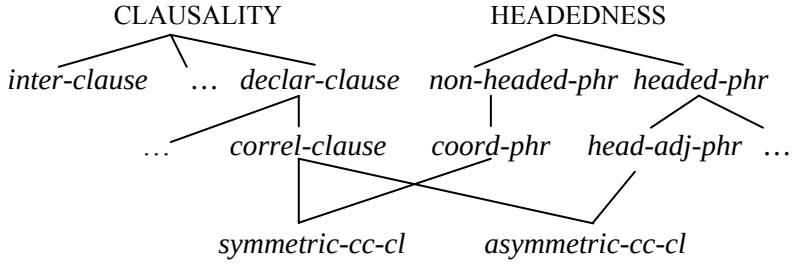
• asymmetric CC, which inherits from head-adjunct phrases (Spanish and French B speakers)

---

6 We include here constructions such as *if* … *then* clauses in English, or *tantôt* … *tantôt* constructions in French. We do not include Hindi type correlatives, which differ from our constructions in at least three properties: only the first clause is introduced by a correlative word, it is mobile and it is also optional (cf Pollard and Sag 1994).

We thus define the following clause hierarchy:

(39)



We now consider the two subtypes of cc-clauses. The symmetric subtype inherits from coordinate phrases. We assume that coordinate phrases are n-ary non-headed phrases with a (optional) conjunction inside one (or more) conjunct(s), and shared features between mother and daughters. A simplified version of the constraints on coordinate phrases is the following :[7]

(40) a Coordinate-phrase $\rightarrow$ $\left[\begin{array}{ll} \text{SYNSEM} & \text{CONJ nil} \\ \text{DTRS} & \text{list([CONJ nil])} + \text{list([CONJ [0]} \neq \text{nil])} \end{array}\right]$

b Coordinate-phrase $\rightarrow$ non-headed-phrase &

$$\left[\begin{array}{ll} \text{SYNSEM} & \left[\begin{array}{l} \text{HEAD [1]} \\ \text{SLASH [2]} \end{array}\right] \\ \text{DTRS} & \text{list}\left(\left[\begin{array}{l} \text{HEAD [1]} \\ \text{SLASH [2]} \end{array}\right]\right) \end{array}\right]$$

Constraint (40a) defines the coordinate phrase as n-ary, with any number of conjuncts without a conjunction, and any number of conjuncts with one (and the same) conjunction. Constraint (40b) defines two distributive features : HEAD and SLASH, and imposes morphosyntactic identiy and extraction identity between all conjuncts.

CC clauses inherit from correl-clauses and can be defined as follows for French (with 'v' meaning 'or'):

7 For a reformulation with captures non identity between the conjuncts, see for example Sag (2002).

(41) a French A speakers :

symmetric-cc-cl → *correl-cl & coord-phr &*

$$[\text{DTRS} <[\text{LEFT CORREL compar}], \begin{bmatrix}\text{CONJ nil v et}\\ \text{LEFT CORREL } \textit{compar}\end{bmatrix}>$$

b French B speakers :

asymmetric-cc-cl → *correl-cl & head-adjunct-phr &*

$$\begin{bmatrix}\text{HD - DTR [0]}\\ \text{DTRS} \quad < \begin{bmatrix}\text{LEFT CORREL } \textit{compar}\\ \text{SLASH [1]}\end{bmatrix}, [0] \begin{bmatrix}\text{CONJ nil v et}\\ \text{LEFT CORREL } \textit{compar}\\ \text{SLASH [1]}\end{bmatrix}\end{bmatrix}$$

c French B speakers :

asymmetric-cc-cl → NON-HD-DTR precedes HD-DTR

Constraint (41a) defines the symmetric type of CC (for A speakers) : it inherits from coordinate phrases, and has an optional conjunction *et* ('and') in the second conjunct. Constraint (41b) defines the asymmetric type of CC (for B speakers) : it inherits from head-adjunct phrases, and the second clause is the Head daughter, with an optional conjunction *et* ('and'). The constraint on similarity of extraction (cf examples 15 above) is captured by identity value of the SLASH feature of each daughter. Constraint (41c) imposes that in the asymmetric construction, the head daughter is always the second daughter.

Spanish has two subtypes of CC clauses with very similar descriptions :

(42) a *symmetric-cc-cl* → *correl-cl & coord-phr &*

$$[\text{DTRS} <[\text{LEFT CORREL compar}], \begin{bmatrix}\text{CONJ nil v y}\\ \text{LEFT CORREL } \textit{compar}\end{bmatrix}>$$

b *asymmetric-cc-cl* → *correl-cl & hd-adjunct-phr &*

$$\begin{bmatrix}\text{HD - DTR [0]}\\ \text{DTRS} \quad < [\text{LEFT CORREL } \textit{cuanto}], [0][\text{LEFT CORREL } \textit{tanto} \text{ v nil}]\end{bmatrix}$$

Constraint (42a) defines the symmetric type of CC in Spanish: it inherits from coordinate phrases, and has an optional conjunction *y* ('and') in the second conjunct. Constraint (42b) defines the asymmetric type of CC in Spanish: it inherits from head-adjunct phrases, and the second clause is the Head

daughter. The *cuanto* element is obligatory in C1 and with an optional *tanto* element.

Conclusions

Comparative correlatives (CC) inherit from other constructions in each language but require specific constructions. Two syntactic patterns are clearly available for Spanish, a symmetric one (with the conjunction *y*) which can be analysed as a particular case of a coordinate construction, and an asymmetric one (with the specifier *cuanto*) which can be analysed as a particular case of a subordinate construction (like English CC). French only has one CC construction, which behaves as a symmetric construction (with the conjunction *et*), but with, for some speakers, a few asymmetric properties.

We conclude that two different syntactic patterns are needed for CC constructions crosslinguistically (contra Den Dikken 2005). Their semantics remains to be investigated.

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A functional typology of copular "be": Towards an HPSG formalisation

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Abstract

A functional typology of copular “be” in Russian allows us to systematically relate variants of predication with and without copula. The analysis sketched in this article does not need empty categories; neither does it have to stipulate categories, category changes or constituents that are not morphologically signalled. With regard to HPSG formalization, the presented approach independently motivates the use of features and mechanisms that are already available in this framework.

1. Introduction

The wide range of morphosyntactic variation in verbless clauses cross-linguistically reveals that they are not a single structural type at all. In the Slavic language family, Russian offers the broadest spectrum of potentially copula-less constructions, comprising not only lexically predicative categories (1a), but also ascriptive (1b) and identificational (1c) predication, as well as locative (1d), existential (1e) and possessive (1f) constructions.

(1) a. *On* *gord* *rezul'tatami.*
he.NOM.SG.M proud.PRD-ADJ.SG.M results.INST.PL
He is proud of the results.

b. *On* *durak* | *tolstyj* | *vysokogo rosta.*
he.NOM.SG.M fool.NOM.SG.M | fat.NOM.SG.M | high height.GEN
He is a fool | fat | of a high height (i.e. tall).

c. *On* – *brat* *Maksima.*
he.NOM.SG.M brother.NOM.SG.M Maksim.GEN
He is Maksim’s brother.

d. *Boris* *na* *sobranii.*
Boris.NOM at meeting.LOC
Boris is at a meeting.

e. *Za* *uglom* (*est’*) *magazin*
behind corner.SG.M.INST (is) store.NOM.SG.M
There is a store around the corner.

f. *U* *Kati* (*est’*) *samovar.*
at Katia.GEN (is) samovar.NOM.SG.M
Katia has a samovar.

Distributional and periphrastic tests suggest that these distinctions are plausible cross-linguistically, as they systematically correspond to truth-conditional semantic differences. In all these constructions there will be an overt copular ‘be’ as soon as the tense and mood information is different from the present-indicative default. What this data demonstrates is that the

possibility of the copula being absent, and therefore of non-verbal syntactic predication, is not limited to one particular semantic type of copula construction, but is widely available as a syntactic strategy.

The mainstream linguistic research would often downplay the challenge by approaching it piecemeal and assuming that the respective constructions were headed in the unmarked case by a phonologically empty category. In this contribution we step back to reconsider fundamental aspects of linguistic classification in order to formulate a comprehensive alternative to such ad hoc analyses. We will show how a slightly different perspective on the way classification is performed leads to a straightforward HPSG formalisation of the desired degree of granularity, and allows us not only capture functional similarities but also predict what distinctions should be possible cross-linguistically.

2. Proposal

Following the approach in (Avgustinova and Uszkoreit 2003), where different types of constructions containing non-verbal predicates are classified on the basis of the relational ontology of (Avgustinova and Uszkoreit 2000), we present a typology of copula for Russian and show how the corresponding semantics can be encoded in the HPSG framework. As the analysed constructs differ in their syntactic (e.g., case marking of arguments) and semantic properties, these differences can now be made explicit and linked to the proposed classification.

The lowest (most informative) types, i.e. the leaves of the hierarchy in (Figure 1), can be straightforwardly motivated, as they correspond to empirical distinctions. The intermediate types factorise the information common to the subclasses of a class, and constraints associated with the specific sub-types provide the appropriate linguistic generalisations.

At the highest level of abstraction, linguistic objects of type *copula* are partitioned according to their function as *inflectional-cop(ula)*, which occurs with lexically/morphologically predicative categories (e.g., Russian short-form adjectives), or as *assembling-operator*, which puts together two non-verbal and lexically non-predicative categories. Overt forms of ‘be’ in the former case tend to function as mere inflectional tense-mood markers. Recall that according to (Pollard and Sag 1994, p. 44-45), "… a marker is a word that is 'functional' or 'grammatical' as opposed to substantive, in the sense that its semantic content is purely logical in nature (perhaps even vacuous)". In turn, the copula as assembling operator is further partitioned into *copular-functor* and *copular-predicator*. Such a key distinction would find strong

cross-linguistic motivation within the Slavic language family. As a matter of fact, Bulgarian instances of copular functor would correspond to forms of “to be”, while those of copular predicator to forms of “to have”

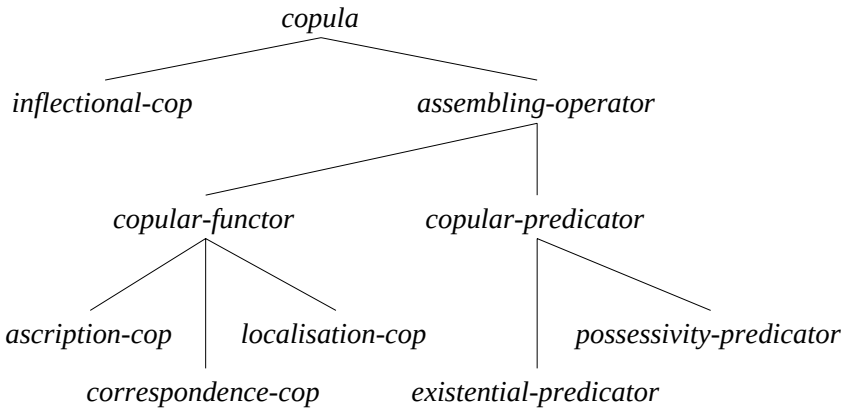

Figure 1: A hierarchy of copula types

More specifically, the copular functor can be of type *ascription-cop(ula)*, *correspondence-cop(ula)* or *localisation-cop(ula)*; and the copular predicator – of type *existentail-predicator* and *possessivity-predicator*. The resulting feature structures are sketched below. Following (Copstake, et al. 1999), the CONTENT value encodes the central predication of a phrase as its KEY, the semantic INDEX of a phrase, and a list of relevant semantic relations RELS.

Semantically, the assembling operator in ascriptive predication (Figure 2) identifies (the INDEX value in) its content with that of the non-verbal (predicative) complement.

$$\begin{bmatrix} \textit{ascription–cop} \\ \text{CAT} \mid \text{VAL} \begin{bmatrix} \text{COMPS} \left\langle \begin{bmatrix} \textit{non–verbal} \\ \text{INDEX } \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix} \\ \text{CONT} \mid \text{INDEX } \boxed{2} \end{bmatrix}$$

Figure 2: Ascriptive predication

The semantic contribution of the assembling operator in identificational predication (Figure 3) is to introduce a key relation of correspondence $\boxed{5}$

(supplying an event variable 4) whose first argument is identified with the index of the subject 3 and its second argument with the index of the non-verbal (predicative) complement 2.

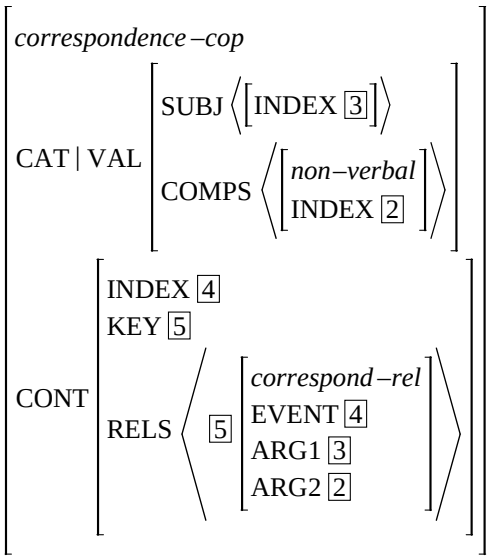

Figure 3: Identificational predication

The semantic a contribution of the assembling operator in localisational predication (Figure 4) is a key relation of localisation 5 (supplying an event variable 4) whose first argument is identified with the index of the subject 3 and its second argument with the index of the non-verbal (predicative) complement 2.

Semantically, the assembling operator in existential predication (Figure 5) introduces a key relation of existence 5 (supplying an event variable 4) with only one argument the existence of which is actually predicated. This argument is identified with the index of the subject 3. The semantic contribution 6 of the non-verbal (predicative) complement – i.e. of the locative adverbial 2 – is integrated in (the RELS list of) the content.

The semantic contribution of the assembling operator in possessive predication (Figure 6) introduces a key relation of possession 5 (supplying an event variable 4) whose first argument is identified with the index of the non-verbal (predicative) complement 2 – the possessor – and its second argument with the index of the subject 3 – the possessed entity.

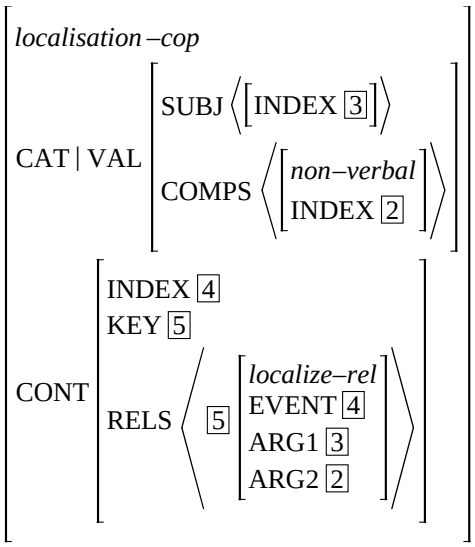

Figure 4: Localisational predication

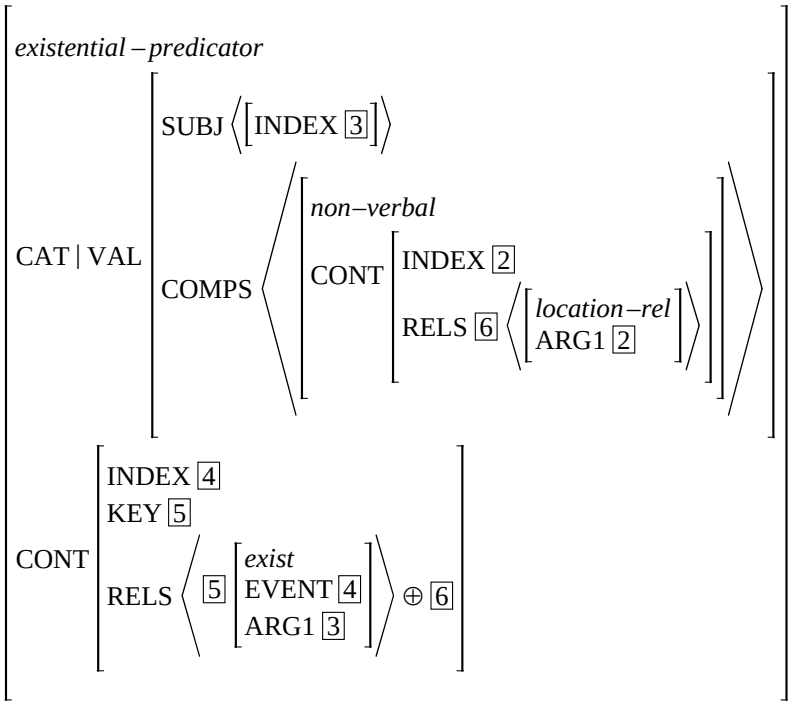

Figure 5: Existential predication

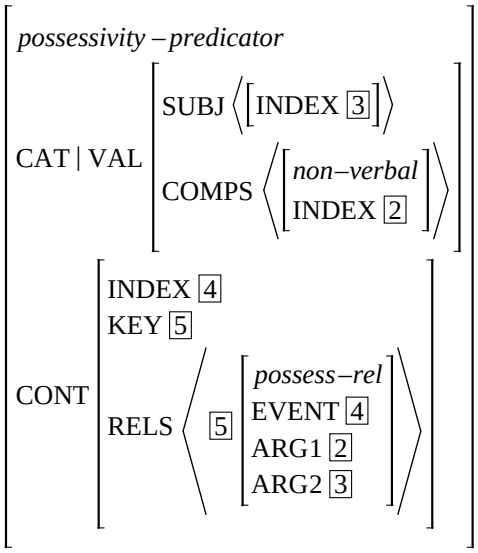

Figure 6: Possessive predication

As a result, two principally different instances of non-verbal predication can be distinguished. Morphologically signalled predicative categories are heads selecting the contingent copula as a specifier (cf. Section 3). Otherwise, the copula is the head (cf. Section 4) – when it is overt, this trivially results in a headed phrase; if there is no overt copula the result is a special type of non-headed phrase.

3. Copular “be” as inflectional marker

In a reasonably large number of languages it is in fact the case that the absence of an overt copula stands in a paradigmatic opposition to the presence of non-present tense copula forms within a particular construction.

So, in Russian, the present tense copula is ungrammatical in combination with the predicative short adjectives (2a), but is required to encode tense in past and future tense constructions (2b). While verbs are inherent predicators with non-verbal categories this is a *derived* property. Russian short adjectives are exclusively used as predicates. As the contrast in (2c) illustrates, their attributive use is ungrammatical.

(2) a. *Otec* (**est'*) *gord* *rezul'tatami.*
father.NOM proud.PRD-ADJ.SG.M results.INST.PL
Father is proud of the results.

b. *Otec byl | budet gord rezul'tatami.*
father.NOM was | will-be proud.PRD-ADJ.SG.M results.INST.PL
Father was | will be proud of the results.

c. *gordyj otec | *gord otec*
proud.NOM SG.M father.NOM | proud.PRD-ADJ.SG.M father.NOM
a proud father

The two clauses in (2a-b) are apparently functionally equivalent – differing only in temporal features, it seems correct to propose an analysis under which the predication relations will be the same across both clauses. Given that the role of the copula here is solely functional, we take it that these cases are suggestive of a lexical approach to such tense-related paradigmatic alternation. Being morphologically signalled, the combinatorial potential of Russian short adjectives is derived lexically as a *diathesis alternation* in the sense of (Avgustinova 2001a, b), which is illustrated in (Figure 7).

$$\begin{bmatrix} \textit{prd–drv} \\ \text{RESULT} \begin{bmatrix} \textit{prd–adjective} \\ \text{DEPS} \left\langle \boxed{1}, \boxed{3}\textit{infl–cop} \mid \boxed{2} \right\rangle \end{bmatrix} \\ \text{SOURCE} \begin{bmatrix} \textit{adjective} \\ \text{MOD } \boxed{1} \\ \text{DEPS } \boxed{2} \end{bmatrix} \end{bmatrix}$$

Figure 7: Russian predicative adjective derivation

The initial element $\boxed{1}$ on the DEPS list of the resulting predicative adjective is identified with the MOD value of the source adjective. This encodes the linguistic generalisation that the subject of a *predicatively* used adjective corresponds to the nominal category modified by this adjective when it is used *attributively*. The observed systematicity justified the assumption in (Avgustinova and Uszkoreit 2003) that the predicative short adjective itself is heading the construction and its VALENCE includes, in addition to SUBJ(ECT) and COM(PLEMENT)S, the attribute SP(ECIFIE)R of the type *infl(ectional)-cop(ula)*. The latter is introduced as a new dependent $\boxed{3}$ of the predicative adjective. Finally, the dependents list $\boxed{2}$ of the source adjective is appended to the DEPS value of the predicative adjective. Note that the value of the ARG-ST feature is not mentioned in the constraint because nothing changes on this level. In accord with the Argument Realisation constraint of (Bouma, et al. 2001), the valence of a predicative adjective is then organised as in (Figure 8).

$$\begin{bmatrix} \textit{prd–adjective} \\ \text{DEPS} \left\langle \boxed{1}, \boxed{3}\textit{infl–cop} \mid \boxed{2} \right\rangle \\ \text{VALENCE} \begin{bmatrix} \text{SUBJ} \left\langle \boxed{1} \right\rangle \\ \text{SPR} \left\langle \boxed{3} \right\rangle \\ \text{COMPS } \boxed{2} \end{bmatrix} \end{bmatrix}$$

Figure 8: Combinatorial potential of Russian predicative adjectives

In HPSG terms, Russian constructions with an overt *inflectional copula* are headed phrases which can be built as instances of the type *head-all-valence-phrase* (Figure 9). The head daughter is of type *prd-adjective*, as derived lexically in (Figure 7). So, the copula is taken as an optional specifier (i.e. dependent) of the adjectival predicate.

$$\begin{bmatrix} \textit{head–all–val–ph} \\ \text{TENSE } \boxed{5} \\ \text{MOOD } \boxed{6} \\ \text{VALENCE} \begin{bmatrix} \text{SUBJ} \left\langle \right\rangle \\ \text{SPR} \left\langle \right\rangle \\ \text{COMPS} \left\langle \right\rangle \end{bmatrix} \\ \text{HD–DTR } \boxed{4} \begin{bmatrix} \textit{prd–adjective} \\ \text{VAL} \begin{bmatrix} \text{SUBJ} \left\langle \boxed{1} \right\rangle \\ \text{SPR} \left\langle \boxed{2} \begin{bmatrix} \text{SPEC } \boxed{4} \\ \text{TENSE } \boxed{5} \\ \text{MOOD } \boxed{6} \end{bmatrix} \right\rangle \\ \text{COMPS } \boxed{3} \end{bmatrix} \end{bmatrix} \\ \text{NH–DTRS} \left\langle \boxed{1}, \boxed{2} \mid \boxed{3} \right\rangle \end{bmatrix}$$

Figure 9: Construction headed by the predicative adjective

Alternatively, for a language like Russian, a language-specific constraint on type *clause* has to ensure a *default* present-tense indicative-mood interpretation in the copula-less variant whenever the specifier valence is not discharged, i.e. the VAL|SPR value is a non-empty list (Figure 10).

$$clause \Rightarrow \begin{bmatrix} \text{TENSE} & \textit{present} \\ \text{MOOD} & \textit{indicative} \\ \text{VAL}|\text{SPR} & \langle [2] \rangle \end{bmatrix}$$

Figure 10: 'Copula-less' constraint

4. The syntactic structure: silent vs. overt assembling operator

With prototypical adjectives, nominals or adverbials in predicative use no morphological signalling of the predicative status is available. A constructional analysis inspired by the silent-copula-phrase approach of (Sag and Wasow 1999) is more adequate than yet another lexical derivation with no observable formal manifestation. A construction with a silent assembling operator is obtained as headless construction in (Figure 11).

$$\begin{bmatrix} \textit{silent–copula–ph} \\ \text{CAT} \begin{bmatrix} \text{TENSE } \textit{present} \\ \text{MOOD } \textit{indicative} \\ \text{HEAD} \begin{bmatrix} \textit{assembling–operator} \\ \text{FORM } \textit{fin} \end{bmatrix} \\ \text{VAL} \begin{bmatrix} \text{SUBJ} \langle\,\rangle \\ \text{SPR} \langle\,\rangle \\ \text{COMPS} \langle\,\rangle \end{bmatrix} \end{bmatrix} \\ \text{NON–HD–DTRS} \left\langle \boxed{\text{A}}, \boxed{\text{B}} \begin{bmatrix} \textit{non–verbal} \\ \text{EXT–ARG } \boxed{\text{A}} \end{bmatrix} \right\rangle \end{bmatrix}$$

Figure 11: Headless construction

The corresponding construction headed by an overt assembling operator is illustrated in (Figure 12). Intuitively, as soon as a given non-predicative category occurs in the predicate, it acquires the property of subcategorising for a subject (broadly understood as the topic of the predication). Introducing an *external argument* for non-verbal categories to be identified with the subject (Figure 13a) models the intuition of opening a slot when these categories are used predicatively.

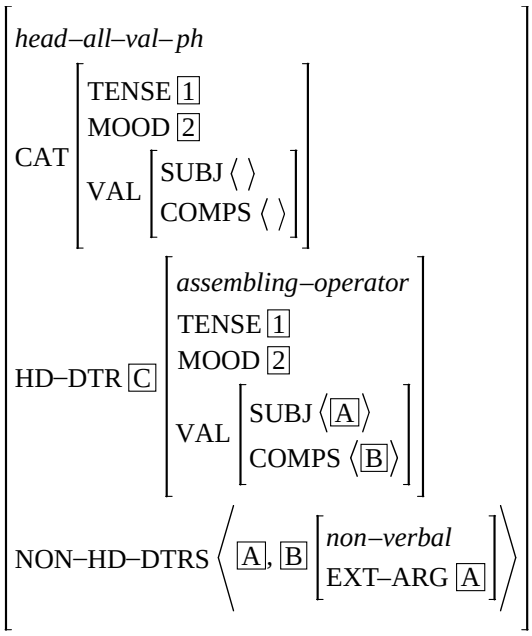

Figure 12: Headed construction

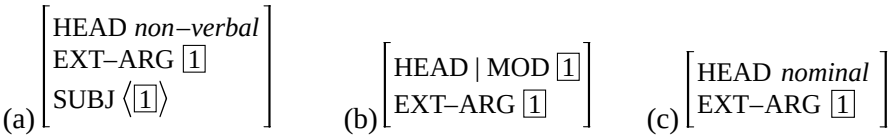

Figure 13: Generalised external argument

With adjectival and adverbial categories, which are specified for the head feature MOD, the external argument is the modified category (Figure 13b). With nominal categories, however, the external argument has to be explicitly introduced (Figure 13c).

5. Conclusions and outlook

A well-known challenge to any grammatical description is posed by predicative constructions in which there is no overt copular verb interpretable as a syntactic head. Empty categories used to be designed for one or several types of copula. The HPSG formalisation sketched in this contribution allows for encoding the significant distinctions as well as for capturing the linguistic generalisations without postulating any empty categories.

The lexical derivation of Russian predicative adjectives systematically differs from the constructional treatment of non-verbal predicates with no morphological signalling of predicative status. In the latter case, the contingent copular item not only marks verbal inflection but functions as an assembling operator putting together two categories that are prototypically non-verbal. Intuitively, as soon as a given non-predicative category occurs in the predicate, it acquires the property of subcategorising for a subject (broadly understood as the topic of the predication).

Related future research has to concentrate on drawing more connections to other Slavic languages, inasmuch as the approach presented here allows linguistically adequate modelling of minimal differences between related languages. From a more general perspective, it is crucial to consider other languages with non-verbal predicative constructions, e.g., Hebrew. And finally, further development of the "generalised external argument" approach within the theoretical model of HPSG is called for.

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Metrical phonology in HPSG

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Abstract

This paper proposes a new approach to the prosody-syntax interface in HPSG. Previous approaches to prosody in HPSG (Klein, 2000; Haji-Abdolhosseini, 2003) represent prosodic information by constructing metrical constituent structure in the tradition of (Selkirk, 1980; Liberman and Prince, 1977). One drawback of this approach is that it does not allow for a direct representation of purely metrical constraints, which are relegated to an unformalized performance component. By contrast, so called 'grid only' approaches (Prince, 1983; Selkirk, 1984; Delais-Roussarie, 2000) use a single data structure, a *metrical grid*, to encode prosodic constraints resulting from syntax and constraints of a rhythmic nature.

We first review relevant data from French showing that prosodic constituency is much less constrained by syntactic structure than is predicted by existing approaches. In all but very short utterances, many different prosodic groupings are possible for a given sentence with a determinate information structure, and rhythmic factors determine a preference ordering on the possible groupings. We then present an HPSG implementation of the metrical grid, and propose minimal syntactic constraints on relative prominence, leaving room for noncategorical rythmic constraints to choose between alternatives. We finish by discussing the interaction of the metrical grid with the rest of the prosodic grammar.

1 Rhythmic and syntactic constraints in metrical phonology

Within the autosegmental-metrical approach to prosody (Selkirk, 1984), it is assumed that prosodic information associated with an utterance is segregated in two distinct representations: a stress pattern and a tonal profile, composed of a nuclear contour and a series of autonomous pitch accents.

Current approaches to the prosody-syntax-pragmatics interface attempt to clarify what prosodic features depend on which dimension. For French, Beyssade et al. (2004) observe that the stress pattern reflects partially syntactic constituent structure, but is unconstrained by pragmatics. The dialogical status of an utterance determines the choice of a nuclear contour, while the informational focus-ground partition determines where the contour anchors. The stress pattern influences the contour only inasmuch as tonal elements must anchor on stressed syllables. Finally, the occurrence of autonomous pitch accents is determined by contrast.[1]

In the present section we will only discuss stress patterns, and concentrate on assertive utterances with an all-focus information structure and no prosodic indication of contrast.

[1] Following Vallduví and Vilkuna (1998) we insist that the information-structural notion of focus (or 'rheme') is strictly distinct from the notion of focus associated with alternative semantics ('contrastive focus' or 'contrast'). In the remainder of this paper we only use 'focus' in the information-packaging sense.

Metrical grids are used as a representation of prosodic prominence. These are usually represented by aligning columns of stars with syllable nuclei; a higher column represents a more prominent syllable, as in (1). This grid indicates a maximal prosodic prominence (level 4) on the final syllable [zɛ̃], with secondary prominence of level 3 on [swa] and of level 2 on [ne] and [fʁɛʁ]. All other syllables are nonprominent.

```
                                    *
                    *               *
      *             *       *       *
*  *  *  *  * * * * * * * * *  * *
```

(1) lə fʁɛʁ də fʁɑ̃swa a telefone a tɔ̃ kuzɛ̃
le frère de françois a téléphoné à ton cousin
'François's brother phoned your cousin.'

1.1 Syntactic constraints

The most important constraint on the syntax-prosody interface in French is the *Right Culmination Constraint* stated in (2).

(2) In any syntactic phrase, the rightmost syllable has maximal prominence.

The workings of the constraint are illustrated by the grid in (1): assuming the constituent structure outlined in (3), the final syllable [zɛ̃] has maximal prominence because it is the rightmost syllable of the whole sentence; and [wa] is locally prominent in the subject NP. There are other prominent syllables, but these are not the effect of (2). (4) illustrates a grid disallowed by (2): the syllable [fʁɛʁ] of the head noun of the subject can not be maximally prominent within the NP, because it is not on the right edge of that phrase.

(3) [[le [frère [de François]]] [a téléphoné [à [ton cousin]]]]

```
                                    *
      *                             *
      *           *         *       *
*  *  *  *  * * * * * * * * *  * *
```

(4) *lə fʁɛʁ də fʁɑ̃swa a telefone a tɔ̃ kuzɛ̃

It is important to note that, contrary to what is generally assumed in the literature (see Delais-Roussarie, 1996; Rossi, 1999, among others), the grammar does not constrain the relative prominence of the subject NP and the head verb. All other things being equal, the subject NP may be more or less prominent than the verb (see Dell, 1984), giving rise to alternative metrical prominence patterns in cases such as (5).

(5) Pierre conduit prudemment. 'Pierre drives safely.'

```
                    *
                    *
            *       *
    *  *  *  * *  *
a. pjɛʁkɔ̃dɥipʁydamã
                    *
    *               *
    *  *  *  * *  *
b. pjɛʁkɔ̃dɥipʁydamã
                    *
    *     *         *
    *  *  *  * *  *
c. pjɛʁkɔ̃dɥipʁydamã
```

A further constraint that must be taken into account is the special status of *leaners* (Zwicky, 1982; Klein, 2000). Leaners are independent words that are prosodically deficient.[2]. In French this has two effects. First, a leaner may not receive initial stress, which is found as an option for short phrases and results in creating a bipolar stress pattern (Di Cristo, 1999). This is shown by the contrast between the nonleaner determiner *certains* 'some' in (6) and the leaner determiner *les* in (7).[3] Second, a leaner can receive final stress if and only if it is phrase-final, as shown by the contrast between the two occurrences of the leaner verb *est* 'is' in (8) and (9).

(6) certains amis 'some friends'

```
            *
    * * *   *
a. sɛrtɛ̃zami
            *
      *     *
    * * *   *
b. sɛrtɛ̃zami
```

[2]Leaners differ from clitics in not being subject to the same kind of sandhi phenomena; clitics, but not leaners, are assumed to form a prosodic word with their host. French leaners include the definite and indefinite articles, monosyllabic prepositions such as *à* 'at' and *de* 'of', and monolyllabic forms of auxiliaries and of the copula. Note that we avoid the issue of French pronominal clitics (FPCs), whose prosodic status is somewhat problematic: since **?** it is well established that the peculiar morphophonological idiosyncrasies associated with FPCs are best accounted for by treating them as (quasi-inflectional) affixes rather than syntactic atoms; and **?** presents a detailed morphological analysis accounting for these properties. On the other hand, **?** shows that FPCs obey specific prosodic constraints setting them apart from other affixes. We leave the integration of these two lines of research for future work.

[3]Remember that we limit ourselves to all-focus, contrast-free utterances; thus the fact that a contrastive accent on *les* is possible in (7) does not affect our generalization.

```
        *
  *     *
  * * * *
```

c. sɛrtɛ̃zami

(7) les chocolats ‘the chocolate bits’

```
      *
  * * **
```

a. leʃokola

```
      *
    *   *
  * * **
```

b. leʃokola

```
       *
   *   *
   * * **
```

c. *leʃokola

(8) Il est à Paris. ‘He is in Paris.’

```
       *
  * * * * *
```

a. ilɛtapaʁi

```
        *
    *   *
  * * * * *
```

b. *ilɛtapaʁi

(9) C’est à Paris qu’il est. ‘It’s in Paris that he is.’

```
          *
      *   *
  * * * * * *
```

a. sɛtapaʁikilɛ

```
        *
   * * * * * *
```

b. *sɛtapaʁikilɛ

There are also some noncategorical syntactic constraints on metrical grids, which have sometimes been confused for hard constraints. For instance, all other things being equal, prominence on heads is favored over prominence on nonheads. This explains why (10b) is slightly more natural than (10a). However this constraint is not strict, and prominence on nonheads will occur if it is the only way of satisfying right culmination, e.g. if the final constituent of a phrase is a nonhead (11).

(10) un jeune ami de Marie ‘a young friend of Marie’s’

```
                *
        *       *
  * * * * * * * *
```
a. ɛ̃ʒœnamidəmaʁi

```
                *
    *           *
    *     *     *
  * * * * * * * *
```
b. ɛ̃ʒœnamidəmaʁi

(11) Un homme charmant est là.
'A charming man is here.'

```
              *
            * *
  * *   *   ** *
```
a. ɛ̃nɔmʃaʁmɑ̃ɛla

```
              *
            * *
    *       * *
  * *   *   ** *
```
b. ɛ̃nɔmʃaʁmɑ̃ɛla

```
              *
     *        *
   * *   *   ** *
```
c. *ɛ̃nɔmʃaʁmɑ̃ɛla

1.2 Rhythmic constraints

Some metrical configurations are strongly disfavored, despite respecting syntactic constraints on meter. For instance (12a) is a very unlikely grid. This is an effect of a rhyhtmic constraint no-clash which bars sequences of stressed syllables. This constraint however is not categorical, and is clearly violated in cases where a stress clash is the only way to satisfy a categorical constraint. This is the case e.g. when a VP following a phrasal subject is monosyllabic, as in (13): the VP has to have maximal prominence, and the final syllable in the subject must be locally prominent, giving rise to a configuration violating no-clash.

(12) le président serbe 'the Serbian president'

```
              *
            * *
    *   * * * *
```
a. ??ləpʁezidɑ̃sɛʁb

```
          *
      *   *
  *  * * * *
```

b. ləpʁezidɑ̃sɛʁb

(13) Paul et Marie dorment. ‘Paul and Marie sleep.’

```
          *
        * *
  *     * *
  ** * * *
```

a. pɔlemaʁidoʁm

```
          *
   *   *  *
   ** * * *
```

b. *pɔlemaʁidoʁm

All other rhythmic constraints are likewise of a gradual and/or noncategorical nature. Long sequences of unstressed syllables are disfavored, all the more so if the speech rate is low. Thus for instance (14a) is virtually impossible at a normal speech rate. We take this to be the effect of a constraint no-lapse whose exact formulation is complex. Furthermore, all other things being equal, rhythmically regular patterns are favored; this is why (14b) is better that (14c). The workings of this eurhythmy constraint are best seen by looking at sentences with the same syntactic structure but with a different metric makeup. The three sentences in (15) have the exact same structure, but the length of the subject NP and of the VP differs from one case to the other. Accordingly, we find different preferred metrical grids, because of the urge to realize a regular rhyhtm, which cannot be met in the same way.

(14) J’avais été découragé dans ma carrière de peintre par les grandes personnes.
‘I had been discouraged from being a painter by the grown-ups.’

```
                  *
    * * * * * * * *
```

a. ??ʒavɛzetedekuraʒe...

```
               *
      *        *
  * * * * * * * *
```

b. ʒavɛzetedekuraʒe...

```
               *
    *  *       *
  * * * * * * * *
```

c. ?ʒavɛzetedekuraʒe...

(15) a. Jean-Christophe voit ses amis.
‘Jean-Christophe is meeting his friends.’

```
                    *
       *            *
 *     *    *       *
 *  *  *    * * *  *
ʒɑ̃kʁistɔfvwasezami
```

b. Pierre écoute ces balivernes.
‘Pierre listens to this nonsense.’

```
      *        *
 *    *    *   *
 * * * * * * *
pjɛʁekutsebalivɛʁn
```

c. Jean-Christophe regardait la télévision.
‘Jean-Christophe was watching TV.’

```
                          *
       *        *        *
 *     *  *     *  *     *
 *  *  *  * *  * * * * * *
ʒɑ̃kʁistɔfʁəgaʁdɛlatelevizjɔ̃
```

To sum up, the construction of the metrical grid in French is influenced by at least three types of constraints:

- Categorical syntactic constraints, such as the right culmination constraint on phrases or the nonprominence constraint on nonfinal leaners.
- Noncategorical syntactic constraints, such as the affinity of heads for prominence.
- Noncategorical rhythmic constraints, such as the no-clash, no-lapse and eurhythmy constraints.

2 A previous HPSG approach to prosody

The approach to prosodic prominence defended here belongs to the tradition of *grid-only* approaches, and contrasts with approaches in the tradition of *metrical constituent structure*. Klein (2000) provides an HPSG version of a metrical constituent structure approach, which we discuss here.[4] Note that the following criticisms are really of a methodological nature: Klein’s work is focussed on English, and does not take into account prosodic phenomena below the word level, whereas

[4]Haji-Abdolhosseini (2003) improves on Klein (2000) by taking into account the influence of information structure on prosodic representation. While this is definitely something that must be done at some point (see section 4 for some proposals), the issue is orthogonal to the ones we discuss here, and Haji-Abdolhosseini’s approach suffers from the same drawbacks as Klein’s, as far as all-focus, contrast-free utterances are concerned.

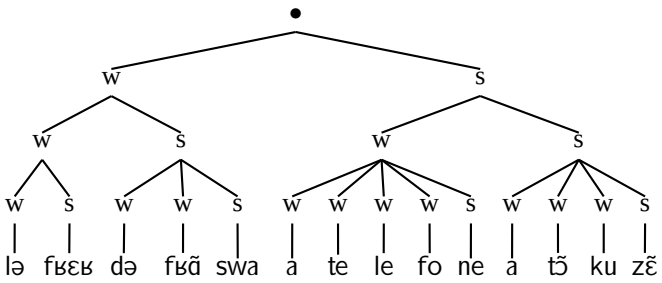


Figure 1: The metrical tree corresponding to (1)

this work is focussed on French and crucially involves phenomena that affect word-internal stress assignment. Thus we can only speculate as to how an approach such as Klein's would apply to the data we are interested in.

Metrical trees represent prosodic prominence by constructing a tree structure with nodes labelled either w ('weak') or s ('strong'). Leaves of the tree normally correspond to syllables.[5] Each local tree contains at most one strong node; the maximally prominent syllable within a tree is the syllable connected to the root by a uninterrupted sequence of strong nodes. Figure 1 contains a possible metrical tree for (1).

The prosody-syntax interface is usually specified as a top-down algorithm for building metrical trees from surface constituent structures (see e.g. Liberman and Prince, 1977; Selkirk, 1980). By contrast, Klein's HPSG approach uses relational constraints to build up metrical trees compositionally on a par with syntactic constituent structure. However, Klein's approach inherits most of the drawbacks of previous metrical tree approaches, which we review here rapidly.

2.1 Lack of underspecification

As other metrical tree approaches, Klein's proposal does not deal satisfactorily with the underspecified nature of the syntax-prosody interface. As we emphasized in section 1, the existence of alternative prosodic prominence patterns for a single sentence (with a given information structure, etc.) is the rule rather than the exception. A natural way to account for this is to design a grammar providing underspecified descriptions of proposdic representations. However, whereas it is quite easy to write underspecified descriptions of metrical grids, underspecified descriptions of metrical trees tend to be cumbersome. Let us illustrate with a concrete example. Sentences ending with an NP containing a PP can get a prosodic prominence on the N, just as if the PP had been outside the NP (16b).

[5] In a language with lexical stress such as English, one may simplify representations by taking leaves to correspond to whole words, since prosodic prominence within the word is determined by the lexicon rather than by interface constraints. This won't do for French however, where maximal prominence may fall on the initial or final syllable of a word depending on the syntactic and prosodic context.

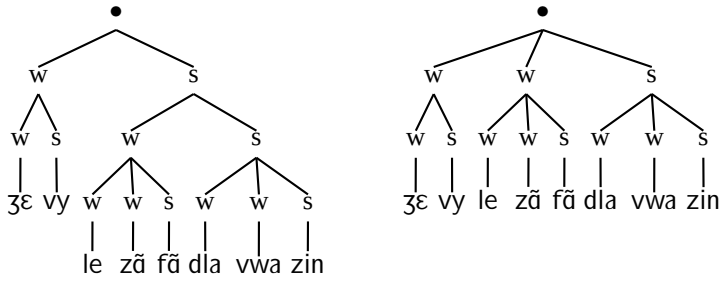


Figure 2: Alternate metrical trees for (16)

(16) J'ai vu les enfants de la voisine.
'I saw the neighbour's children.'

```
                    *
      *             *
    * * * * * * *   *
a.  ʒɛvylezɑ̃fɑ̃dlavwazin
                    *
      *     *       *
    * * * * * * *   *
b.  ʒɛvylezɑ̃fɑ̃dlavwazin
```

The two corresponding metrical trees are shown in figure 2. Whereas it is trivial to describe the relationship between these two trees in transformational terms, it is not that trivial to provide an underspecified description corresponding to that family of trees. Accordingly, Klein's strategy is not to use underspecified descriptions of metrical trees, but to embed the underspecification in the definition of the relational constraints relating fully specified descriptions of syntactic trees to fully specified descriptions of metrical trees. While there is no empirical problem as such with this general strategy, the result is a grammar that is not easy to manipulate, because prosodic constraints are embedded in the definition of the relation rather than stated directly. We hope that the alternative strategy of using underspecified descriptions of metrical grids will make for a more manageable grammar, where prosodic constraints contributed by different parts of the grammar can be stated in a modular way.

2.2 Rhythmic constraints

A first difficulty with Klein's approach is that rhythmic constraints cannot be modelled directly: the output of the grammar is a completely specified metrical tree, which must be turned into a more concrete prosodic representation by a performance model. Since the performance model is not described as such (see Atterer and Klein, 2002, for some hints of what Klein has in mind), it is not possible to evaluate the proposal as such; all one can say is that Klein's model outputs

a single metrical tree in cases where empirically more than one prosodic prominence pattern is possible. Even assuming that an adequate performance model will provide all licit prosodic realizations from a single tree, there are two conceptual drawbacks to such an approach. First, it assumes that one of the realizations is the normal, 'canonical' one generated by the grammar, and that alternatives arise as deviations from that canonical realization; yet there is no empirical evidence favoring one realization over the others. Second, this particular use of the competence-performance distinction seems to be more of a distinction between underlying structure and surface structure than between grammar and processing: Klein's metrical trees are abstract phonological representations which are not necessarily homomorphic to surface prosodic properties. Such an approach seems to go against the spirit of surface-orientation usually assumed in HPSG: it seems preferable to state all constraints on prosody on the same, concrete data structure, and to avoid abstract phonological representations just as we avoid abstract syntactic ones.

2.3 No motivation for prosodic phrases

A classical argument against grid-only approaches to prosodic prominence is that prosodic constituents are independently needed, since they serve to define the domain of some segmental phenomena, such as sandhi phenomena. Although Klein does not address this issue, it is clear that his metrical structures could be used to such an effect, while metrical grids do not contain enough information stemming from syntactic structure to do so.

However, the very hypothesis that there is a correspondance between prosodic phrasing and sandhi phenomena is disconfirmed by recent research carried out on the three clear sandhi phenomena that obtain in French. In *obligatory liaison*, a word-final consonant is obligatorily realized before a vowel but never before a consonant (17a). In *optional liaison*, a word-final consonant is optionally realized before a vowel but never before a consonant (17b). In *enchaînement*, a word-final consonant is syllabified at the beginning of the next word (17c).

(17) a. les enfants: [lezɑ̃fɑ̃]/*[leɑ̃fɑ̃]
'the children'

b. Ils sont arrivés: [ilsɔ̃taʁive]/[ilsɔ̃aʁive]
'They have arrived.'

c. chaque enfant: [ʃa.kɑ̃.fɑ̃]
'each child'

Recent research shows that the obligatory liaison occurs only in determiner-N′ sequences, a context that can be characterized only in syntactic terms (Bonami et al., 2004).[6] Post (2000) shows that the phonological phrase as usually defined

[6] Assuming that pronominal clitics are affixes (Miller and Sag, 1997). Note that even if pronominal clitics were analyzed as words, there is no non-circular way of characterizing obligatory liaison

is not the domain of optional liaison, contra e.g. Selkirk (1986). Finally, Fougeron and Delais-Roussarie (2004) shows that prosodic constituents such as the phonological phrase or the accentual phrase are the domain of neither liaison nor enchaînement.

We thus conclude that at least in the case of French there is no evidence that reference to prosodic phrase boundaries is necessary to characterize segmental phenomena, and thus no independent evidence for the need for prosodic tree structures.

3 Modelling the metrical grid

3.1 Constructing the grid

We model metrical grids as lists of *columns*, where each column is a nonempty list of objects of type *star*. Thus the official representation for the grid in (18a) is (18b). The grid is a part of the phonological representation of a sign, on a par with the list of segments (19). The relation between segmental representations and metrical grids is mediated by two constraints. First, at the level of words, grid columns are aligned with vowels in the segment list (there are no syllabic consonants in French). Second, the grid of a phrase is the concatenation of the daughter's grids. Thus in a complete utterance we find exactly one grid column for each syllable nucleus.[7]

(18) Paul est venu. 'Paul came.'

```
        *
  *     *
  * *   *
```

a. pɔlɛvny

b. $\left\langle \langle star, star\rangle, \langle star\rangle, \langle star, star, star\rangle \right\rangle$

(19) $phon \rightarrow \begin{bmatrix} \text{SEG} & list(segment) \\ \text{GRID} & list(nelist(star)) \end{bmatrix}$

(20) a. $word \rightarrow \left(\begin{bmatrix} \text{PHON} & \begin{bmatrix} \text{SEG} & \boxed{1} \\ \text{GRID} & \boxed{2} \end{bmatrix} \end{bmatrix} \wedge \mathsf{align}(\boxed{1}, \boxed{2}) \right)$

b. $\mathsf{align}\Big(\langle vowel\text{—}\boxed{1}\rangle, \langle \boxed{2}\text{—}\boxed{3}\rangle\Big) \leftrightarrow \mathsf{align}(\boxed{1}, \boxed{3})$

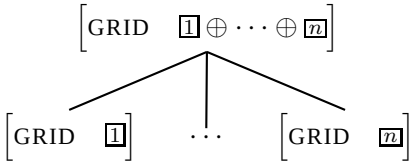
c. $\mathsf{align}\Big(\langle cons\text{—}\boxed{1}\rangle, \boxed{2}\Big) \leftrightarrow \mathsf{align}(\boxed{1}, \boxed{2})$

d. $\mathsf{align}(elist, elist)$

contexts as a prosodically natural class.

[7] Note that we assume that [ə]-deletion is modelled by having underspecified representations of segment lists, rather than abstract segments which may or may not surface in actual phonetic realization. Thus 'mute *e*s' get a column in the grid when and only when they are actually realized.

(21) *phrase*→



3.2 Categorical constraints

Since there is no lexical stress in French, the grammar does not have much to say on the grid of words. Note that contrary to the received view, stress on the final syllable is not obligatory: in short phrases the final syllable of a non-final word can be unstressed, giving rise to a bipolar pattern (see examples (6c), (12b)). The only definite lexical constraint is that word-initial onsetless syllable of polysyllabic words cannot be prominent (Plénat, 1994).

(22) Anémone viendra. 'Anémone will come.'

```
                *
        *       *
    * * *   *   *
```

a. anemɔnvjɛ̃dʁa

```
                *
        *       *
    *   *       *
    * * *   *   *
```

b. *anemɔnvjɛ̃dʁa

(23) $\begin{bmatrix} \textit{word} & \\ \text{SEG} & \langle \textit{vowel}, \ldots \rangle \\ \text{GRID} & \langle \textit{list}(\textit{star}), \textit{list}(\textit{star}), \ldots \rangle \end{bmatrix} \rightarrow \left[\text{GRID} \quad \langle \langle \textit{star} \rangle, \ldots \rangle \right]$

Next we turn to the issue of *leaners*. Remember that we want leaners to always be nonprominent except when they are phrase-final (8–9). To account for this behaviour, we follow Klein in assuming that *phon* objects are typed for their prosodic properties (24). The constraint in (25) checks that all nonfinal leaners are nonprominent.

(24) a. $\textit{phon} \rightarrow \textit{lnr} \vee \textit{full}$

b. $\textit{phrase} \rightarrow \left[\text{PHON} \quad \textit{full} \right]$

(25) $\textit{phrase} \rightarrow$

$$\left[\text{DTRS} \quad \left(\textit{list}\left(\left[\text{PH} \begin{bmatrix} \textit{lnr} \\ \text{GRID} \quad \textit{list}(\langle \textit{star} \rangle) \end{bmatrix} \right] \right) \bigcirc \textit{list}([\text{PH} \ \textit{full}]) \right) \oplus \langle \textit{sign} \rangle \right]$$

Finally we need to implement right culmination. This can be done quite simply by inspecting the grid of phrases and checking that the last column is the highest one.

(26) $\mathit{phrase} \rightarrow \Big(\Big[\textsc{grid} \quad \boxed{1} \oplus \langle \boxed{2} \rangle \Big] \wedge \mathsf{sup}(\boxed{2}, \boxed{1}) \Big)$

(27) a. $\mathsf{sup}\Big(\boxed{1}, \langle \boxed{2} \text{—} \boxed{3} \rangle\Big) \leftrightarrow \Big(\boxed{1} > \boxed{2} \wedge \mathsf{sup}(\boxed{1}, \boxed{3}) \Big)$

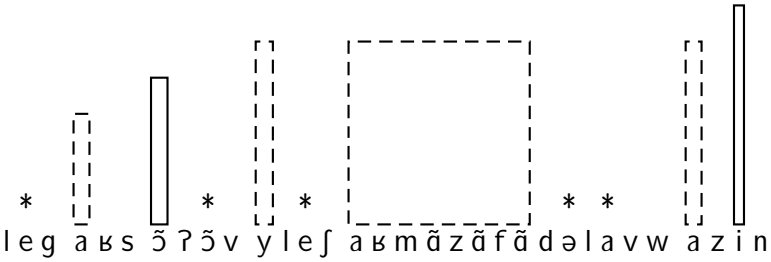
b. $\mathsf{sup}(\mathit{list}(\mathit{star}), \mathit{elist})$

(28) a. $\langle \boxed{1} \text{—} \boxed{2} \rangle > \langle \boxed{3} \text{—} \boxed{4} \rangle \leftrightarrow \boxed{3} > \boxed{4}$

b. $\mathit{nelist}(\mathit{star}) > \mathit{elist}$

The set of constraints so far is sufficient to exclude all examples marked as ungrammatical in the preceding pages—(4), (7c), (8c), (9b), (11c), (13a), (22b)—and to license all grammatical examples. The effect of the constraints is best seen by looking at possible grids for a rather complex example. Figure 3 is the syntactic tree for the sentence in (29). (30) sums up the set of constraints imposed by the grammar on the grid of (29). The only syllables which get a definite prominence value are those corresponding to leaners and word-initial vowels—which are constrained to be nonprominent. The effects of the right culmination constraint is represented by the relative height of boxes dominating vowels or sequences of vowels. Since all phrases but the subject NP are right-branching, all we know is that the final syllable [zin] must have maximal prominence, and that the final syllable of the subject [sɔ̃] must be locally prominent. Thus [zin] is strictly more prominent that [sɔ̃], which is strictly more prominent than all syllables preceding [sɔ̃]. The syllables between [sɔ̃] and [zin] must be less prominent than [zin], but are unconstrained with respect to [sɔ̃]. This is represented by the three dashed boxes of equal height, which indicate that the corresponding syllables may have any prominence strictly included in those boxes.

(29) Les garçons ont vu les charmants enfants de la voisine.
'The boys saw the neighbour's charming children.



(30) l e g a ʁ s ɔ̃ ʔ ɔ̃ v y l e ʃ a ʁ m ɑ̃ z ɑ̃ f ɑ̃ d ə l a v w a z i n

(31) is a sample of grids disallowed by the grammar: (31a) has a prominent word-initial vowel, (31b) has a prominent non-phrase final leaner, and (31c) does not respect final prominence.

```
                                        *
            *   *       *               *
          * *  * * * * *  * * * * *  * *
(31)  a. *legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin
                                        *
            *   *     *     *           *
          * *  * * * * *  * * * * *  * *
      b. *legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin
               *
            *   *         *             *
          * *  * * * * *  * * * * *  * *
      c. *legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin
```

One design feature of our model is that we do not state absolute constraints on prominence: the grammar only attributes nonprominence to some syllables or constrains the relative prominence of two syllables, but it never states an absolute value for a prominent syllable. The motivation of this choice is that it allows for a simpler construction of the grid: since we never have to deal with absolute values, we can state relative prominence constraints locally on each phrase and leave most of the grid underspecified. However a consequence is that the number of grids licensed for each sentence is unbounded. Even if we limit ourselves to grids with a maximal prominence of 3 (that is, the flattest grids compatible with the constraits in (30)), the grammar licenses 32 distinct grids for (29). For lack of space we cannot discuss them all explicitly here. However (32) gives a representative sample of the types of grids licensed by the grammar.

```
                                        *
            *   *       *   *           *
          * *  * * * * *  * * * * *  * *
(32)  a. legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin
                                        *
            *                           *
          * *  * * * * *  * * * * *  * *
      b. legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin
                                        *
            *   *   *   *   *           *
          * *  * * * * *  * * * * *  * *
      c. legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin
                                        *
            *   *       *   *       * *
          * *  * * * * *  * * * * *  * *
      d. legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin
```

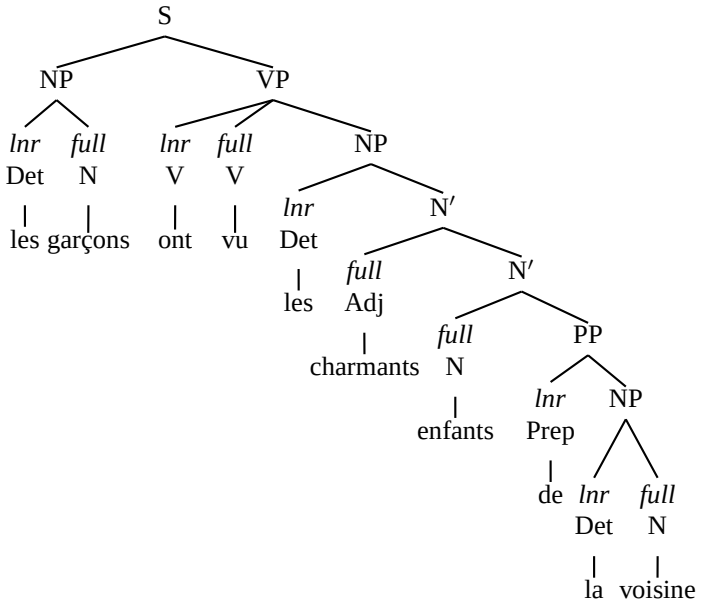


Figure 3: Syntactic constituent structure of (29)

```
                                  *
      *   *       *               *
* *  * * * *  * * * * *  * *
```

e. legaʁsɔ̃ʔɔ̃vyleʃaʁmãzãfãdəlavwazin

3.3 Noncategorical constraints

Among the grids in (32), only (32a) is completely satisfactory: (32b) is strongly disfavored because of the very long sequence of nonprominent syllables. (32c) and (32d) both contain a sequence of stressed syllables. Finally (32e) is not very good because the nonhead *charmant* is stressed whereas the adjacent head *enfants* is an equally good candidate for prominence.

The encoding of the metrical grid we propose has the advantage of allowing for an easy formulation of the constraints which are at play here. As an example, we provide a definition of no-clash. Intuitively, we want to count as clashing any grid which contains either a monotonous rise in prosodic prominence or a plateau of adjacent prominent syllables (monotonous descents do not count as clashing; see e.g. (14a)). Thus we can define no-clash as the property of a grid which contains neither monotonous rises nor plateaus.

(33) a. $\text{no-clash}(\langle \boxed{1},\boxed{2},\boxed{3}\text{—}\boxed{4}\rangle) \leftrightarrow \Big(\neg\text{rising}(\langle \boxed{1},\boxed{2},\boxed{3}\rangle) \wedge \neg\text{plateau}(\langle \boxed{1},\boxed{2}\rangle) \wedge \text{no-clash}(\langle \boxed{2},\boxed{3}\text{—}\boxed{4}\rangle)\Big)$

b. $\text{no-clash}(\langle \boxed{1},\boxed{2}\rangle) \leftrightarrow \neg\text{plateau}(\langle \boxed{1},\boxed{2}\rangle)$

c. no-clash($\langle \boxed{1} \rangle$)

(34) rising($\langle \boxed{1},\boxed{2},\boxed{3} \rangle$)$\leftrightarrow \Big(\boxed{2} > \boxed{1} \wedge \boxed{3} > \boxed{2} \Big)$

(35) plateau($\langle \boxed{1},\boxed{2} \rangle$)$\leftrightarrow \neg \Big((\boxed{1} > \boxed{2}) \vee (\boxed{2} > \boxed{1}) \vee (\boxed{1} = \langle \mathit{star} \rangle) \Big)$

What is not easy is to account for the noncategorical status of such constraints in an HPSG setting. A previous attempt at on optimality-theoretic treatment (Delais-Roussarie, 1996) has shown that gradual constraint violations and gang violations of constraints are at play, which clearly call for a stochastic model. The construction of such a model will have to await future work.

4 The metrical grid within the prosodic grammar

In this section we outline how the account of French stress patterns can be integrated in a grammar producing tonal profiles. According to Beyssade et al. (2004), the following constraints must be taken into account:[8]

(36) a. The *nuclear contour* realized by an utterance is a sequence of tones whose choice is determined by the dialogical status of the utterance. For instance, the contour **H* L* L%** signals that the speaker does not expect to be forced to revise their commitments by the addressee's reaction (Marandin, 2004).

b. The elements of the contour are realized on prosodically prominent syllables.

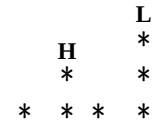
c. Each contour contains a distinguished pitch accent which anchors on the prominent syllable of the (information) focus.

d. Other tones in the contour anchor relative to the position of that pitch accent.

The effect of these constraints is illustrated in (37-38). (37b) is an all-focus utterance; thus the most prominent syllable is the last one. The **L*** tone anchors there. The **L%** must realize on *all* prominent syllables following the end of the focussed phrase. Here it does not realize at all, since there is no more room on the right. The **H*** anchors on *one* prominent syllable on the left, if there is one; otherwise it anchors on the first syllable. Here [fʁɛʁ] is the only available prominent syllable.

(37) a. Qu'est-ce qui s'est passé ?
'What happened?'

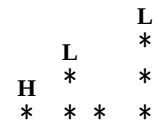
[8] For lack of space we avoid discussion of contrast.



b. mɔ̃fʁɛʁɛvny
Mon frère est venu.
'My brother came.'

(38b) has narrow focus on the subject NP. Thus the **L*** tone falls on the final syllable of the NP; **L%** falls on the only following prominent syllable; and **H*** falls on the first syllable.

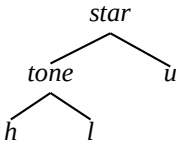
(38) a. Qui est venu ?
'Who came?'



b. mɔ̃fʁɛʁɛvny

To implement such an analysis in an HPSG grammar, we take advantage of the fact that metrical grids have been modeled as lists whose members play no role in the analysis. Thus we can use the typing of list members to encode tonal information. We assume three subtypes of *star*, corresponding to a high tone (*h*), a low tone (*l*), or the absence of a tonal specification (*u*).[9] Only prominent syllables may carry a tone.[10]

(39) a.



b. $sign \rightarrow \left[\text{GRID} \;\; list(2\text{-}list(tone)) \bigcirc list(list(u)) \right]$

We assume with De Kuthy (2002) that focus is encoded by a list-valued feature taking as value the list of semantic contribution of focal signs. Focal signs are identifiable as signs whose semantic contribution coincides with the single element on their FOCUS list. For the purposes of contour anchoring, we need to keep track of the syllable ending the focal sign. We thus assume that *star* carries a binary feature EFS (End of Focal Sign). The constraints in (40) ensure that exactly one syllable per focus will be [EFS +], and that it will correspond to the most prominent syllable of the focal signs.

[9] As is usual with autosegmental tonal representations, the tonal profile is a properly phonological representation, which will be interpreted phoneticaly in specific ways. Stating that a syllable is unspecified for tone just means that phonetics will interpolate an appropriate pitch for that syllable depending on the neighbouring tones.

[10] *2-list*(σ) is shorthand for a list of at least two elements of type σ.

(40) a. $sign \rightarrow \begin{bmatrix} \text{FOCUS} & \boxed{1} \\ \text{GRID} & list(list([\text{EFS}\ -]))\bigcirc \\ & \boxed{2}\ list(list([\text{EFS}\ +])) \end{bmatrix}$

where $\mathsf{length}(\boxed{1}) = \mathsf{length}(\boxed{2})$

b. $\begin{bmatrix} \text{FOCUS} & \langle \boxed{1} \rangle \\ \text{CONT} & \boxed{1} \end{bmatrix} \rightarrow \begin{bmatrix} \text{GRID} & list(list(star)) \oplus \\ & \langle list([\text{EFS}\ +]) \rangle \end{bmatrix}$

Contours can then be seen as types of utterances. For lack of space we cannot discuss in detail the grammar of contours; however we can assume with Marandin (2004) that contours relate types of dialogue gameboards (Ginzburg, to appear) to tonal realizations. (41) outlines what the grammar must state on the effect of one particular contour, **H* L* L%**, in the case of a single-focus utterance. (41a) anchors the low pitch accent at the end of the focal sign, and checks that the grid up to the end of the focal sign contains exactly one tone, a high pitch accent, falling on a prominent syllable if possible; and that each prominent syllable after the focal sign carries a low boundary tone.

(41) a. $h*l*l\% \rightarrow \begin{bmatrix} utterance & \\ \text{FOCUS} & \langle sign \rangle \\ \text{GRID} & \boxed{1} \oplus \left\langle 2\text{-}list\left(\begin{bmatrix} l \\ \text{EFS}\ + \end{bmatrix}\right) \right\rangle \oplus \boxed{2} \\ \text{CXT}|\text{DGB} & \text{“no revision expected”} \end{bmatrix}$

where $\mathsf{pitch\text{-}accent}(h, \boxed{1})$ and $\mathsf{bnd\text{-}tone}(l, \boxed{2})$

b. i. $\mathsf{pitch\text{-}accent}\Big(\boxed{1}, \langle \langle \boxed{1} \rangle \oplus list(\langle u \rangle) \Big)$

ii. $\mathsf{pitch\text{-}accent}\Big(\boxed{1}, \langle 2\text{-}list(\boxed{1}) \rangle \bigcirc list(list(u))) \Big)$

iii. $\mathsf{pitch\text{-}accent}(tone, elist)$

c. $\mathsf{bnd\text{-}tone}\Big(\boxed{1}, list(2\text{-}list(\boxed{1})) \bigcirc list(\langle u \rangle) \Big)$

5 Conclusion

This paper proposes a new approach to prosodic representations in HPSG with two important design properties: first, prosodic representations are impoverished structures encoding only minimal information directly useful to phonetic interpretation. Second, the grammar makes heavy use of underspecification in the description of prosodic representations. As a result, it is quite easy to approach prosody in a modular way, where syntactic, lexical, pragmatic, rhythmic, etc., conditions provide independent constraints that are monotonically added to the overall description.

While this paper shows how such an approach can be succesfully applied to the basic prosodic profile of French, two aspects of the analysis are in need of

more work: first, we have shown that many rhythmic and syntactic constraints are of a noncategorical and/or gradual nature, and are thus not easy to state within a classical HPSG grammar. Second, while we have shown how the description of intonation contours can be integrated with the current approach on a particular case, it remains to be seen how a general HPSG grammar of contours is to be written.

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A linear approach to negative prominence

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Abstract

Languages often require negation to be realized in a prominent position. A well known example is Italian, which seems to require a pre-verbal realization of negation. Some other languages require negation to be in a prominent position but do not require it to be pre-verbal. An example is Swedish. Working within Lexical Functional Grammar (LFG), Sells (2000) proposes that Swedish requires a negative element which is not inside VP and that Italian has the same constraint. Similar facts are found in the VSO language Welsh. However, Sells's approach cannot be applied to Welsh. Borsley and Jones (2005) develop a selectional approach to Welsh, in which certain verbs require a negative complement. This works well for Welsh but cannot be applied to Swedish or Italian. A similar approach to all three languages is possible within the linearization-based version of Head-driven Phrase Structure Grammar (HPSG) developed by Kathol (2000). It seems, then, that a linear approach is preferable to both a structural and a selectional approach.

1. Introduction

Languages often require negation to be realized in a prominent position.[↑] This was noted by Jespersen, who observed that there is a 'natural tendency, ... for the sake of clearness, to place the negative first, or at any rate as soon as possible' (1917: 5). This tendency is seen in Italian, where a pre-verbal n-word appears without any other marking of negation but a post-verbal n-word requires the negative particle *non* before the verb. The following, in which the negative elements are in bold, illustrate:

(1) a. **Nessuno** telefona a Gianni.
no one telephones to Gianni
'No one calls Gianni.'

b. *Gianni telefona a **nessuno**.
Gianni telephones to no one
'Gianni does not call anyone.'

[↑] Some of the ideas in this paper were included in a talk at the 12th Welsh Syntax Seminar in Gregynog, Mid-Wales, in July 2005, and in another, at Université Paris 7 in October 2005. I have benefited from discussion with Henriette de Swart. I am also grateful to Kersti Börjars for help with the Swedish data and to Bob Morris Jones for help with the Welsh. Any bad bits are my responsibility.

c. Gianni **non** telefona a **nessuno**.
Gianni NEG telephones to no one
'Gianni does not call anyone.'

Such data suggest that Italian requires some pre-verbal marking of negation. Other languages require negation to be quite early in the sentence but do not require it to be pre-verbal. It is common within generative syntax to propose that phenomena that appear to involve linear order really involve something else. However, as Culicover and Jackendoff (2005) point out, there is a reason for favouring approaches involving linear order. They remark that:

> Given the epistemological priority of linear order – it is immediately available to the learner in a way that structure is not – it seems to us that the natural approach would be to see how much explanatory mileage one could get out of linear order. (Culicover and Jackendoff 2005: 52)

In this paper, I will argue that this phenomenon should indeed be analyzed in terms of linear order and will show how this can be done within the linearization-based version of Head-driven Phrase Structure Grammar (HPSG) developed by Kathol (2000).

The paper is organized as follows. In section 2, I consider the simple linear approach to the Italian data outlined in De Swart (forthcoming). In section 3, I look at the rather different Swedish data and outline the structural approach developed in Sells (2000). Next, in section 4, I show that Sells's approach cannot be applied to the very similar data in Welsh. I then outline the selectional approach of Borsley and Jones (2005) and show that this cannot be applied to either the Italian or the Swedish data. In section 5, I show how the negation facts of all three languages can be accommodated within linearization-based HPSG. Finally, in section 6, I conclude the paper.

2. Italian

A simple linear approach to the Italian data is proposed in De Swart (forthcoming). Working within Optimality Theory, De Swart proposes that the facts are the result of what she calls the Negfirst principle, which simply requires negation to be pre-verbal.

(2) Negfirst
Negation is pre-verbal.

This seems to account for the data in (1) and also allows examples with a preposed negative complement, such as (3).

(3) A **nessuno** ho parlato.
to nobody have spoken
'I haven't talked to anybody.'

It also accounts for the fact that *non* is required with a post-verbal subject. The following illustrate:

(4) a. *Ha telefonato **nessuno**.
has telephoned nobody
'Nobody has phoned.'
b. **Non** ha telefonato **nessuno**.
NEG has telephoned nobody
'Nobody has phoned.'

(4a) is acceptable as an interrogative, meaning 'Has anyone phoned?', but is ungrammatical as a negative declarative.

This approach is quite plausible for Italian. It is also easy to accommodate a language in which negation is not required to be early in the sentence. One can simply assume that Negfirst is a low ranked constraint in such a language. However, it cannot accommodate certain other languages, which require negation to appear quite early but do not require it to be pre-verbal.

3. Swedish

One language that is relevant here is Swedish, discussed by Sells (2000). Here, while (5a–5c) are fine, (5d) and (5e) are ungrammatical.

(5) a. Jag har **inte** gett boken till henne.
I have not given the book to her
'I have not given the book to her.'
b. **Ingen** såg mig.
no one saw me
'No one saw me.'
c. Jag såg **ingen**.
I saw no one
'I saw no one.'
d. *Jag har sett **ingen**.
I have seen noone
'I haven't seen anybody.'
e. *Jag pratade med **ingen**.
I spoke with noone
'I didn't speak to anyone.'

Grammatical counterparts of (5d) and (5e) have *inte* 'not' and a negative polarity item:

(6) a. Jag har **inte** sett någon.
I have not seen anyone
'I haven't seen anybody.'
b. Jag pratade **inte** med någon..
I spoke not with anyone
'I didn't speak to anyone.'

One way to describe the facts is to say that negation must be early in the sentence. In (5a–c) it is early enough, but in (5d) and (5e) it isn't.

Working within Lexical Functional Grammar (LFG), Sells develops a structural approach to the facts. He makes the following assumptions:

(7) a. Swedish sentences may contain a VP. The finite verb is outside VP in a main clause. Other verbs are inside VP.[1]
b. Pronominal objects are outside VP when the associated verb is outside VP.
c. Negative objects are outside VP.
d. Other objects are inside VP.

In support of these assumptions, Sells draws attention to examples like the following:

(8) Jag kysste henne **inte**.
I kissed her not
'I didn't kiss her.'

Here, both the verb *kysste* and the pronoun *henne* precede the negative particle *inte*. Sells assumes that *inte* marks the left edge of VP. Given this assumption, such examples suggest that both the verb and the pronoun are outside VP. Contrasting with (8) are examples like the following:

(9) Jag såg **inte** Sven.
I saw not Sven
'I did not see Sven.'

This provides evidence that non-pronominal objects are inside VP. Sells also highlights examples like (10).

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[1] Sells assumes that subjects are in SpecIP and that the verb is in I when it follows the subject. He assumes that the verb is in C when it precedes the subject and that any preceding phrase is in SpecCP. A related but somewhat simpler view of Swedish clause structure is proposed in Börjars, Engdahl and Andréasson (2003).

(10) Hon hade **inga** biljetter köpt.
he had no tickets bought
'He hadn't bought any tickets.'

Here the negative object precedes the associated non-finite verb, which suggests that it is outside VP. Contrasting with (10) are examples like (11).

(11) Hon hade köpt några biljetter.
he had bought some tickets
'He had bought some tickets.'

This provides evidence that non-negative objects are inside VP.

The assumptions in (7) allow a simple structural account of the Swedish data. Given these assumptions, the examples in (5) have the following structures:

(12) a. [$_{IP}$ Jag har **inte** [$_{VP}$ gett boken till henne]]
b. [$_{IP}$ **Ingen** såg mig]
c. [$_{IP}$ Jag såg **ingen**]
d. [$_{IP}$ Jag har [$_{VP}$ sett **ingen**]]
e. [$_{IP}$ Jag pratade [$_{VP}$ med **ingen**]]

Sells proposes that the facts are the consequence of the following constraint:

(13) A negative clause requires a negative expression which is not inside VP.

He also suggests that the same constraint is operative in Italian.

Sells's analysis seems to work quite well. However, it requires an analogue of verb-movement to allow a verb to appear outside the associated VP. This is something that has not generally been assumed within HPSG. Hence, it is natural to look for an alternative approach. A relevant fact is that quite similar data are found in another language, where a structural account is not plausible. This is Welsh, which I discuss in the next section.

4. Welsh

Welsh differs from Swedish in a variety of ways. However, in the area of negation it is rather similar. Consider the following examples:

(14) a. Dw i **ddim** wedi rhoi 'r llyfr iddi hi.
am I NEG PERF give the book to.3SGF she
'I have not given the book to her.'

b. Welodd **neb** fi.
saw.3SG no one I
'No one saw me.'

c. Welish i **neb**.
saw.1SG I no one
'I saw no one.'

d. *Dw i wedi gweld **neb**.
am I PERF see nobody
'I haven't seen anybody.'

e. %Soniish i wrth **neb**.
mentioned I to no one
'I didn't talk to anyone.'

These examples show that Welsh is a VSO language and also that it has a rather different perfect construction. Otherwise, they are quite like those in (5). The only significant difference is that (14e) is acceptable for some speakers (as indicated by '%'). The grammatical counterpart of (14d) is (15a), and a counterpart of (14e) which is grammatical for all speakers is (15b).

(15) a. Dw i **ddim** wedi gweld **neb**.
am I NEG PERF see nobody
'I haven't seen anybody.'

b. Soniish i **ddim** wrth **neb**.
mentioned I NEG to no one
'I didn't talk to anyone.'

These examples show that Welsh, unlike Swedish but like Italian, is a language which allows multiple realizations of negation. However, the similarities between Welsh and Swedish negation are quite striking, and it is natural to try to extend Sells's structural approach to Welsh. I will show, however, that this is not possible.

Almost all transformational work has assumed that Welsh VSO clauses contain a VP, from which the verb is extracted by verb movement. Roberts (2005: 8) remarks that 'the general consensus of work on Welsh' is 'that VSO clauses involve an operation which moves the verb out of VP to the left over the subject', and this is indeed the consensus of transformational work.[2] It is in fact generally assumed that both the verb and the subject originate within VP and that both are moved out of VP with the verb moving further than the subject to give the VSO order. Within one transformational

[2] A similar analysis is proposed within LFG in Bresnan (2001: 127–131).

approach, that of Rouveret (1994), the examples in (14) would have the following structures:

(16) a. $[_{AgrP}$ Dw$_i$ $[_{TP}$ i$_j$ $[_{VP}$ t$_j$ t$_i$ **ddim** wedi rhoi 'r llyfr iddi hi]]]
b. $[_{AgrP}$ Welodd$_i$ $[_{TP}$ **neb**$_j$ $[_{VP}$ t$_j$ t$_i$ fi]]]
c. $[_{AgrP}$ Welish$_i$ $[_{TP}$ i$_j$ $[_{VP}$ t$_j$ t$_i$ **neb**]]]
d. $[_{AgrP}$ Dw$_i$ $[_{TP}$ i$_j$ $[_{VP}$ t$_j$ t$_i$ wedi gweld **neb**]]]
e. $[_{AgrP}$ Soniodd$_i$ $[_{TP}$ Sioned$_j$ $[_{VP}$ t$_j$ t$_i$ am **neb**]]]

Here, the finite verb is in Agr and the subject in Spec TP. Somewhat more complex structures are proposed in Roberts (2005). An important property of these structures is that the object in (16b) and (16c), and the PP complement in (16e) are within VP. If a VP is assumed, it is fairly clear that it should include both objects and PP complements. Welsh does not have the kind of data that supports the idea that certain objects are outside VP in Swedish.

In Swedish, the fact that pronominal objects sometimes precede the negative particle *inte* suggests that they may be outside VP. In Welsh, the object of a finite verb cannot co-occur with the negative particle *ddim*. A simple transitive sentence is negated by what Borsley and Jones (2005: chapter 5.3.2) call a pseudo-quantifier, giving (18) instead of (17).

(17) *Welish i **ddim** y bachgen.
saw.1SG I NEG the boy
'I didn't see the boy.'
(18) Welish i **mo** 'r bachgen.
saw.1SG I NEG the boy
'I didn't see the boy.'

It follows that we cannot ask whether the object of a finite verb precedes or follows *ddim*. However, the object of a finite verb may co-occur with the adverbs *byth* and *erioed*, which mean 'never' and appear to occupy the same post-subject position as *ddim* when they are the sole marker of negation.[3] In this situation, non-pronominal and pronominal objects come second, as the following show:

(19) a. Wela' i **byth** Emyr eto.
will-see.1SG I never Emyr again
'I will never see Emyr again.'
b. *Wela' i Emyr **byth** eto.
will-see.1SG I Emyr never again

3 *Byth* is used in imperfective contexts and *erioed* in perfective contexts.

(20) a. Welish i **erioed** Emyr eto.
saw.1SG I never Emyr again
'I never saw Emyr again.'
b. *Welish i Emyr **erioed** eto.
saw.1SG I Emyr never again
(21) a. Wela' i **byth** fo eto.
will-see.1SG I never he again
'I will never see him again.'
b. *Wela' i fo **byth** eto.
will-see.1SG I he never again
(22) a. Welish i **erioed** fo eto.
saw.1SG I never he again
'I never saw the men again.'
b. *Welish i fo **erioed** eto.
saw.1SG I he never again

A negative object may precede or follow *byth* and *erioed*:

(23) a. Wela' i **byth neb** eto.
will-see.1SG I never no one again
'I will never see anyone again.'
b. Wela' i **neb byth** eto.
will-see.1SG I no one never again
(24) a. Welish i **erioed neb** eto.
saw.1SG I never no one again
'I never saw anyone again.'
b. Welish i **neb erioed** eto.
saw.1SG I no one never again

In this situation, however, the adverbs are not the sole marker of negation and do not have to be in the post-subject position. They can also appear in the sentence-final adverbial position. This is shown by examples with a negative subject or *ddim*.

(25) a. Fydd **neb** yn y cae **byth**.
will-be no one in the field ever
'No one will ever be in the field.'
b. Fuodd **neb** yn y cae **erioed**.
was no one in the field ever
'No one was ever in the field.'
(26) a. Fydd Gwyn **ddim** yn y cae **byth**.
will-be Gwyn NEG in the field ever
'Gwyn will never be in the field.'

b. Fuodd Gwyn **ddim** yn y cae **erioed**.
was Gwyn NEG in the field ever
'Gwyn was never in the field.'

Thus, examples like (23b) and (24b) do not show that negative objects may appear earlier than other objects.

Similarly, in Welsh sentences with an auxiliary and a non-finite verb, the object follows the verb. The following illustrate for non-pronominal objects:

(27) a. Naeth Emrys weld Emyr.
did.3SG Emrys see Emyr
'Emrys saw Emyr.'
b. *Naeth Emrys Emyr weld.
did.3SG Emrys Emyr see

With a pronominal object the non-finite verb is preceded by a clitic but the object follows the verb and may not precede:

(28) a. Naeth Emrys ei weld o.
did.3SG Emrys 3SGM see he
'Emrys saw him.'
b. *Naeth Emrys o weld.
did.3SG Emrys he see

With a negative object, the verb must be preceded by *ddim* or some other negative element. The object may not precede the verb. ((29a) is rather like (15a).)

(29) a. Naeth Emrys **ddim** gweld **neb**.
did.3SG Emrys NEG see no one
'Emrys didn't see anyone.'
b. *Naeth Emrys **neb** weld.
did.3SG Emrys no one see

Thus, while it is quite plausible to suppose that certain objects appear outside VP in Swedish, there seems to be no evidence that any objects are outside VP in Welsh.

There also seems to be no evidence that PP complements are outside VP. A PP complement always follows the negative particle *ddim*.

(30) a. Soniish i **ddim** wrth Megan.
mentioned I NEG to Megan
'I didn't talk about Megan.'

b. *Soniish i wrth Megan **ddim**.
mentioned I to Megan NEG
'I didn't talk about Megan.'

It also follows a non-finite verb.

(31) a. Nesh i sôn wrth Megan.
did I mention to Megan
'I didn't talk to Megan.'
b. *Nesh i wrth Megan sôn.
did I to Megan talk
'I didn't talk to Megan.'

Thus, if Welsh VSO clauses contain a VP, Sells's structural approach cannot be extended to Welsh.

Although a VP analysis of Welsh VSO clauses has been generally accepted within transformational work, Borsley (2006) shows that the arguments for such analyses are quite weak. For example, one argument highlights the fact that non-finite clauses such as the bracketed material in (32), show subject-verb order and presumably contain a VP.

(32) Mae Siôn yn disgwyl [i Emrys ddarllen llyfr].
is Siôn PROG expect to Emrys read book
'Siôn expects Emrys to read a book.'

This would provide evidence that finite verbs contain a VP if one assumed that all forms of a lexeme must be associated with the same structure. However, it seems that no one assumes this. It has been generally accepted since the 1970s that passive verbs differ from the related active verbs in taking an optional PP, containing an NP with the semantic role which is assigned to the subject of the active.

If Welsh VSO clauses do not in fact involve a VP, then verb and its subject and complements are all daughters of S. This might lead one to propose a variant of Sells's approach which requires a negative constituent which is a daughter of S. (14a–14c) will have a negative constituent which is a daughter of S, whereas (14d) will have a negative constituent inside an aspectual phrase. (14e) will have a negative constituent which is a daughter of S if the PP complement counts as a negative constituent but will not if it does not. However, if complements are daughters of S, so will post-complement adverbs be. These do not give a well-formed negative sentence, as (19b) and (20b), repeated here in (33), show:

(33) a. *Wela' i Emyr **byth** eto.
will-see.1SG I Emyr never again
'I will never see Emyr again.'

b. *Welish i Emyr **erioed** eto.
saw.1SG I Emyr never again
'I never saw Emyr again.'

Thus, whether or not Welsh VSO clauses contain a VP, it seems that Sells's structural approach is untenable.

Borsley and Jones (2005: chapters 3 and 9) develop what might be called a selectional approach to the Welsh data. They propose that Welsh has a class of weak negative verbs, which normally look like positive verbs, as in (34), but sometimes have a distinctive form, as in (35).

(34) a. Fydd Gwyn yng Nghymru.
will-be Gwyn in Wales
'Gwyn is in Wales.'
b. Fydd Gwyn **ddim** yng Nghymru.
will-be Gwyn NEG in Wales
'Gwyn is not in Wales.'
(35) a. Mae Gwyn yng Nghymru.
is Gwyn in Wales
'Gwyn is in Wales.'
b. Dydy Gwyn **ddim** yng Nghymru.
is Gwyn NEG in Wales
'Gwyn is not in Wales.'

They propose that such verbs are subject to the following constraint:

(36) Negative Dependent Constraint
A weak negative verb must have a negative complement.

Following Borsley (1989b), they assume that post-verbal subjects are complements, and they argue (2005: chapter 5) that the same is true of post-subject adverbs. They assume that a constituent is negative if it has a negative head and that for some speakers but not others a PP is negative if its head has a negative complement.

This approach provides a straightforward account of the data in (14). (14a)-(14c) all contain a negative complement. In (14d), the complement *wedi gweld neb* contains a negative element, but it is not negative itself because the negative element is not the head. In (14e) the complement *wrth neb* contains a negative element which is not the head. However, it is negative for some speakers but not others.

This approach works well for the Welsh data. However, it is obviously not possible to apply it to the Italian data because neither post-verbal complements nor post-verbal subjects produce a well-formed negative sentence. Nor can it be applied to Swedish. Unlike Welsh, Swedish has a double-object construction. As the following show, a negative second object only gives a well-formed negative sentence if the first object is pronominal.

(37) a. Jag lånade dig **inga** pengar.
I lent you no money
'I didn't lend you any money.'
b. *Jag lånade Sven **inga** pengar.
I lent Sven no money
'I didn't lend Sven any money.'

For Sells, the first object in (37a) is pronominal and can be outside VP. Hence, the second object can also be outside VP. In contrast, the first object in (37b) is non-pronominal and must be inside VP. Hence, the second object must be inside VP. Obviously, examples like (37b) show that not all negative complements give a well-formed negative sentence in Swedish. Thus, Borsley and Jones's approach cannot be applied to Swedish.

We have now considered three approaches to negative prominence: De Swart's simple linear approach, Sells's structural approach, and Borsley and Jones's selectional approach, and three languages, Italian, Swedish and Welsh. The following table shows which approaches can accommodate which languages:

	De Swart (forthcoming)	Sells (2000)	Borsley and Jones (2005)
Italian	yes	yes	no
Swedish	no	yes	no
Welsh	no	no	yes

Table 1: Approaches to negative prominence

None of the three approaches can accommodate the negative realization facts in all three languages. It is natural, then, to look for a rather different approach.

5. Linearization-based HPSG approach

I will now show that a more sophisticated linear approach can be developed within the linearization-based version of HPSG developed in Kathol (2000), which can accommodate all three languages.

For linearization-based HPSG, constituents have an order domain, to which ordering constraints apply. The domain elements of a constituent may be 'compacted' to form a single element in the order domain of the mother or they may just become elements in the mother's order domain, in which case the mother has more domain elements than daughters. Most importantly in the present context, order domains and especially clausal order domains are divided into topological fields. Kathol shows how a variety of facts about

German clause structure can be accounted for by constraints on order domains. I will show how the negation facts of all three languages can be attributed to such constraints.

Kathol (2000: chapter 9) discusses Swedish clause structure and proposes the following system of topological fields:

first	Initial constituents
second	Finite verbs in main clauses
third	Constituents which follow the finite verb in a main clause but precede non-finite verbs and finite verbs in subordinate clauses
fourth	Non-finite verbs and finite verbs in subordinate clauses
fifth	Constituents which follow the finite verb in a subordinate clause

Table 2: Swedish topological fields

Assuming these fields and assuming that constituents which can give a well-formed negative sentence are [NEG +], the examples in (5) will have the following clausal order domains:

(38)
$$\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{har} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{inte} >\end{matrix}\right], \left[\begin{matrix}\textit{fourth}\\ < \text{gett} >\end{matrix}\right], \left[\begin{matrix}\textit{fifth}\\ < \text{boken til henne} >\end{matrix}\right] >\right]$$

(39)
$$\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ \text{NEG} +\\ < \text{ingen} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{såg} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{mig} >\end{matrix}\right] >\right]$$

(40)
$$\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{såg} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{ingen} >\end{matrix}\right] >\right]$$

(41)
$$\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{har} >\end{matrix}\right], \left[\begin{matrix}\textit{fourth}\\ < \text{sett} >\end{matrix}\right], \left[\begin{matrix}\textit{fifth}\\ \text{NEG} +\\ < \text{ingen} >\end{matrix}\right] >\right]$$

(42) $\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{pratade} >\end{matrix}\right], \left[\begin{matrix}\textit{fifth}\\ < \text{med ingen} >\end{matrix}\right] >\right]$

(38) and (40) have a [NEG +] element in *third*, and (39) has a [NEG +] element in *first*. In (41) a [NEG +] element is in *fifth*. (42) has no [NEG +] element. The ungrammaticality of (43) suggests that *med ingen* is not [NEG +].

(43) *Med **ingen** pratade jag.
with no one spoke I
'I didn't speak to anyone.'

Notice that this contrasts with Italian, where (3) suggests that PPs like this are [NEG +], and Welsh, where (14e) suggests that similar PPs are [NEG +] for some speakers. The grammatical counterparts of (5d) and (5e), (6a) and (6b) have the following clausal order domains:

(44) $\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{Jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{har} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{inte} >\end{matrix}\right], \left[\begin{matrix}\textit{fourth}\\ < \text{sett} >\end{matrix}\right], \left[\begin{matrix}\textit{fifth}\\ < \text{någon} >\end{matrix}\right] >\right]$

(45) $\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{Jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{har} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{inte} >\end{matrix}\right], \left[\begin{matrix}\textit{fifth}\\ < \text{med någon} >\end{matrix}\right] >\right]$

Both have a [NEG +] element in *third*.

We should also consider the examples in (37). These will have the following clausal order domains:

(46) $\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{lånade} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{dig} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{inga pengar} >\end{matrix}\right] >\right]$

(47) $\left[\text{DOM} < \left[\begin{matrix}\textit{first}\\ < \text{jag} >\end{matrix}\right], \left[\begin{matrix}\textit{second}\\ < \text{lånade} >\end{matrix}\right], \left[\begin{matrix}\textit{fifth}\\ < \text{Sven} >\end{matrix}\right], \left[\begin{matrix}\textit{fifth}\\ \text{NEG} +\\ < \text{inga pengar} >\end{matrix}\right] >\right]$

In (46) the first object is in *third* and therefore the negative second object can also be in *third*. In (47) the first object is in *fifth* and therefore the negative second object must also be in *fifth*.

Given these order domains, there is a simple generalization about Swedish negation. A negative clause has a negative element in the first or second field. Thus, we need the following constraint:

(48) *negative-clause* $\rightarrow$ $\left[\text{DOM} < ... \left[\begin{array}{l} \textit{first} \ \vee \ \textit{third} \\ \text{NEG} + \end{array}\right] ... >\right]$

We can turn now to Welsh. As far as I am aware, topological fields have not been applied to Welsh clause structure. However, Borsley and Kathol (2000) propose the following topological fields for the related Celtic language, Breton, and they seem appropriate for Welsh as well.

first	Pre-verbal constituents
second	Verbs
third	Subjects, post-subjects adverbs, complements
fourth	Adverbial constituents

Table 3: Welsh topological fields

Assuming these fields, we can propose the following schematic clausal order domains for the examples in (14):

(49)
$$\left[\text{DOM} < \left[\begin{array}{l}\textit{second}\\ < \text{dw} >\end{array}\right], \left[\begin{array}{l}\textit{third}\\ < \text{i} >\end{array}\right], \left[\begin{array}{l}\textit{third}\\ \text{NEG} +\\ < \text{ddim} >\end{array}\right], \left[\begin{array}{l}\textit{third}\\ < \text{wedi rhoi r'llyfr iddi hi} >\end{array}\right] >\right]$$

(50) $$\left[\text{DOM} < \left[\begin{array}{l}\textit{second}\\ < \text{welodd} >\end{array}\right], \left[\begin{array}{l}\textit{third}\\ \text{NEG} +\\ < \text{neb} >\end{array}\right], \left[\begin{array}{l}\textit{third}\\ < \text{fi} >\end{array}\right] >\right]$$

(51) $$\left[\text{DOM} < \left[\begin{array}{l}\textit{second}\\ < \text{fydd} >\end{array}\right], \left[\begin{array}{l}\textit{third}\\ < \text{i} >\end{array}\right], \left[\begin{array}{l}\textit{third}\\ \text{NEG} +\\ < \text{neb} >\end{array}\right] >\right]$$

(52) $\left[\text{DOM} < \left[\begin{matrix}\textit{second}\\ < \text{dw} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{i} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{wedi gweld neb} >\end{matrix}\right] > \right]$

(53) $\left[\text{DOM} < \left[\begin{matrix}\textit{second}\\ < \text{soniish} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{i} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ (\text{NEG} +)\\ < \text{wrth neb} >\end{matrix}\right] > \right]$

[NEG +] is bracketed in the domain element of *wrth neb* because some speakers but not others will have this feature specification. (49)–(51) and, for some speakers, (53) have a [NEG +] element in *third*. (52) has no [NEG +] element because *neb* is not the head of the complement *wedi gweld neb*. The examples in (15) will have the following clausal order domains:

(54) $\left[\text{DOM} < \left[\begin{matrix}\textit{second}\\ < \text{dw} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{i} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{ddim} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{wedi gweld neb} >\end{matrix}\right] > \right]$

(55) $\left[\text{DOM} < \left[\begin{matrix}\textit{second}\\ < \text{soniish} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{i} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{ddim} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ (\text{NEG} +)\\ < \text{wrth neb} >\end{matrix}\right] > \right]$

Both have a [NEG +] element in *third*. The grammatical examples in (19)–(22) also have a negative element in *third*. (19a), for example, has the following clausal order domain:

(56) $\left[\text{DOM} < \left[\begin{matrix}\textit{second}\\ < \text{wela} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{i} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ \text{NEG} +\\ < \text{byth} >\end{matrix}\right], \left[\begin{matrix}\textit{third}\\ < \text{Emyr} >\end{matrix}\right], \left[\begin{matrix}\textit{fourth}\\ < \text{eto} >\end{matrix}\right] > \right]$

It is clear, then, that a negative element in *third* gives a well-formed negative sentence. However, this is not the only possibility.

Borsley and Jones (2005: chapter 3) show that Welsh also has certain strong negative verbs, which produce a well-formed negative sentence on their own. One type is a verb in a subordinate clause preceded by the particle *na* (*nad* before a vowel).[4] (57) illustrates.

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4 Welsh also has negative subordinate clauses which are just like negative main clauses. Thus, (i) is possible instead of (57).

(57) Wn i [**na** fydd Sioned yn gweithio heno].
know.PRES.1SG I NEG be.FUT.3SG Sioned PROG work tonight
'I know that Sioned will not be working tonight.'

Another is a special negative verb used in imperatives, illustrated in (58).[5]

(58) **Paid**/ **Peidiwch** â mynd i Aberystwyth.
NEG.SG NEG.PL with go to Aberystwyth
'Don't go to Aberystwyth'

The subordinate clause in (57) and the imperative in (58) will have the following clausal order domains:[6]

(59) $\left[\text{DOM} < \left[\begin{array}{l} \textit{second} \\ \text{NEG} + \\ < \text{na fydd} > \end{array} \right], \left[\begin{array}{l} \textit{third} \\ < \text{Sioned} > \end{array} \right], \left[\begin{array}{l} \textit{third} \\ < \text{yn gweithio heno} > \end{array} \right] > \right]$

(60) $\left[\text{DOM} < \left[\begin{array}{l} \textit{second} \\ \text{NEG} + \\ < \text{paid/peidiwch} > \end{array} \right], \left[\begin{array}{l} \textit{third} \\ < \text{â mynd i Aberystwyth} > \end{array} \right] > \right]$

Both domains have a negative element in *second*. Thus, this is a second possibility.

(i) Wn i fydd Sioned **ddim** yn gweithio heno.
know.PRES.1SG I be.FUT.3SG Sioned NEG PROG work tonight
'I know that Sioned will not be working tonight.'

5 This is a defective verb, which has just the imperative forms in (58) and a non-finite form *peidio* used to negate a non-finite clause. The latter is illustrated in (i), where it appears as *beidio* due to a regular mutation process.

(i) Mae Siôn yn disgwyl [i Emrys **beidio** â darllen llyfr]
is Siôn PROG expect to Emrys NEG with read book
'Siôn expects Emrys not to read a book.'

6 In Borsley and Jones (2005) only semantically negative dependents are marked [NEG +]. However, there is no good reason why negative heads should not also be marked in this way. A clause with a [NEG +] head must not be [NEG +] itself because it does not make a superordinate clause negative. This is no problem if heads and their mothers are only identical by default as in Ginzburg and Sag (2000).

What about negative elements in *first*? This is what we have in (61), which will have the clausal order domain in (62).

(61) ***Neb** welish i.
no one saw-1SG I
'It was no one that I saw.'

(62) $\left[\text{DOM} < \left[\begin{array}{l} \textit{first} \\ \text{NEG} + \\ < \text{neb} > \end{array}\right], \left[\begin{array}{l} \textit{second} \\ < \text{welish} > \end{array}\right], \left[\begin{array}{l} \textit{third} \\ < \text{i} > \end{array}\right] > \right]$

It seems, then, that a negative element in *first* does not give a well-formed negative sentence.

What about *fourth*? The ungrammatical examples in (19)–(22) show that a negative element in *fourth* does not give a well-formed negative sentence. (19b) will have the following clausal order domains:

(63) $\left[\text{DOM} < \left[\begin{array}{l} \textit{second} \\ < \text{wela} > \end{array}\right], \left[\begin{array}{l} \textit{third} \\ < \text{i} > \end{array}\right], \left[\begin{array}{l} \textit{third} \\ < \text{Emyr} > \end{array}\right], \left[\begin{array}{l} \textit{fourth} \\ \text{NEG} + \\ < \text{byth} > \end{array}\right], \left[\begin{array}{l} \textit{fourth} \\ < \text{eto} > \end{array}\right] > \right]$

It seems, then, that a Welsh negative clause requires a negative element in either the second or the third field, and hence that the following constraint is necessary:

(64) *negative-clause* $\rightarrow \left[\text{DOM} < ... \left[\begin{array}{l} \textit{second} \vee \textit{third} \\ \text{NEG} + \end{array}\right] ... > \right]$

Finally, we can consider Italian. Here, it seems reasonable to assume the following very simple set of topological fields (cf. Przepiórkowski 1999):

first	Pre-verbal constituents
second	Verbs
third	Post-verbal constituents

Table 4: Italian topological fields

Given these assumptions, (1a) and (1b) will have the following clausal order domains:

(65) $\left[\text{DOM} < \left[\begin{array}{l} \textit{first} \\ \text{NEG} + \\ < \text{nessuno} > \end{array}\right], \left[\begin{array}{l} \textit{second} \\ < \text{telephona} > \end{array}\right], \left[\begin{array}{l} \textit{third} \\ < \text{a Gianni} > \end{array}\right] > \right]$

(66) $\left[\text{DOM} < \left[\begin{array}{l} \textit{first} \\ < \text{Gianni} > \end{array}\right], \left[\begin{array}{l} \textit{second} \\ < \text{telephona} > \end{array}\right], \left[\begin{array}{l} \textit{third} \\ \text{NEG} + \\ < \text{a nessuno} > \end{array}\right] > \right]$

What of (1c)? For Kim (2000: chapter 4.3), *non* is a clitic-auxiliary and hence a type of verb. For Abeillé and Godard (2003) it is a lexical adjunct to the verb. Either way it will be in *second*. Given Kim's analysis, (1c) will have something like the following order domain:[7]

(67) $\left[\text{DOM} < \left[\begin{array}{l} \textit{first} \\ < \text{Gianni} > \end{array}\right], \left[\begin{array}{l} \textit{second} \\ \text{NEG} + \\ < \text{non} > \end{array}\right], \left[\begin{array}{l} \textit{third} \\ < \text{telephona} > \end{array}\right], \left[\begin{array}{l} \textit{third} \\ \text{NEG} + \\ < \text{a nessuno} > \end{array}\right] > \right]$

Assuming these order domains, Italian requires a negative element in either the second or the third field, and hence the following constraint:

(68) *negative-clause* $\rightarrow \left[\text{DOM} < ... \left[\begin{array}{l} \textit{first} \ \vee \ \textit{second} \\ \text{NEG} + \end{array}\right] ... > \right]$

It seems, then, that while a number of non-linear approaches cannot accommodate the negative realization facts in all three languages, there is no problem for a linear approach assuming topological fields.

6. Concluding remarks

In this paper, I have looked at the ways in which three languages, Italian, Swedish, and Welsh, require negation to be realized in a prominent position. I have shown that a linear approach employing topological fields can provide an account of the facts in all three languages, unlike the simple linear approach of De Swart (forthcoming), the structural approach of Sells (2000) and the selectional approach of Borsley and Jones (2005). It looks, then, as if

[7] There are other possible analyses here. *Telefona* and *a nessuno* might form a single member of the third field. Alternatively, *telefona* might be a second member of *second*.

we have phenomena here which not only appear to involve linear order but really do involve linear order.

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Noun ellipsis without empty categories

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Abstract

In this paper, we present an analysis of noun phrases with elided nouns that dispenses with the positing of empty categories and preserves the NP structure assumed for NPs with overt nouns, modulo the absence of the head noun. On a par with traceless analyses of long distance dependencies, this is proposed as a further step towards a more lean theory of grammar, without phonetically null items.

1 Introduction

Elliptical NPs get structured around missing head nouns, as illustrated in the following examples from English (Lobeck (1995)):

(1) a. Although John's friends were late to the rally, [Mary's -] arrived on time.

b. Because [her two -] were sick, Melissa didn't take the children to swimming lessons that week.

c. We tasted many wines, and I thought that [some -] were extremely dry.

This is a widespread type of construction that occurs in many languages other than English, as exemplified below with data from German (Netter (1996)) and Spanish (Ticio (2005)):

(2) a. das rote Auto und [das blaue -]
the red car and the blue
the red car and the blue one

b. la casa azul y [la - verde]
the house blue and the green
the blue house and the green one

The following is a list of typical properties of NP ellipsis that have been reported in the literature.

As noun ellipsis is to be viewed as a phenomenon different from null arguments, at least one specifier, one complement or one modifier is present in the elliptical NP.

In some languages, like German, ellipsis cannot be NP initial (Netter (1996)):

(3) a. Alte Männer mit Hut haben [junge - mit Mütze] getroffen.
old men with hat have young with cap met
Old men in hats met young ones in caps.

[†]We would like to thank Valia Kordoni for reviewing a previous version of this paper and Berthold Crysmann and Stefan Müller for some German data and comments. Any mistakes are entirely ours.

b. * Alte Männer mit Hut haben [- mit Mütze] getroffen.

In some languages, some determiners, like the English definite articles, cannot alone form an NP (English example from Lobeck (1995)), while others are allowed to (1c):[1]

(4) * A single protester attended the rally because [the -] apparently felt it was important.

In languages like Portuguese and Spanish, with pre- and post-head adjectives, pre-head ones (which are intensional) cannot appear in this construction (Spanish example in (5b) from Ticio (2005)), although postnominal adjectives (intensional or not) can (Portuguese example in (5a)):

(5) a. a terrorista real e [a - imaginada]
the terrorist real and the imagined
the real terrorist and the imagined one

b. * Ayer vi a la verdadera terrorista y a [la supuesta -].
yesterday I saw the true terrorist and the alleged
intended: *Yesterday I saw the real terrorist and the alleged one.*

In addition, the elliptical NP relies on an antecedent to be interpreted, from which it inherits gender as well as subcategorization and count/mass properties (Netter (1996) and Masullo (1999)),

(6) a. die starke Konzentration auf die Wirtschaft
the strong concentration on the economy
und [die weniger grosse - auf den Umweltschutz]
and the less large on the environment
the strong concentration on the economy and the less large on the environment

b. * Juan visitó a sus tíos y Pedro visitó a [la - suya].
Juan visited his uncles/aunts.MASC and Pedro visited the his.FEM
intended: *Juan visited his aunt and uncle and Pedro visited his (aunt).*

but not necessarily number:

(7) Juan visitó a sus tíos y Pedro visitó a[l - suyo].
Juan visited his uncles/aunts.MASC and Pedro visited the - his.MASC.SG
Juan visited his aunt and uncle and Pedro visited his (uncle).

[1] We are assuming, like much of the literature on noun ellipsis, that if an item can appear in an NP which is restrictively modified, it is not a pronoun but a determiner, since restrictive modifiers attach to $\overline{\text{N}}$ (see Section 4.4).

In English, an overt element (*one*) is used instead of a null noun in certain contexts (*one* anaphora).

Finally, NP ellipsis should not be confused with missing-N generics (e.g. *the desperately poor*),[2] which tend to be limited to descriptions of people and do not resort to an antecedent to be interpreted.

2 Previous Accounts

Many previous analyses of NP ellipsis, either in the HPSG framework (e.g. Netter (1996), Nerbonne and Mullen (2000)) or under other theoretical persuasions (e.g. Lobeck (1995), Ticio (2005)), assume an empty category approach where the missing noun is assumed to be an actual, though phonetically null, lexical item.

In line with a view of grammar free of reified empty categories, alternatives to this approach have been advanced as well. One of such alternatives was put forward in (Winhart, 1997) and consists in analyzing adjectives in elliptical NPs as the result of a nominalization lexical rule. A major problem for this account, pointed out in (Netter, 1996), is that it cannot derive an elliptical NP where the adjective has modifiers or specifiers of degree, as in (8).

(8) die ziemlich alten Männer und [die [besonders jungen] -]
the quite old men and the particularly young
the quite old men and the particularly young ones

A similar analysis, based on explaining away the data via some category change of the elements occurring in elliptical NPs, might be envisaged for determiners: when items from these categories appear in elliptical NPs, they could be taken as pronouns, either as a result of some lexical rule, or even as homonymous items included in the lexicon from the start. Such an approach has also found appropriate appreciation and criticisms in (Nerbonne and Mullen, 2000), the main argument against it being the possibility of restrictive modification (see Section 4.4).

Another line of research has been to propose the underspecification of adjectives and other NP elements so that they can function as nouns as well. A crucial problem here concerns how the semantics of the NP is composed given that determiners and nouns, for instance, make different contributions to its semantic content. This is the approach explored in (Beavers, 2003) for nouns and determiners. That work is limited in its range because it only covers elliptical NPs with a single determiner.

Another option to be explored for an analysis that does not resort to empty categories is to use a unary syntactic rule, which can operate in tandem with the usual specifier-head or adjunct-head schemata. This possibility is appreciated in (Netter, 1996), to be dismissed as being theoretically uninteresting. Taking into account,

[2]We will call missing-N generics to what is referred to in the literature as *people* deletion (Pullum (1975)) or null-N generics (Nerbonne and Mullen (2000)), because that expression is more neutral than the latter with respect to the status of transformations or empty categories.

however, how the use of unary schemata has been enhanced since then,[3] this is clearly an option worth considering, and it is the approach that will be explored in the next Sections.

Two computational HPSGs for German (Müller and Kasper (2000) and Müller (1996)) indeed use unary syntactic rules that apply to noun modifiers and produce a noun-headed projection.

The analysis proposed in the following Sections presents a unified treatment of noun adjuncts and determiners in noun ellipsis constructions, merging the latter accounts with the account of Beavers (2003).

3 Functors and NP structure

Before entering into the details of the proposed analysis for elliptical NPs, it is useful to briefly sketch the NP organization assumed by our analysis.

Our account of ellipsis builds upon the work of Allegranza (1998a), Allegranza (1998b), Van Eynde (2003a) and Van Eynde (2003b), who propose the simplification resulting from replacing the specific constructs used to handle specifiers and adjuncts by a more general one for functors.[4] Following this work, the specifier vs. adjuncts distinction becomes useless by letting all functors select their head via a single feature (its designation has not been uniform: here we use SELECT) and by using another feature (here MARKING) to, somewhat redundantly in the presence of valence features, directly describe saturation. This eliminates the features MOD, SPEC and SPR and turns out to require fewer syntactic schemata.

A head-functor schema then comes into play, which, as outlined in Figure 1, identifies the element in the functor's SELECT feature with the head daughter. While the mother node's valence and head features are shared with the head element, as expected, its MARKING value is contributed by the functor, via functor's MARK value.[5]

A type hierarchy for the possible values that features MARKING and MARK can take are then used to enforce the subtleties of the NP internal syntactic structure. For the sake of illustration, a type hierarchy for MARKING values is presented in Figure 2, and the following paragraphs describe the necessary constraints where they are employed to model a very simplified NP structure assumed in the remaining Sections.[6]

[3] Ginzburg and Sag (2001) make heavy use of them, also in the analyses of constructions related to ellipsis, like sluicing, and Sag (2000) employs a syntactic rule to handle VP ellipsis that in some cases may be unary.

[4] This is in line with similar proposals in transformational grammar, including the influential Kayne (1994), which assumes perhaps the more far reaching motto that "specifiers are an instance of adjunction".

[5] Despite the name of MARKING we are using for this feature, functors are not to be confused with the markers of Pollard and Sag (1994).

[6] This hierarchy will be used for all languages under consideration. Inevitably, if one wants to cover phenomena that are not treated in this paper, there will be language-related differences. To give an example, in Portuguese, possessives co-occur with articles: $o_{Article}$ $teu_{Possessive}$ $carro_{Noun}$

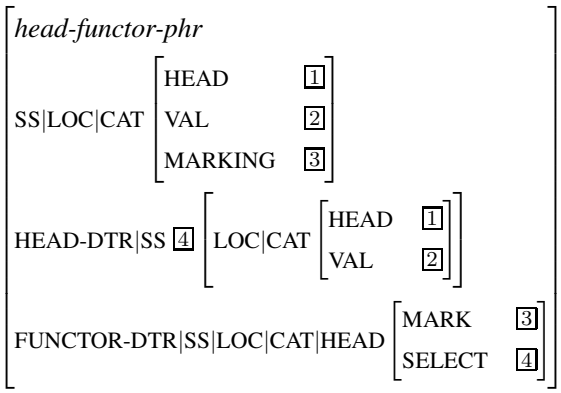

Figure 1: Outline of head-functor schema

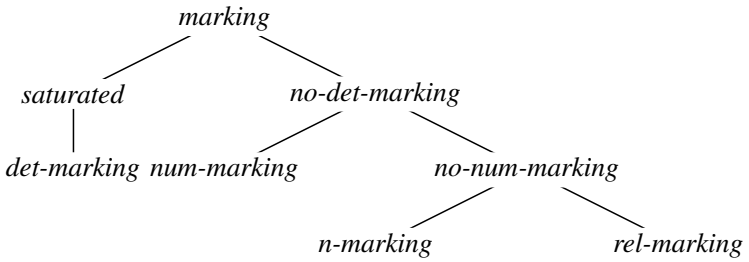

Figure 2: Type hierarchy of marking

With this setup, items that select for NPs constrain them to have a MARKING with value *saturated* (instead of requiring their SPR feature to be empty). For instance, an item with an NP complement (and no other complement) will say:

$$\left[\text{SYNSEM|LOCAL|CAT|VAL|COMPS}\left\langle\left[\text{LOCAL|CAT}\begin{bmatrix}\text{HEAD} & \textit{noun}\\ \text{VAL|COMPS} & \langle\rangle\\ \text{MARKING} & \textit{saturated}\end{bmatrix}\right]\right\rangle\right]$$

Nouns come in the lexicon with [MARKING *n-marking*]. Therefore, they need to combine with a functor with a MARK value unifiable with *saturated* in order for the resulting constituent to be able to occur in NP contexts.

Determiners select a constituent with a value of MARKING incompatible with the value of their MARK feature, so that they do not iterate:

$$\left[\text{SYNSEM|LOCAL|CAT|HEAD}\begin{bmatrix}\textit{determiner} & \\ \text{SELECT|LOCAL|CAT|MARKING} & \textit{no-det-marking}\\ \text{MARK} & \textit{det-marking}\end{bmatrix}\right]$$

Numerals are similar but less peripheral:

(*your car*). They cannot however be treated as adjectives, because they cannot iterate and are more peripheral (they precede numerals). So a more elaborated type hierarchy for *marking* is required. To the best of our knowledge, no attempts have been made yet to establish hierarchies for *marking* that can be assumed as universal. The one we present does not bear that claim either.

$$\begin{bmatrix} \text{SYNSEM|LOCAL|CAT|HEAD} & \begin{bmatrix} \textit{numeral} & \\ \text{SELECT|LOCAL|CAT|MARKING} & \textit{no-num-marking} \\ \text{MARK} & \textit{num-marking} \end{bmatrix} \end{bmatrix}$$

APs and PPs select for a constituent with [MARKING *n-marking*] and produce a node with the same level of saturation:

$$\begin{bmatrix} \text{SYNSEM|LOCAL|CAT|HEAD} & \begin{bmatrix} \textit{adjective} \vee \textit{preposition} & \\ \text{SELECT|LOCAL|CAT|MARKING} & \textit{n-marking} \\ \text{MARK} & \textit{n-marking} \end{bmatrix} \end{bmatrix}$$

As a consequence, they are allowed to recur and, when following the noun, to be interspersed (i.e. both Noun-AP-PP and Noun-PP-AP sequences are grammatical in languages that allow postnominal adjectives).[7]

Relative clauses should be allowed to iterate, but they are more peripheral than APs and PPs inside an NP:

$$\begin{bmatrix} \text{SYNSEM|LOCAL|CAT|HEAD} & \begin{bmatrix} \text{SELECT|LOCAL|CAT|MARKING} & \textit{no-num-marking} \\ \text{MARK} & \textit{rel-marking} \end{bmatrix} \end{bmatrix}$$

Appropriate nesting is thus enforced with the help of MARKING values: for instance, determiners are more peripheral than numerals.

Marking values do not constrain relative word order between the daughters of head-functor phrases, which must be enforced separately.[8]

The use of a unary schema can also be assumed to produce bare NPs when appropriate. Instead of discharging the SPR feature of nouns, that rule takes as daughter a noun-headed constituent with [MARKING *no-det-marking*] and produces a node with [MARKING *det-marking*].

3.1 Example

An example parse for the NP *these two cars* is presented in Figure 3.

[7] If a language has both prenominal and postnominal adjectives, or prenominal adjectives and postnominal PPs, potentially spurious attachment ambiguities will be produced for a sequence AP-Noun-PP/AP: [AP [Noun PP/AP]] and [[AP Noun] PP/AP]. It is straightforward to complicate the type hierarchy of *marking* to control this, too. If one wants to keep the structure [AP [Noun PP/AP]] and rule out [[AP Noun] PP/AP], the type *n-marking* can be split into two subtypes *pre-n-marking* and *post-n-marking*, and prenominal adjectives can be specified to have the constraint [MARK *pre-n-marking*] and select for nominal projections with [MARKING *n-marking*], with prepositions and postnominal adjectives selecting for sister nodes with [MARKING *post-n-marking*] and bearing an identical value for their MARK attribute. Nouns would then come in the lexicon with [MARKING *post-n-marking*]. We will ignore this complication in the remainder of this text.

[8] For instance, by having two subtypes of the functor-head schema with different precedence relations between head and functor and controlling rule application by some dedicated feature in functors.

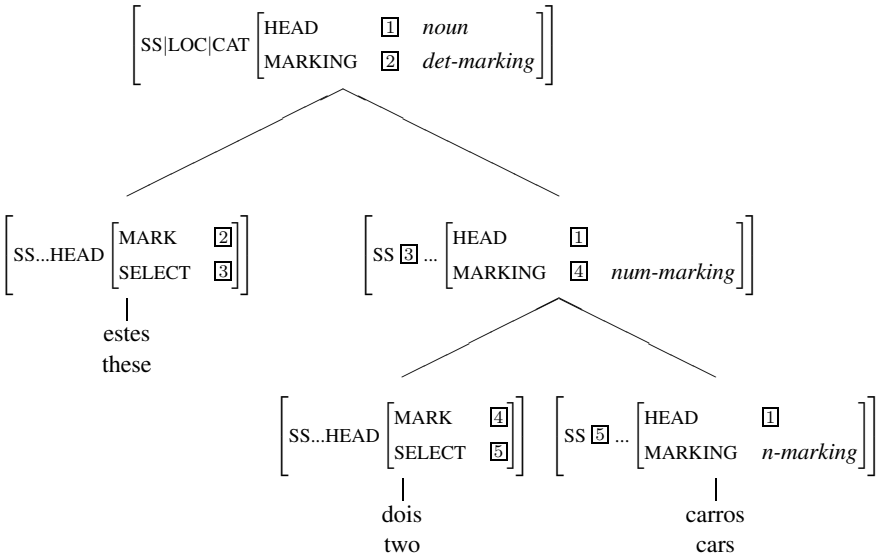

Figure 3: Parse tree for *estes/these dois/two carros/cars*.

4 Analysis

In the approach sketched in the previous Section, both for specifiers and adjuncts, the information about their head can be found in a single place (the SELECT feature), and the same holds for the information on the nature of the constituents they yield when they are attached to their head (under the MARK feature). This account of NPs in general brings two important advantages: (1) specifiers and modifiers receive a uniform treatment; (2) since all the syntactic properties of the constituent resulting from the attachment of a functor with its head are present in the functor, they will be known if the head is missing. Therefore, a single schema for noun ellipsis can be implemented for both specifiers and adjuncts ensuring syntactic structures that replicate the ones obtained when the nominal head is not missing.

Against this background, elliptical NPs without complements can be easily accounted for with the help of a syntactic schema *n-ellipsis-functor*, which is a straightforward unary version of the schema in Figure 1 for NPs but without the HEAD-DTR. Some properties of this schema are:

- the MARKING value of the mother node is given by its functor's MARK value;
- the SYNSEM of the mother node is partly shared with the SYNSEM of the functor's SELECT value: it is shared at least for the features HEAD and VAL.[9] As for the remainder features, note that, on the one hand, the SYNSEM|LOCAL|

[9]These are the same features that are shared between the mother and the head-daughter in a head-functor phrase, and functors must be able to fully specify the level of saturation of the head they attach to.

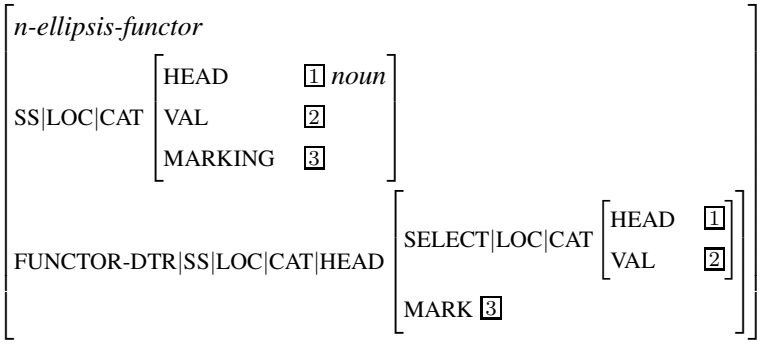

Figure 4: Outline of the noun ellipsis schema.

CONT|RELS of the mother node must be the union of the functor's RELS with a multi-set of relations corresponding to the denotation of the missing noun; on the other hand, the MARKING values (i.e. the MARKING feature of the mother node and the MARKING feature of the synsem in the SELECT attribute of the functor) may be incompatible and should not be shared at all;

- the HEAD of the mother is constrained to be a noun (functors not selecting nouns via the SELECT feature will thus not be part of an elliptical NP), and its COMPS should be inherited from the antecedent.

Hence, given an elliptical NP, this schema will directly apply to the functor with the most specific marking type. The other functors will be combined as expected, following the usual schemata in place also for non elliptical NPs.

Figure 4 depicts the syntactic constraints associated with the noun ellipsis schema. The semantic properties of this construction are discussed in Section 4.3.

4.1 Example

We present the parse tree for the NP *estes dois*/ *these two* in Figure 5. The numeral *dois*/*two* feeds the *n-ellipsis-functor* rule and yields a node with [HEAD *noun*] and [MARKING *num-marking*]. The determiner attaches as expected, via some head-final version of the head-functor schema in Figure 1, giving rise to a node with [MARKING *det-marking*], a full (saturated) NP. The resulting structure is completely parallel to the one of an NP like *estes dois carros* (*these two cars*), except for the missing N node and the branch connecting it (Figure 3).

The NP *estes*/*these* will also be generated (with *estes*/*these* feeding the ellipsis rule and producing a projection headed by a noun with a saturated MARKING value, i.e. an NP), but then the numeral cannot attach for the very reasons that prevent numerals from modifying full NPs: conflicting values of MARKING and other constraints that also block numerals from attaching to the right of constituents in Portuguese and English.

In general, NPs with elided nouns are derived by an application of the ellipsis rule to the most embedded constituent as defined by the marking hierarchy. The

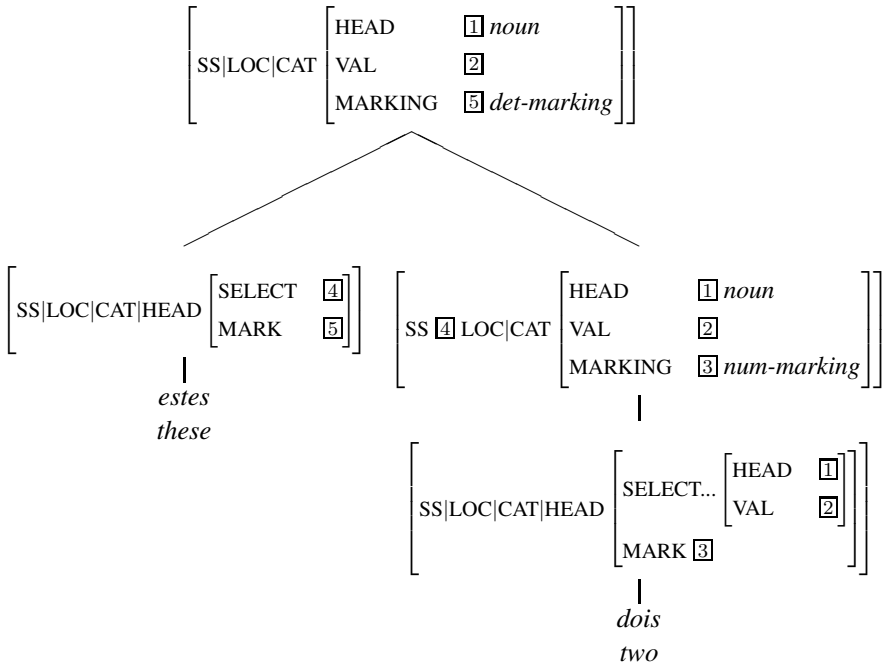

Figure 5: Parse tree for the NP [*estes/these dois/two* -].

other functors that are present combine as expected. In (9) we show the structures produced by the present analysis for some of the English ((9a) and (9b)), Spanish (9c) and German (9d) examples in Section 1:

(9) a. $[_{det-marking}$ [D some]]

b. $[_{det-marking}$ [D her] $[_{num-marking}$ [Num two]]]

c. $[_{det-marking}$ [D la] $[_{n-marking}$ [A verde]]]

d. $[_{det-marking}$ $[_{n-marking}$ [A junge] $[_{n-marking}$ [PP mit Mütze]]]]

4.2 Antecedent Resolution

The relation between an NP with an elided noun and its antecedent has been reported in the literature to have properties in common with the kind of binding ruled by Principle B (Hankamer and Sag (1976), Lobeck (1995) among others; the following examples are theirs). In fact, the antecedent can be given pragmatically, as in (10a), or be in a different sentence (10b).

(10) a. *At a food vendor's*: I'll take [two -].

b. - John caught a big fish.
- Yes, but [Mary's -] was bigger.

The way to determine the antecedent may thus be dependent on how anaphoric binding is analyzed in general and will not be discussed here. But it is worth noting that, whereas in binding there is an anaphoric relation between NPs, here there is a semantic dependency relation between predicators (sentence (3a) illustrates this point clearly). We will continue using the expression *one anaphora* in this text though.

4.3 Semantics

Bearing in mind the considerations in the previous paragraphs, we illustrate the composition of semantics for these phrases, ignoring for now the way the antecedent is to be recovered. Minimal Recursion Semantics (Copestake et al. (2005)) is used to this end.[10] Figure 6 shows the semantic constraints on *n-ellipsis-functor*, and its main properties are the following:

- the SYNSEM|LOCAL|CONT|RELS of the mother node is the union of the functor's RELS with a multi-set with a nominal object in it (a *noun-ellipsis* relation);
- since no handle constraints should be associated with the missing noun, the HCONS feature of the mother node is simply the HCONS of the daughter;
- the INDEX of a nominal projection is the INDEX of the head noun, which is structure-shared with the ARG0 of the noun's relation in the lexical entry for the noun. In the absence of this lexical unit, this unification must be performed here, by directly identifying the INDEX of the mother node with the ARG0 of the *noun-ellipsis* relation;
- the functor must be allowed to see the LTOP and the INDEX of the node it selects because they can be arguments of the relation or relations the functor contributes to the semantics. Since a noun would equate its LTOP with the LBL feature of its relation and its INDEX with the ARG0 feature there, these are unified with the LTOP and INDEX under the SELECT attribute of the functor;
- to simplify our presentation, we ignore Kasper's problem (Copestake et al. (2005)) in this analysis and (1) unify the LTOP of the mother node with the LTOP of the daughter, and (2) assume in what follows that, in the lexicon, intersective modifiers identify their LTOP with the LTOP of what they select. It should be clear that the present proposal is compatible with any of the two known solutions to that problem (i.e. multiplying syntactic rules or multiplying the features used for the composition of semantics; see the cited paper).

[10] For conciseness reasons, we omit feature HOOK in our presentation.

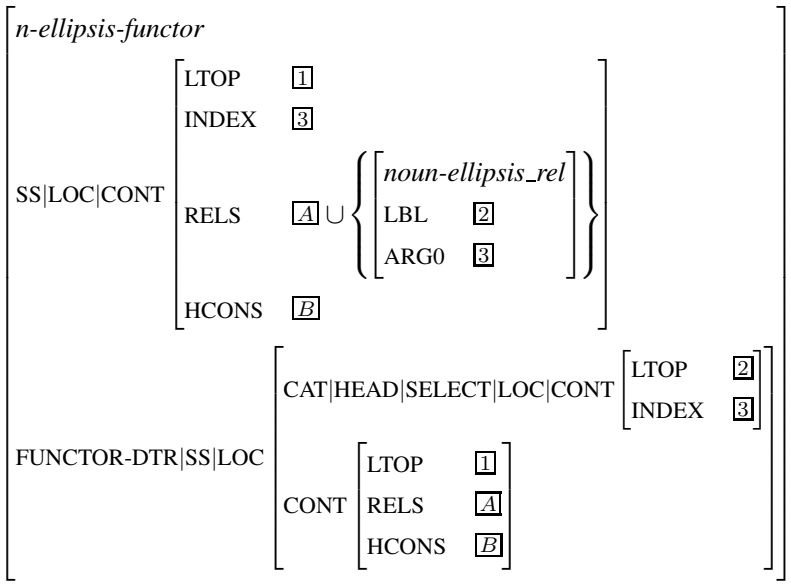

Figure 6: Semantic constraints of the noun ellipsis schema.

4.3.1 Example

We present an example parse for the NP *some - in Varna*, decorated with LTOP and INDEX features, in Figure 7. In that figure, it is assumed that features SS|LOC|CAT|HEAD|SELECT|LOC|CONT|LTOP and SS|LOC|CONT|LTOP are unified in the lexical entry for the preposition. The resulting MRS is presented in Figure 8.

4.4 Structural Parallelism

Maintaining structural parallelism between NPs with expressed nouns and NPs with missing nouns has several advantages. For instance, if we assume that relative clauses attach lower than determiners in expressed noun NPs, as we have been, in the present analysis an NP like *some that arrived* will get the parallel structure [[*some* $_{\text{D}}$] [[*that arrived* $_{\text{RC}}$] $_{\overline{\text{N}}}$] $_{\text{NP}}$]. This can be important for semantic reasons, since restrictive relative clauses contribute relations in the restrictor of the quantifier of the NP they are in.

An alternative analysis where *some* would be, say, a pronoun and restrictive modifiers must attach higher would introduce asymmetries in the way semantics is built. For example, in the analysis of Beavers (2003), a unary syntactic rule is put in place for noun ellipsis that takes a determiner as input, and noun-headed projections are considered complements of determiners (the DP hypothesis is followed). This analysis has obvious problems attaching a relative clause (or a numeral as in *these three*, etc.) to an unexpressed complement of a determiner and will thus be forced to have these elements attached to full DPs when no noun is present. In the analysis presented here, determiners, with [MARK *det-marking*], produce full

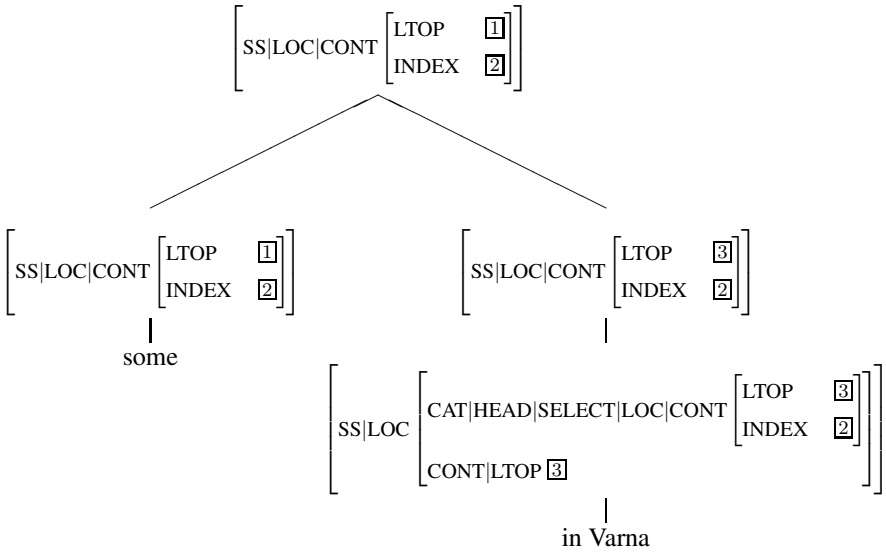

Figure 7: Parse for the example NP *some - in Varna*.

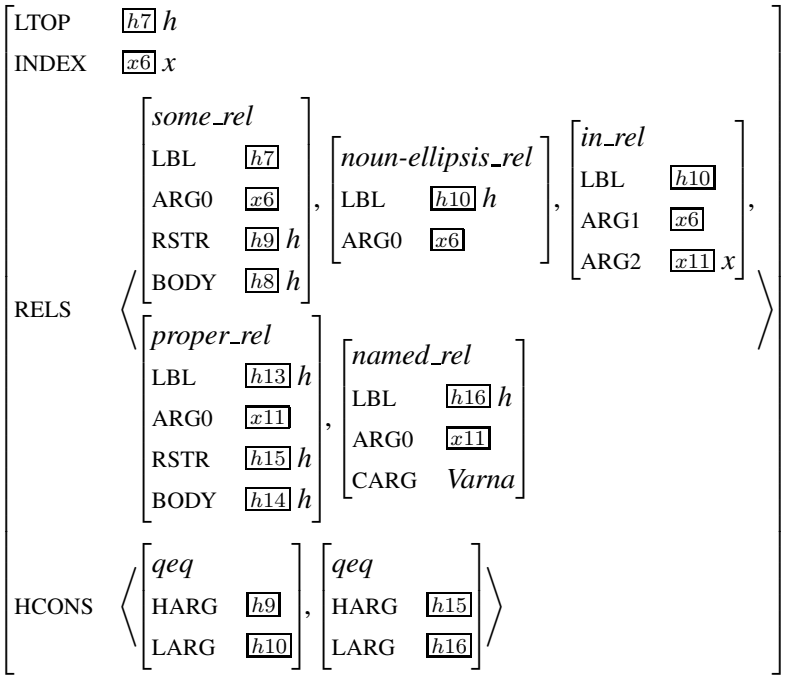

Figure 8: MRS for the NP *some - in Varna*.

NPs when they undergo the ellipsis rule, but if a relative clause is present, it is this element that feeds *n-ellipsis-functor* and the determiner attaches higher.

To put it more explicitly, a restrictive relative clause will behave like the PP in Figure 7, identifying its LTOP with the LTOP of the constituent it selects. In an analysis where determiners of elided nouns are treated as pronouns, a relative clause would have to attach to a full NP. In that case, the LTOP of its sister would have a different value, as can be seen in that Figure, and extra features would be required to fix the problem. Allowing for NPs like [*these two* -] and simultaneously blocking numerals from attaching to the right of NPs headed by overt nouns would be even more cumbersome.

4.5 Complements of Null Nouns

The COMPS feature of the node produced by the *n-ellipsis-functor* rule should be the same as the COMPS feature of the antecedent noun: in languages where noun modifiers can intervene between the noun and its complements, head-complement schemata can apply higher, for instance to derive Portuguese examples like:[11]

(11) o filho mais velho do Rui e o [$_{\overline{N}}$ [$_{N}$ - mais novo] [da Ana]]
the son most old of the Rui and the most young of the Ana
Rui's eldest son and Ana's youngest one

However, since the deepest constituents of elliptical NPs with complements might not be functors (i.e. might be the complements themselves), a further unary schema, *n-ellipsis-comp* is required. For example, we want to assign to the NP *o da Ana* the structure presented in (12), but the most embedded PP is not a functor.

(12) o filho do Rui e [$_{NP}$ o [$_{\overline{N}}$ - [$_{PP}$ da Ana]]]
the son of the Rui and the of the Ana
Rui's son and Ana's

This second schema simply turns a PP that can be a noun complement into a nominal projection. The remaining functors, if present, will attach upwards as expected. This schema should of course ensure that the complement PP is compatible with the selectional properties inherited from the antecedent of the elliptical NP.

Some of its key properties are common to the *n-ellipsis-functor* schema above. The resulting constituent:

- has a HEAD of type *noun* and a MARKING of type *n-marking*;
- since the antecedent can have more than one complement, its COMPS value is the tail of the COMPS value of the antecedent of the elliptical NP;

[11] This is why in *n-ellipsis-functor* the VAL of the mother node is shared with the VAL in the functor's SELECT feature: functors that must attach only after the complements are projected — e.g. all adnominals in English and relative clauses in Portuguese — can specify that they attach to a projection with empty COMPS, with the desired effect that they are blocked from appearing in contexts like (11).

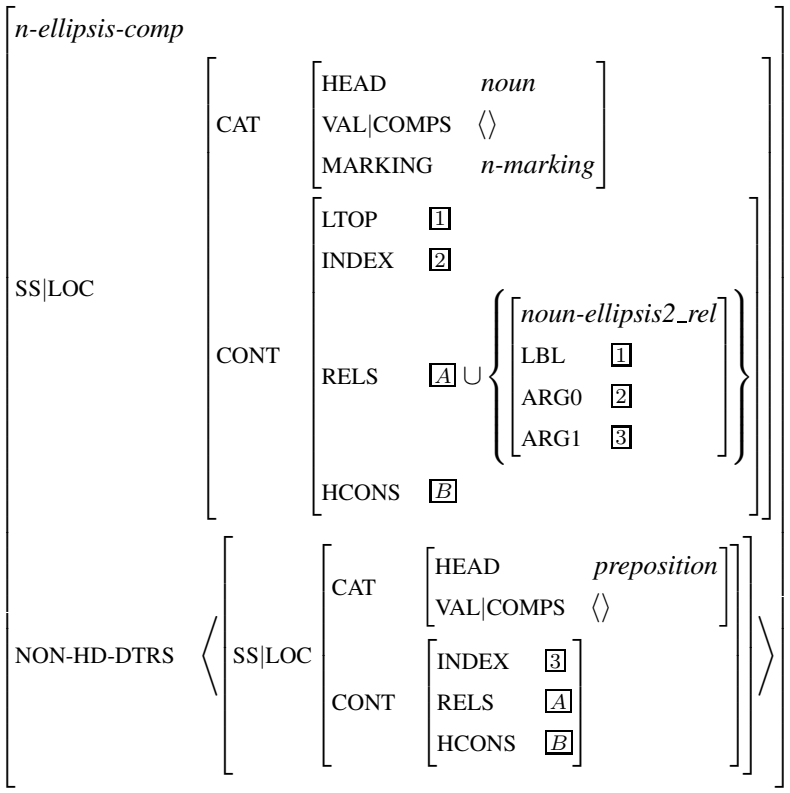

Figure 9: Additional noun ellipsis schema for PPs as noun complements.

- its RELS and HCONS values are also mainly contributed by the daughter, with the semantics of the missing noun added;
- the LTOP and INDEX features of the mother node correspond to the features LBL and ARG0 of the added relation, as in nouns.

A few technical issues arise if the antecedent is not available: (1) it is not possible to constrain the value of the COMPS in the mother node appropriately; (2) it is not possible to know the arity of the relation for the missing noun; and (3) it is not possible to know how the arguments of that relation are instantiated (e.g. the second argument of the nominal relation is given by the INDEX feature of the daughter node if it is a PP headed by a non-predicational preposition, but by its LTOP feature if it is a CP). In general, selectional properties of the missing noun are not known but they are required to constrain the daughter appropriately. The antecedent is thus crucial to resolve these values. Figure 9 depicts this schema, limited only to PP complements of nouns selecting for a single complement. If the antecedent cannot be known, additional schemata may be necessary for other kinds of complements.

Note that this second schema may not be required for every language. Lobeck (1995) points out that in English, elliptical NPs cannot contain noun complements.

Therefore, in some languages *n-ellipsis-functor* may suffice to account for all data concerning noun ellipsis.[12]

4.6 Co-Occurrence Restrictions

In order to control many co-occurrence restrictions in elliptical NPs, the *Left Periphery (Empty)* (LP(E)) attribute is used in some analyses (Nerbonne and Mullen (2000), Netter (1996)).[13] Such an approach is compatible with the present proposal and can be kept in use for the same purpose.

In (Nerbonne and Mullen, 2000), null nouns have the value *null* for their LP feature, the anaphoric *one* shows the value *one* and all other lexical items are constrained to be [LP *full*], a value that is percolated from the leftmost daughter in phrases. In the following paragraphs we show how this behavior can be mimicked when one uses unary rules instead of the null noun.

In order to make use of LP in this approach, each ellipsis rule can be split into two rules: one that corresponds to the case where the missing noun precedes the functor or complement, the other corresponding to the inverse situation. Note that not all combinations will be necessary for every language, as in languages with fixed head-complement word order only one *n-ellipsis-comp* rule will be needed. Head-initial ellipsis rules must then be specified to be [LP *empty*], the others structure-share the LP feature in the mother node with the LP attribute of the functor daughter (which will be *full*). Control on which functors feed each ellipsis rule can be done in the same way as control on linear precedence between a functor and an expressed head.[14]

An additional constraint must be added to *n-ellipsis-functor* rules — their functor daughter selects an element with [LP *empty*], because the LP(E) analyses rely on functors being able to see the LP value of what they select, and we want to mimic the effect of them attaching to a null constituent:

$$\left[\text{FUNCTOR-DTR}|\text{SS}|\text{LOC}|\text{CAT}|\text{HEAD}|\text{SELECT}|\text{LP } \textit{empty}\right]$$

The LP constraints on lexical items and remaining phrases are as in the original proposals.

Sections 4.6.1, 4.6.2, 4.6.3 and 4.6.4 make use of the LP machinery to tackle the co-occurrence restrictions of elided nouns enumerated in Section 1.

4.6.1 NP Initial Ellipsis

In some languages, like German, where NP initial ellipsis is ruled out (ex. (3)), LP has been used to prevent PPs from being NP initial. That analysis can be used here. Bare-NPs can be produced via a unary syntactic rule that adds quantifier semantics

[12] Additionally, the COMPS of the mother node in *n-ellipsis-functor* may have to be constrained to be empty in these languages. In English, it is actually not required, since nominal functors select synsems with empty COMPS anyway, and *n-ellipsis-functor* is sensitive to this information (Figure 4).

[13] In Nerbonne and Mullen (2000) LP takes the values *empty*, *full* or *one*. We will also use these.

[14] We are assuming a setup like the one described in footnote 8.

and produces a node with [MARKING *det-marking*]. In these languages the bare-NP rule must also constrain its daughter to be [LP *full*].

4.6.2 *One* Anaphora vs. Missing Nouns

The LP feature used in (Nerbonne and Mullen, 2000) to account for the specific distribution of NPs with *one* and NPs with a missing head noun in English are compatible with the present proposal, and will keep ensuring the same results in this respect.[15]

4.6.3 Definite Articles

In some languages, like English or Portuguese, some specifiers like the definite article cannot alone form an elliptical NP (ex. (4)).

The LP feature has been used also to promote this blocking effect. Again, this analysis can also be incorporated here: the definite articles can select an element with [LP ¬*empty*]. More on this will be said in Section 5.

4.6.4 Prenominal Adjectives of Romance Languages

In some languages, like Spanish or Portuguese, predominantly with post-head adjectives, pre-head ones cannot feed the ellipsis rules (ex. (5)).

The LP analysis can be extended to accommodate these data straightforwardly. All that is needed is that these adjectives select a constituent that is [LP ¬*empty*].[16]

It should be noted that it is not possible to test how local this blocking effect is, i.e. whether these adjectives are really sensitive to edge constraints or to the absence of the head noun, since the only material that can intervene between a prenominal adjective and the noun is another prenominal adjective.

5 Problems with the LP Analysis

However successful it may be for most of the issues tackled above, the Left Periphery analysis of Nerbonne and Mullen (2000) makes wrong predictions regarding the distribution of the English and the Portuguese definite articles. Below, we identify two problems that seem to be manifestations of the same underlying issue. But note that this is orthogonal to whether null categories are used or not.

The first problem is related to the fact that Portuguese simultaneously (1) lacks *one* anaphora, (2) does not allow definite articles to make up NPs alone, but (3) allows them to co-occur with postnominal material in elliptical NPs.

[15] For instance, with the setup presented above, it can be maintained that the English "many" selects a constituent with [LP ¬*one*] and "none" selects one with [LP *empty*]. See Nerbonne and Mullen (2000) for several examples.

[16] Recall that *n-ellipsis-functor* rules constrain its functor daughter to select an element with [LP *empty*].

Whereas the constraint presented in Section 4.6.3 is appropriate for English, it may not be for other languages: although NPs that consist of a single article are blocked because of that constraint, other NPs are wrongly so as well. Consider the Portuguese example:

(13) Os homens de chapéu encontraram [$_{NP}$ os [$_{\overline{N}}$ - de boné]].
the men of hat met the of cap
The men in hats met the ones in caps.

The constituent selected by the determiner (labeled $\bar{N}$ in the example) actually has the property [LP *empty*] under all analyses using the LP feature, because PPs attach to the right of nouns. The same also happens in all NPs where a definite article immediately precedes a postnominal functor (be it a PP, an AP or a relative clause) or a nominal complement. The LP analysis thus wrongly rejects these NPs.

Note that the distribution of the Portuguese definite article is independent of whether the noun is realized or not, because of NPs like [*os dois (carros)*] ([*the two (cars)*]), and it is also independent of edge features, since the article can attach to [LP *full*] constituents and to [LP *empty*] ones.

The second problem arising from the usage of edge features concerns the English article: we cannot simultaneously accept an NP like *the one in caps* and block an example like:[17]

(14) * A single protester attended the rally because [the one] apparently felt it was important.

If we consider these two problems together and use the empty categories metaphor for ease of exposition, it seems that the definite article in these languages must attach to a constituent which contains more material than just the null noun or the anaphoric *one*. In the case of English (but not of Portuguese) the sister of the article is also required to be [LP ¬ *empty*], as presented in Section 4.6.3.

It is not clear what sets the two constructions just spotted above apart from the rest. We think that it is not a phonological or semantic issue. It cannot be a phonological question, because there is nothing special with the item *one* compared to nouns in this respect, and in fact the English NP *the one* is attested when the item *one* is not the anaphoric *one*.

In turn, if it were a semantic effect, it would be a surprise that some languages may allow it. If one accepts that the form *der* in example (15) is in fact an article and not a demonstrative, German is one such language.

(15) Wir haben einen Film gesehen aber [der -] war langweilig.
we have a movie watched but the was boring
We watched a movie but it was boring.

[17] If the English definite article attaches to a constituent that is [LP ¬ *empty*], then *the one* is accepted; if its sister is constrained to be [LP *full*], then *the one in caps* is rejected.

It is thus possible that this constraint is a purely formal requirement. We abstain however from defending the trivial technical solution of distinguishing these two constructions from the rest via some feature that shows one value in one group and an incompatible one in the other, given its stipulative nature.

6 Related Issues and Open Questions

The analysis of noun ellipsis presented here can be extended also to related constructions. For instance, partitive constructions of the form *some of them* can be analyzed as elliptical and accounted for in a similar and direct fashion.

The present analysis also straightforwardly covers the syntax of missing-N generics (e.g. *the poor*). Their semantics, however, should be different from the semantics of elliptical NPs, since they do not have an antecedent, typically denote humans and carry kind readings.

In this connection, it is worth noting that the difference between the two constructions (NP ellipsis and missing-N generics) also involves lexical idiosyncrasies. For example, the Portuguese NP in (16a) is ambiguous between the noun ellipsis and the missing-N generic reading, as its two English correlates indicate. The English correlate with *one* anaphora corresponds to the ellipsis reading, and the English correlate with a missing noun corresponds to the missing-N generic reading.

(16) a. [os pobres -]
the poor
the poor (missing-N generic reading)
the poor ones (noun ellipsis reading)

b. [os dois -]
the two
the two (noun ellipsis reading)

The NP in (16b) lacks the missing-N generic reading, and, accordingly, only has one English correlate. But in this case, English surprisingly uses the missing noun strategy, although one would expect noun ellipsis readings to correspond to *one* anaphora here, too. Future research may use such considerations to shed light on the distribution of *one* (only used in the languages that have them when there could otherwise be ambiguity between the two constructions?), which is accounted for by the LP analyses in a completely stipulative way.

Another issue that is left open is the status of personal pronouns. The point here is whether personal pronouns are fully saturated NPs or rather determiners occurring in NPs missing the noun. Phrases like the English *you two* or *we students* might suggest the latter answer, but personal pronouns fail to systematically show the ability to be restrictively modified.

7 Conclusion

In this paper, we outlined an analysis of noun ellipsis that builds on the selectional information lexically available in functors of nouns and permits dispensing with the positing of extra phonetically null nominal items in the lexicon.

In line with traceless analyses of long distance dependencies, the account presented here is proposed as a further step towards a more lean theory of grammar, without the reification of missing elements as actual empty categories.

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Coordination of unlikes without unlike categories

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Abstract

Several analysis of Coordination of Unlikes have been proposed within the HPSG framework. In some of these approaches the possible combinations of 'unlike categories' are encoded in the grammar, while other accounts resort to an independently motivated ellipsis analysis. In this paper we provide further arguments in favor of the latter. However, some problematic cases of Coordination of Unlikes in certain S-adjoining constructions are left unaccounted for. We propose a general analysis of these S-adjoining constructions, and in doing so, the problematic coordination cases are predicted without the need for further assumptions.

1 Introduction

The data in (1) illustrate the phenomenon usually referred to as Coordination of Unlikes, in which constituents of different categories are apparently conjoined:

(1) a. Fred became wealthy and a Republican. [AP &NP]
b. Sue is healthy and in good shape. [AP & PP]
c. That was a rude remark and in very bad taste. [NP & PP]

There are several avenues of research for capturing this phenomenon in HPSG. A brief overview of previous proposals is given in §2, as well as several arguments in favor of ellipsis approaches. In §3 we discuss problematic cases of coordination of unlikes occurring in dangling phrases, which behave as apparent exceptions to Wasow's Generalization (Pullum and Zwicky, 1986). We show in §4 that a proper treatment of these constructions suffices to obtain the problematic coordination data as a prediction. Finally, §5 provides concluding remarks about the paper.

2 Background

HPSG analysis of Coordination of Unlikes like the one in Pollard and Sag (1994) are essentially based in the GPSG analysis proposed in Sag et al. (1985), in which the coordination rule is allowed to underspecify the category of the mother node. This account ran into at least two problems. On the one hand, it did not rule out cases like the one below, due to Jacobson (1987):

(2) *Pat grew and remained wealthy and a Republican.

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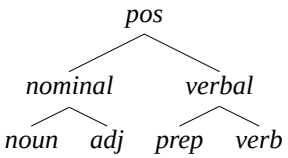
The issue here is that one of the conjoined arguments (in this case, *a Republican*) is not compatible with the selectional requirements of one of the conjoined functors (i.e. *grew*). In general, each conjoined argument must must be compatible with each functor, a constraint which is often referred to as Wasow's Generalization.

A secondary issue is that the above proposal clashed with the idea that HPSG descriptions are totally sort-resolved. Several theoretical alternatives have been put forth since then. For instance, Levy and Pollard (2002) propose to explicitly encode the possible part-of-speech combinations in a different kind of type lattice that is usually assumed in HPSG. However, this and related accounts such as Daniels (2002), entail a combinatorial explosion of types (Levy and Pollard 2001, 225), and require special-purpose lattice operations in order to cope with cases like (2).

A different strategy is pursued in Sag (2002). Here, the sort-resolvedness requirement for HPSG descriptions is abandoned, and a '$\leq$' (*is-a-supertype-of*) constraint is introduced in the formalism with the purpose of imposing unification bounds. This is illustrated in the (simplified) lexical entry seen below in (3a):

(3) a.
$$\begin{bmatrix} \text{PHON} \langle \textit{became} \rangle \\ \text{SYN} \begin{bmatrix} \text{SUBJ} & \left\langle [\text{HEAD} \quad \textit{noun}] \right\rangle \\ \text{COMPS} & \left\langle \begin{bmatrix} \text{HEAD} & \boxed{1}, \textit{nominal} \leq \boxed{1} \\ \text{COMPS} & \langle\rangle \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

b.



The verb '*to become*' selects a subject NP and a complement of (at least) type *nominal* which is a supertype of *noun* and *adj(ective)*, according to the hierarchy in (3b). In turn, the coordination rule in Sag (2002) states that the category of the mother node must be the upper bound over the category assigned to each conjunct. Thus, a conjunction [AP & NP] is assigned the category *nominal*, which is now compatible with the valence requirements imposed by the verb:

(4)
$$\begin{array}{c} \left[\text{HEAD } \boxed{0}\textit{nominal}, \boxed{0} \leq \boxed{1}, \boxed{0} \leq \boxed{2}\right] \\ \left[\text{HEAD } \boxed{1}\textit{adj}\right] \quad \left[\text{HEAD } \boxed{2}\textit{noun}\right] \end{array}$$

This allows the verb to take as complements APs, NPs, or conjunctions of AP and NP categories, such as '*Pat became* [*wealthy and a Republican*]'.

Verbs like '*to grow*' on the other hand, specify for [COMPS $\langle$AP$\rangle$] and are therefore unable to take complements which are of a type more general than *adj*. Thus, phrases like [AP & NP], which are of type *nominal*, are not valid complements of '*grow*' because the constraint $\boxed{0} \leq \boxed{2}$*noun* is violated: $\boxed{0}$ cannot be unified with *adj* because *adj* $\not\leq$ *noun*. The use of type-underspecification keeps the number of nodes in the hierarchy much lower than in Levy and Pollard (2002), but, as Sag (2002) notes, each different kind of unlike category coordination still entails stipulating a new supertype in the *part-of-speech* hierarchy.

A second potential problem concerns the formal status of the '$\leq$' constraint. Although its behavior is intuitive, it is not clear how much formal machinery must be added in order to maintain the monotonicity of constraint resolution in HPSG.

A more recent analysis is proposed in Yatabe (2004), in which the category of a coordination phrase is list-valued. As illustrated below in (5), a head feature ARGS is used to list the head values found in the local daughters:

(5) $\begin{bmatrix} \text{PHON} \langle \textit{wealthy}, \textit{and}, \textit{a}, \textit{republican} \rangle \\ \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} \text{CONJ} \ \textit{and} \\ \text{ARGS} \ \langle \textit{adj}, \textit{noun} \rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$

A recursive relation $c(\alpha)$ is introduced in the verbal lexical entries with the purpose of traversing the ARGS list and ensuring that each conjunct is compatible with the verbal subcategorization specifications α. For instance, in a verb like '*to become*' the HEAD value of the complement must satisfy the constraint $c(noun \vee adj)$.

Notice that none of the above accounts offers any insight on why certain categories can be conjoined. The combinatorial possibilities are directly stipulated in the grammar: in one case these are encoded in the type hierarchy, and in the other case these are listed in lexical entries. Ideally, the theory should predict which are the eligible categories for Coordination of Unlikes in a given language. Also, the above analyzes introduce considerable complexity in the grammar, in type hierarchies and/or in special constraints that propagate non-locally in the descriptions.

Crysmann (2003) and Beavers and Sag (2004) propose a more general approach in which Coordination of Unlikes is the consequence of an independently motivated ellipsis operation, responsible for capturing Argument Cluster Coordination (henceforth ACC; often also referred to as Conjunction Reduction or Left-periphery Ellipsis). Consider the ACC examples seen below.

(6) a. John gave a book to Mary, and a record to Sue.
b. John gave Mary a book, and to Peter a record.
c. I gave Mary a coloring book, and new roller skates to her sister.
d. I sent a postcard to your brother on Monday and to your sister on Tuesday.
e. That boy and girl are really no different from each other.

The cases in (6a–d) can be obtained via a standard VP coordination rule in which the verb is elided in the non-initial conjunct (e.g. [*gave Mary a book*] and [~~*gave*~~ *to Peter a record*]). The example in (6e) is also interesting because of the syntactic and semantic behavior of the subject NP. The pronoun must agree with the nominal structure it attaches to (e.g. *those* / **that boys are similar*), and the VP triggers a reciprocal reading which is only felicitous with a plural subject. The pattern in (6e) can be accounted for straightforwardly if one takes the subject to be a standard NP coordination structure in which the pronoun is elided: [*that boy*] *and* [~~*that*~~ *girl*].

For perspicuity, we present a (simplified) coordination construction in Figure 1 (based in Yatabe (2001), Crysmann (2003) and Beavers and Sag (2004)) that allows for left-peripheral ellipsis. This construction resorts to DOM(AIN) lists, which

are used for linearization purposes in HPSG (seem Kathol (2000) for instance). Ellipsis is obtained because each daughter domain is split in several DOM lists, but some lists are absent from the mother node (in this case, the left-peripheral list $\boxed{A'}$):

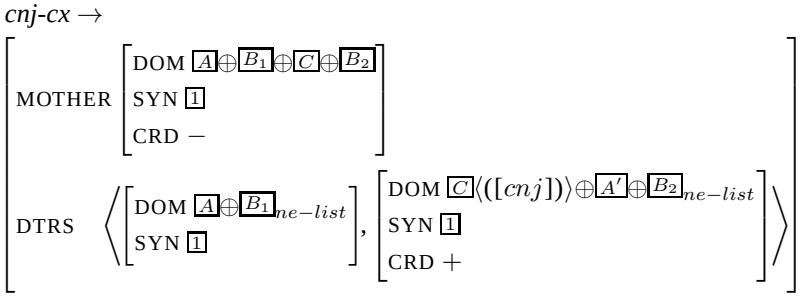


Figure 1: (Simplified) Coordination Construction

Identity restrictions must hold between the two (possibly empty) $\boxed{A}$ and $\boxed{A'}$ lists, although proposals differ about the required identity conditions (cf. §2.1).

So-called long-distance ACC is also consistent with an ellipsis operation:

(7) Asimov gave a talk about natural selection on Monday, and about general relativity on Thursday.

This is a case of long-distance ACC because the PP[about] is not a complement of the verb. Rather, it is attached to the relational noun *talk*. If this PP were a complement of the verb then one would expect it to be extractable. This prediction is not borne out: **That talk, I think Asimov gave _ about relativity on Thursday*, or **This talk was easy to give _ about relativity on Monday*. Confront with '*That talk (about relativity), I think Asimov gave on Thursday*', and '*This talk (about relativity) was easy to give*'. Note that (7) must be interpreted as referring to two different talks, and similarly, that (6d) must be interpreted as involving two different postcards. These facts are also obtained as a prediction of a phonological ellipsis analysis. For example, in one of the readings for (8), a single postcard was addressed to two people, while in the other reading, two distinct postcards were sent.

(8) I sent a postcard to your brother and to your sister.

The first reading can be obtained with a standard PP coordination parse, while the second can be obtained by a VP coordination parse with elision of the non-initial verb: '[*sent a postcard to your brother*] *and* [~~*sent a postcard*~~ *to your sister*]' (see Crysmann (2003) and Beavers and Sag (2004) for more discussion).

As Crysmann (2003) and Beavers and Sag (2004) note, a construction like the one in Figure 1 is able to capture ACC phenomena as well as the Coordination of Unlikes data in (1). In this unifying analysis, both phenomena boil down to constituent coordination in which the left periphery of non-initial conjuncts is elided (e.g. [[*is a Republican*] *and* [~~*is*~~ *proud of it*]]$_{VP}$).

There are alternative analysis of ACC within HPSG which do not resort to ellipsis. In §2.1 we briefly discuss these accounts and point out some of the problems.

2.1 On the shortcomings of base-generation

In a base-generation analysis of ACC and Coordination of Unlikes, the two phenomena are unrelated and require different mechanisms specifically introduced for that purpose. To our knowledge the first such account in HPSG was put forth in Cho (1996), and more recently a similar proposal is put forth in Mouret (2006). In a nutshell, HPSG's constituency features are redesigned so that ACC (and in the case of Cho (1996), other non-constituent coordination phenomena as well) are based-generated. The coordination schema is allowed to form non-standard constituents, which the verb can take as arguments as informally depicted below:

(9) John gave [[a book to Mary] [and [a record to Sue]]].

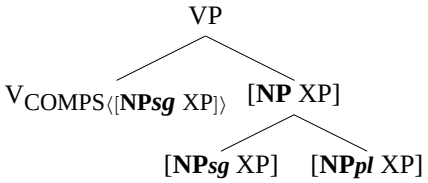
Here, the string '*a book to Mary*' yields a special kind of non-headed cluster constituent which may now be conjoined with other constituents. Cho (1996) thus revises the Sucategorization Principle so that Wasow's Generalization is enforced in ACC: each element in the cluster is required to be compatible with the subcategorization frame of the head. If this constraint is not ensured, then one would obtain cases like **Tom gave a bike to Mia and a book Mary*, and **Tom became tired and in Italy*. At this point we encounter an empirical problem. Similarly to what occurs in Gapping, ACC does not require that the missing verb is phonetically identical to the overt verb. Consider English and German inverted clauses:

(10) a. Was the message easy to find, and the instructions easy to follow?
b.*Was the instructions easy to follow?
c.*Were the message easy to find, and the instructions easy to follow?
d.*Was the instructions easy to follow, and the message easy to find?

(11) Ist die Ente im Ofen und ~~sind~~ die Flaschen im Kühlschrank?
'is the duck in oven and are the bottles in fridge'

On the surface, the result is that the realized verbal head agrees only with the closest NP. The problem for a base-generation analysis arises because '*was*' must select a singular NP argument, and yet it would have to somehow require that the initial conjoined cluster contains such an NP:

(12)



Base-generated ACC is therefore hard-pressed to account for (10a) while at the same time reject (10b–d). On the other hand, no fundamental complications arise in an ellipsis analysis of (10a). The string '*were*' is simply omitted from the second conjunct. More examples are provided in (13).

(13) a. On the ground floor there is a marble block since early June, and three wooden pillars since late September.

b. There were many available parking spaces when Tom first called me, but just one handicap space when he arrived.
c. Why is the TV on full volume, and all the doors left wide open?

In the remainder of this paper we will focus on coordination of unlikes, but see Chaves and Sag (2006) for an ellipsis account of these and other ACC phenomena.

Mouret (2006) also argues that patterns like (14) are problematic for ellipsis. The claim is that the agreement pattern is incompatible with an ellipsis analysis, and that the sentence involves a 'single complex event'. We do not agree with the latter assessment, on lack of empirical grounds. The observable facts are that the sentence involves two events/situations (one in which a doe comes from a bush and another event in which a fox comes from a field), and the presence of the adverb '*simultaneously*' – in this particular case – asserts that these overlap in time.

(14) Alors surgissent simultanément d'un buisson une biche, et d'un
then come simultaneously from-a bush a doe and from-a
champ un renard.
field a fox

The existence of two propositions is correctly predicted by an ellipsis account, whereas it has to be stipulated in base-generation via copying-out of the semantic content of predicates. For instance, in (7) one would have to copy-out the verb predicate as well as the NP *a talk*, and ensure that variable binding is done properly. It is not clear exactly how this copying out should work, given that the order of conjoined clusters need not be parallel, as observed in (6b,c).

This brings us to the matter of the semantic analysis of argument clusters, which necessarily requires extending the formalism with very complex machinery specifically designed for this purpose. Cho (1996, 55) argues that HPSG should be extended with a something like a lambda calculus backbone, but this idea is not made precise. Mixing the two formalisms, HPSG's and lambda calculus, is theoretically undesirable because lambda calculus is already sufficiently expressive to encode entire HPSG grammars (see Copestake et al. (2001) for further arguments against the use of lambda terms in HPSG grammars). Again, an ellipsis approach offers a more parsimonious account since the construction of semantic representations can, for a large part, be done as usual: variable binding is stated lexically, and the semantics of a mother node is defined as the concatenation of the semantic contribution of the local daughters, as for instance in Copestake et al. (2006).

However, the agreement pattern in (14) raises several questions. Most of the speakers we consulted from other Romance languages like Italian, Portuguese, and Spanish, consider examples like (14) to be degraded, although fully comprehensible. A minority of speakers did find it acceptable. Examples in which the adverb is not present are generally harder to process. Cf. the following Portuguese example:

(15) Entrou / ?*entraram um homem no carro, e uma mulher no taxi.
entered$_{sg}$ entered$_{pl}$ a man in-the car and a woman in-the taxi

Moreover, our Italian and Portuguese informants also generally agree that the examples below – with number and gender agreement mismatches – are grammatical.

Italian:

(16) Sono arrivate due amiche venerediì ed
are arrived$_{pl\ fem}$ two$_{pl\ fem}$ friends$_{pl\ fem}$ Friday and

~~è arrivato~~ un amico lunedì.
is arrived$_{sg\ masc}$ one$_{sg\ masc}$ friend$_{pl\ masc}$ Monday.
'Two female friends arrived Friday, and one male friend arrived Monday'

Portuguese:

(17) Chegou um pacote na terça-feira e ~~chegaram~~ duas cartas na sexta.
arrived$_{sg}$ one package on Tuesday and arrived$_{pl}$ two letters on Friday
'One package arrived on Tuesday and two letters arrived Friday'

(18) Foram encontradas duas das raparigas ontem à tarde
were found$_{pl\ fem}$ two$_{pl\ fem}$ of-the$_{pl\ fem}$ girls yesterday in afternoon

e ~~foi~~ ~~encontrado~~ um dos rapazes hoje de manhã.
and was found$_{sg\ masc}$ one$_{sg\ masc}$ of-the$_{pl\ masc}$ boys today in morning.
'Two of the girls were found yesterday in the afternoon, and one of the boys was found this morning'

It is implausible that (16) and (18) result from a single verb agreeing with both NPs because the expected agreement would be *plural masc* rather than *plural fem* (regardless of the presence of an adverb like '*simultaneously*'):

(19) Foram editados / *editadas uma brochura e um livro.
were edited$_{pl\ mas}$ / edited$_{pl\ fem}$ a$_{fem}$ brochure$_{fem}$ and a$_{mas}$ book$_{mas}$

The data in (16) – (18) are similar to (10a), and likewise follow from an ellipsis account. In our view, agreement mismatches like (14) are best explained as cases of ACC which are subject to processing interference, reinforced by the presence of the adverb '*simultanément*' (cf. Beavers and Sag (2004, 63–65)). There is a lot more to say about this kind of effects in more experimental research, in particular, in understanding better the differences and similarities in agreement processing strategies that French and other Romance languages exhibit in these constructions.

Neither Cho (1996) nor Mouret (2006) can account for instances of ACC of unlike categories, as seen in (6b,c). In the case of Cho (1996, 26), this is due to the proposed Subcategorization Principle, which explicitly rules out these cases. This can in principle be corrected at the cost of introducing extra ad-hoc machinery in the account. Despite claims of the contrary, Mouret (2006) cannot account for cases like (6b,c) either. For example, in Mouret (2006) coordination is able to conjoin two non-standard constituents [NP$_{sg}$ NP$_{sg}$] and [NP$_{pl}$ PP[to]] as in (6c).

It is assumed that the '$\leq$' constraint somehow operates recursively between conjuncts, and as a result, that it underspecifies the conflicting features of the parallel categories. Thus the result of the constraints '$\boxed{0} \leq$ [NP$_{sg}$ NP$_{sg}$], $\boxed{0} \leq$ [NP$_{pl}$ PP[to]]' introduced by the coordination rule is a constituent with underspecified head information: $\boxed{0}$[NP XP]. On the other hand, a verb like '*give*' requires NP and PP[to] complements. This fact is encoded in the lexical entry by specifying, for instance, [COMPS ⟨NP, PP[to]⟩].

Here is where the proposal breaks down. There seems to be no way to state the subcategorization constraints of the verb such so that it is compatible with both [NP$_{sg}$ NP$_{sg}$], [NP$_{pl}$ PP[to]], or [PP[to] NP$_{sg}$] clusters, without overgeneration. This is because of the above '$\leq$' bounding constraints, introduced over $\boxed{0}$[NP XP]. No description *more specific* than [NP XP] can unify with this cluster. This is illustrated in Figure 2: $\boxed{1}$ cannot unify with $\boxed{0}$ because PP[to] $\not\leq$ NP$_{sg}$.

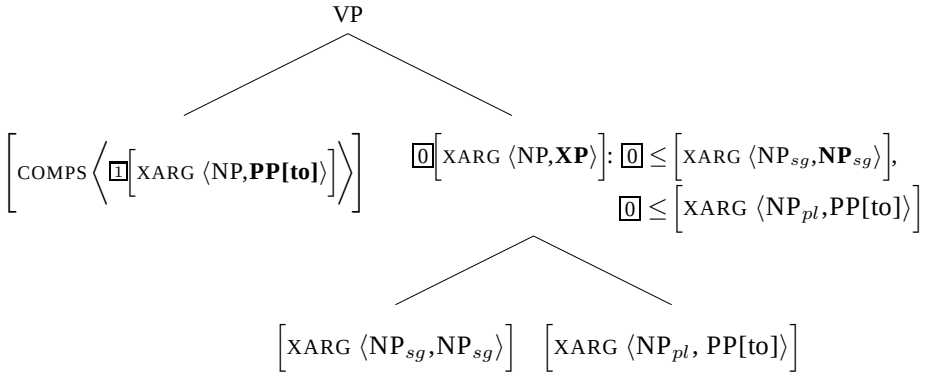


Figure 2: VP '*gave* [*Mary a coloring book, and new roller skates to her sister*]'

This problem still arises if the verb subcategorizes for [COMPS ⟨PP[to], NP⟩] or [COMPS ⟨NP, NP[to]⟩] instead. More generally, this issue is raised for any other verb that allows alternations with complements of different categories. Using underspecification on either or both arguments will allow overgeneration (e.g. '**I gave* [*Mary a book and a bike Tom*]$_{[NPNP]}$'). Note that the problem is created by argument cluster formation and not by the '$\leq$' constraint: Sag (2002) correctly rules out cases like **Tom grew happy and a Republican* by resorting to this very technique, as discussed in §2. The verb '*grew*' specifies for [COMPS ⟨AP⟩], but the type $\boxed{0}$*nominal* of the complement '*happy and a Republican*' cannot unify with the type *adj* in the complements list because of the constraint $\boxed{0} \leq$ *noun*.

There are other problems raised by base-generated ACC. For instance, nothing is said in these accounts about Binding Theory. With argument clusters, the members of the verbal ARG-ST no longer directly correspond to the subcategorized arguments. For instance, a verb may subcategorize for a complement cluster like [NP NP], which can be composed of two conjuncts [[NP NP] [*conj* [NP NP]]]. The latter can exhibit very distinct binding relations, and thus one can no longer state binding principles over ARG-ST members.

It is important to point out that neither base-generation approaches nor ellipsis approaches are free of multiple analysis. However, the argument is that all things being equal, there is a preference for constituent coordination over ellipsis. Particularly, if ellipsis is seen as a simplification strategy adopted by speakers. Thus, in certain contexts and with certain constructions, multiple solutions capture actual ambiguities as in (8). That is, as long as the underlying coordination structure is well-formed. The sentence in (20a), for instance, is felicitously interpreted as S coordination, in which case different letters were discovered. The case is similar in (20b), taken from Beavers and Sag (2004).

(20) a. Several letters were discovered by me in 1982, and by my wife in 1993.
b. Three men died in Baghdad on Tuesday, and in Tikrit on Friday night.

The full range of elliptical analysis may therefore be grammatically available, but restricted by contextual, processing, and discourse-based strategies.

In sum, the existing base-generation accounts of ACC and Coordination of Unlikes raise more problems than the ones they claim to solve. Ellipsis provides a more promising and parsimonious research avenue for these phenomena.

3 Unlike dangling modifiers

Most of the focus on coordination of unlikes phenomena has been on arguments. There are however some problematic cases concerning certain S-adjoining phrases. Consider the sentences given in (21):

(21) a. Wealthy and a Republican, Fred quickly rose in the political arena.
b. Alone and without money, John found himself unable to get a job.
c. A successful business woman and in the position to take charge of her life, Madam C. J. Walker went on to become a millionaire.
d. A woman, rich, and in the lucky position of owing a castle, Zoe did not let such an opportunity slip through her fingers.
e. Hungry and feeling rotten to the core, the soldiers packed their gear and broke camp before dawn.
f. Descended from Mexicans, and being an impressionable young man, I naturally settled into the traditional beer with a twist of Tabasco sauce.

The adjunct is prosodically independent, and typically, each unlike conjunct is also prosodically contrasted. Ellipsis can in principle account for the data in (21) by eliding the right-periphery, e.g. [AP ~~S~~]$_S$ & [NP & S]$_S$. However, there are cases which cannot be reduced to S coordination. This is either because the underlying conjuncts are either ungrammatical. or because the S coordination counterpart has different truth-conditions. In the examples below, the structure [[[*cnj* Adj] [*cnj* PP]] S] cannot be reduced to [[*cnj* [Adj ~~S~~]] [*cnj* [PP S]]]:

(22) a. Neither tired nor in a hurry, I decided to walk and save the bus fare.

b. Both tired and in a foul mood, Bob packed his gear and headed North.

(23) a.*Neither tired, I decided to walk and save the bus fare nor in a hurry, I decided to walk and save the bus fare.

b.*Both tired, Bob packed his gear and headed North, and in a foul mood, Bob packed his gear and headed North.

Here the problem stems from syntax. The correlative coordinators '[*both ... and ...*]' and '[*neither ... nor ...*]' cannot be clause initial (Sag et al., 1985, pp. 138, ft. 12). The cases in (24) on the other hand, are problematic on truth-conditional grounds, because the adverb is interpreted as modifying the unlike conjuncts, not the clause:

(24) a. Simultaneously [shocked and in awe], Fred couldn't believe his eyes.

b. Probably [injured and on the verge of exhaustion], one of the deer was unable to squeeze through the iron fence.

The remainder of this paper proceeds as follows. We will consider in more detail the properties of this kind of construction, setting aside coordination for a moment. In the end, by virtue of our account of dangling modifiers, the above coordination data fall out as a consequence, without further stipulations.

4 An analysis

Dangling modifiers are always composed of predicative phrases, and these usually receive a subject-oriented interpretation:

(25) a. *Exhausted, the river started pulling John away from the margin.

b. *Pregnant with twins, Tom helped Mary into the delivery room.

c. *An 1949 Oldsmobile, Mary painted her car.

The 'topic' position of the adjunct cannot be attributed to extraction of an embedded modifier for several reasons. The *in situ* realizations can be either ungrammatical or truth-conditionally different (often a *causal* / *justification* import is attributed to the S-adjoining phrase):

(26) Tired, Tom decided to go home. $\neq$ Tom decided to go home tired.

(27) a. A trained nurse, she was to become vice-president of the Royal College.

b. *She was to become vice-president of the Royal College a trained nurse.

Moreover, the relevant target seems to be the semantic subject. In the inverted clause below, the dangling modifier phrase preferentially targets the NP '*the roofless ruins of a stone house*', rather than the structurally closer NP '*the river*'.

(28) a. Silent and gray in the moonlit evening, a few yards away beyond the river stood the roofless ruins of a stone house.

b. # Too fast for them to navigate, a few yards away beyond the river stood the roofless ruins of a stone house.

Still, the targeted NP can be embedded if the subject of the matrix clause is a non-referential pronoun, as seen in (29).

(29) a. Bored out of his mind, it seemed to John that an entire week had gone by.
b. Exhausted from the heavy load, it never occurred to Bob that he should have camped while there was some light left.

Another property of these adjuncts is that individual-level predicates (i.e. denoting intrinsic, non-transient properties) exhibit a tendency to avoid this position:

(30) a. Exhausted, he decided to sit down under a tree.
b. Furious, Tom left the room and returned to the hotel.
c. Sick with the flu, Ann was out of school for two weeks.

(31) a. *Spanish, Maria was already familiarized with some of the dancing steps.
b. *Homosexual, Fred was not enlisted in the Marines.
c. *Blonde, Mia had to dye her hair black for the role.
d. *Vegetarian, Ann always cooked dishes that we hated.

If the individual level predicate is embedded in a copula participle structure, then the oddness vanishes as illustrated in (32).[1]

(32) a. Being Spanish, Maria was already familiarized with the dancing steps.
b. Being homosexual, Fred was not enlisted in the Marines.

There are cross-linguistic idiosyncrasies regarding individual-level and stage-level predicates, but the distinction is widespread. For instance, in Spanish, Portuguese, Italian, and Old French the copula verb *stare* (Latin for 'to stand') is only compatible with stage level adjectives, while the copula *esse* (Latin for 'essence') is only compatible with individual level adjectives. Accordingly, only the former usually occur with a null copula, as illustrated in (33) from Portuguese:

(33) a. (Estando) cansada, a Ana voltou para a cama.
(Being$_{stare}$) tired the Ana returned to the bed.
'Feeling tired, Ana went back to bed'

b. *(Sendo) europeia, a Ana pode regressar para casa
Being$_{esse}$ European the Ana could return to home.
'Being European, Ana could return home'

Note that although the presence of the *esse* copula is, in these constructions, obligatory with individual level adjectives, it is optional in the case of predicative NP complements. However, predicative NPs are usually also compatible with *stare*.

Superlative forms are known to allow individual level predicates to become stage-level. As expected, these elements can occur in the dangling construction:

(34) Blonder than ever, the 49-year-old performer made a stunning stage entrance.

[1]The copula does make some form of semantic/aspectual contribution. For instance, two copulas can co-occur with semantic contrast: '*Kim is shy*' $\not\Leftrightarrow$ '*Kim is being shy*' and '*Kim is a fool*' $\not\Leftrightarrow$ '*Kim is being a fool*'. The main verb is interpreted as stage level while the nested verb is interpreted as individual level (= '*NP acts as if intrinsically XP*'). Conversely, two copulas cannot co-occur in the case of stage level complements, because the interpretation '*NP is intrinsically acting as if XP*' is nonsensical: '*Kim is (*being) tired*' and '*Kim is (*being) in a good mood*'.

All this evidence suggests that the adjuncts in (30) may involve a null copula. In fact, some informants spontaneously reported perceiving a copula verb in these data to the likeness of the examples in (32).[2]

Note that the same optional copula pattern arises in absolute constructions:

(35) a. (With) Tom (being) too drunk to drive, I called my parents to pick us up.
b. (With) Sue (being) injured, we were unable to carry on the play.
c. (With) the truck (being) finally loaded, they said goodbye and drove off.

(36) a. With Tom *(being) racist, we were unable to participate in the play.
b. With trade *(being) domestic, we end up being dragged into domestic Mardukan politics (...)
c. With my friends *(being) European, we could travel without any Visas.
d. With Mother Nature *(being) kind, I am proud to say I managed my natural features without any surgeries.

Similarly, predicative NPs and PPs can also occur without the copula:

(37) a. With Tom out of town, Beth hastily exited New Albany and fled to Ohio.
b. With Bush a born-again Christian, the public already had a sense of where he would stand on those issues.

In the HPSG analysis of absolutes in Riehemann and Bender (1999), it is made the standard assumption that these structures consist of a lexical item '*with*' followed by a small clause of the form '[NP + predicative XP]'. To account for the optional preposition two phrasal constructions are put forth: one to obtain a S-adjoining PP and a second construction for obtaining S-adjoining *with*-less PPs from a predicative small clause.

However, we believe that the elements after the preposition are better viewed as forming a gerund phrase rather than a small clause. One of the trademarks of gerunds is the possibility of having a subject in accusative or genitive case:

(38) a. With [us (being) located in Dublin], we can collect all candidate applications into one location.
b. With [him (being) injured], the team was eliminated from both Europe and the State Cup.
c. With [your handling and Mogs'], I'm quickly beginning to see the benefits of the final color change, rather than the finish I've used.
d. With [Sandy's (being) stoned all the time], we'll never get a record deal.

[2]There are other well-known cases first noted in Bolinger (1967) which may also involve copulas. Here, stage level adjectives can be realized post-nominally in English (e.g. '*All rivers navigable are being controlled*', and '*Every penny available was put into the project*'). The main differences are that the missing copula would have to be in finite form, and that predicative NPs are disallowed: '*A man *(who is) a Republican is also a God-fearing person*'. Nothing prevents our account from allowing empty finite copula VPs to occur as reduced relative clause constructions.

In our view, some of the phenomena discussed in Riehemann and Bender (1999) involving idioms in absolutes require a different explanation.[3]

The remainder of this paper provides an account of optional copulas in these two constructions, and so doing, also captures the Coordination of Unlikes data.

4.1 A phrasal construction account

The fact that certain participle VPs attach to clauses, and that the copula is optional in some cases is captured by the interplay of two distinct non-branching constructions. The construction in (39a) allows participle VPs to be *coerced* into subject-oriented clause adjoining constructions (henceforth referred to as 'Vp'). The construction in (39b) allows certain predicative XPs to be *coerced* into VPs.

(39) a. *dangling-prp-cx* →

$$\left[\begin{array}{l}\text{MTR} \mid \text{SYN} \left[\begin{array}{l}\text{HD} \mid \text{VFORM } \textit{prp} \\ \text{MOD } \text{S}_{fin}[\text{X-ARG } \boxed{2}] \\ \text{SUBJ } \langle\,\rangle\end{array}\right] \\ \text{DTRS} \left\langle \left[\begin{array}{ll}\textit{phrase} & \\ \text{SYN} & \left[\begin{array}{l}\text{HD} \mid \text{VFORM } \textit{prp} \\ \text{MOD } \textit{none} \\ \text{SUBJ } \langle \text{XP}_{\boxed{2}} \rangle\end{array}\right]\end{array}\right] \right\rangle\end{array}\right]$$

b. *silent-copula-cx* →

$$\left[\begin{array}{l}\text{MTR} \mid \text{SYN} \left[\begin{array}{l}\text{HD} \left[\begin{array}{l}\textit{verbal} \\ \text{NULL } +\end{array}\right] \\ \text{SUBJ } \langle \boxed{1} \rangle\end{array}\right] \\ \text{DTRS} \left\langle \left[\begin{array}{ll}\textit{phrase} & \\ \text{SYN} & \left[\begin{array}{l}\text{HD} \left[\begin{array}{l}\text{PRED } + \\ \text{NULL } - \\ \text{INDL } -\end{array}\right] \\ \text{SUBJ } \langle \boxed{1} \rangle\end{array}\right]\end{array}\right] \right\rangle\end{array}\right]$$

The construction in (39a) allows a present participle (*prp*) VP to become a Vp. The latter adjoins to S, does not require a subject argument, and has the subject referent bound to the subject of S. Following Sag and Pollard (1991) and others, the feature X-ARG is used to single out the subject referent of the matrix clause, and assume that a Vp adjoins to a matrix clause via a standard *head-modifier* construction.

The construction in (39b), on the other hand, obtains silent (present-participle or gerund) copula VPs from predicative stage-level XPs. If the category of the mother node in (39b) is resolved as a participle, then it can feed the construction in (39a) to obtain silent copula dangling participles. This allows the grammar to capture cases like '*Trying to be polite, Peter asked if he should leave*' and '*(Being) an expert on blepharoplasty, Sue grasped the problem right away*'.[4]

[3] Basically, certain idioms only occur in *with* absolutes, and not in *with*-less absolutes, e.g. **Peace talks old hat, it's hard to get a sense of the situation.* We conjecture that oddness arises from processing interference caused by the lack of clues as to what is the constituency relation one should attribute to a sequence of NPs. The data improve once more information is present, e.g. if the copula is realized *Peace talks being old hat, it's hard to get a sense of the situation*, or if the preposition is realized, thus making clearer which construction is at stake. This is also consistent with the considerable degree of judgment variation which Riehemann and Bender (1999) encounter for these cases.

[4] In regard to cases like (29) above, we assume without further discussion constraint requiring that the value of X-ARG of verbs with an expletive *it* subject is structure-shared with the value of X-ARG of the S complement. Future work must be dedicated to a more detailed discussion about this matter.

If the category of the mother in (39b) is resolved as a gerund, then it may be taken as a nominal complement of '*with*'. This is made possible by following Malouf (2000) in assuming that gerunds are a mixed category that belongs to both verbal and nominal parts-of-speech:

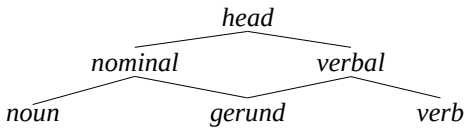


Figure 3: Gerunds as mixed categories in the part-of-speech type hierarchy

The feature [VFORM *vform*] is assumed to be appropriate for the type *verbal*. Accordingly, *gerund* only allows for the specification [VFORM *ger*].

Note that two new features are introduced in (39b). The feature [NULL *bool*] is adopted in order to prevent the silent copula from occurring freely in other constructions. A second feature, [INDL *bool*], identifies individual/stage level predicates. Adjectives like '*calm*' or '*sick*' can occur with both kinds of copulas and therefore remain underspecified for INDL. This is also the case for nouns, since they are generally compatible with both *stare* and *esse* copulas. Prepositions usally pattern with *stare* copulas and thus will be specified as [INDL−].

The gerund resolution of (39b) yields a constituent which is a suitable complement for a preposition. All we need to capture the two kinds of absolute constructions under discussion are two other grammar constructions:

(40) a. *with-less-absol-cx* →

$$\left[\begin{array}{l}\text{MTR}\left[\text{SYN}\left[\begin{array}{ll}\text{HEAD} & \textit{prep}\\ \text{MOD} & \text{S}_{fin}\\ \text{SUBJ} & \langle\,\rangle\\ \text{COMPS} & \langle\,\rangle\end{array}\right]\right]\\ \text{DTRS}\left\langle\left[\text{SYN}\left[\begin{array}{ll}\text{HD} & \textit{gerund}\\ \text{SUBJ} & \langle\rangle\\ \text{COMPS} & \langle\rangle\end{array}\right]\right]\right\rangle\end{array}\right]$$

b. *with-absol-cx* →

$$\left[\begin{array}{l}\text{MTR}\left[\text{SYN}\left[\begin{array}{ll}\text{HEAD} & \textit{prep}\\ \text{MOD} & \text{S}_{fin}\\ \text{SUBJ} & \langle\,\rangle\\ \text{COMPS} & \langle\,\rangle\end{array}\right]\right]\\ \text{DTRS}\left\langle\left[\textit{with}\right],\left[\text{SYN}\left[\begin{array}{ll}\text{HD} & \textit{gerund}\\ \text{SUBJ} & \langle\rangle\\ \text{COMPS} & \langle\rangle\end{array}\right]\right]\right\rangle\end{array}\right]$$

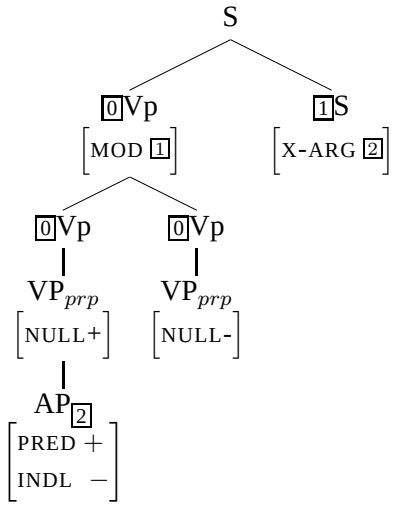
The construction in (40a) accounts for *with*-less absolutes, and (40b) (adapted from Bender (2002)) is responsible for *with* absolutes. Of course, absolutes phrases with silent copulas are possible because the construction in (39b) is able to produce '[NULL+]' gerunds. To account for the causative interpretation that usually arises in both dangling participle and absolute constructions, we can simply introduce a supertype construction over *dangling-prp-cx*, *with-less-absol-cx*, and *with-absol-cx* which introduces this kind of semantic import (see section §4.2 for instance).

Notice that nothing prevents silent copula Vps from being conjoined. This means that a standard coordination rule is able to obtain the (apparent) cases of Coordination of Unlikes in (21) and (22) for free, as constituent coordination:

(41) [[Neither Vp] [nor Vp]]$_{\text{VP}}$ [I decided to walk and save the bus fare]$_{\text{S}}$

The analysis of a mixed case of [AP & VP] is illustrated in more detail in (42):

(42) More optimistic and beginning to understand the problem, we decided to reorganize the code into something more logical and manageable.



The *VP-to-Vp* construction in (39a) is underspecified in regard to NULL, given that dangling participles make no commitment about the phonetic realization of the copula. Nothing else needs to be added about coordination of unlikes in dangling modifiers. These cases all follow from the account just proposed.

But a problem arises when scaling this fragment to other related constructions: for each new case one must introduce several more pairs of construction types. For instance, two more construction types are needed for temporal absolutes. These are headed by an adverb and their arguments are participles:

(43) a. (When) opening the front door, the clock struck midnight.
b. *When Tom (being) tired, we went back home.

Stump (1985, 330f.) notes other absolutes headed by different words, such as:

(44) Crossing the street, { John was hit by a car. (‘while’) / John entered the bank. (‘after’) / John entered a different country. (‘by’) }

In order to account for the syntactic (and semantic) properties of these absolutes the grammar ends up enumerating a series of phrasal constructions (plus one lexical for obtaining ‘NULL–’ gerunds, such as Malouf (2000, 66)). Below we explore and alternative account which resorts to *lexical* constructions. The Coordination of Unlikes phenomena are obtained as a prediction in a similar way, but more cross-cutting generalizations are possible, so that the same results are obtained in a more systematic way. In fact, our results are similar to the findings in Müller (2004), in which a phrasal account of certain German word order phenomena is argued to

miss basic regularities that an empty copula analysis captures straightforwardly.

4.2 A lexical construction account

The usage of empty categories in HPSG is not without controversy. Some recent proposals which resort to such elements for various purposes are Netter (1998), Meurers (2000), Bender (2002), Borsley (2004), and Müller (2004) among others. As Riehemann and Bender (1999) note "In general, there is a certain formal equivalence between null elements and constructions. (...) However, approaches based on null elements and those based on constructions do differ in the kinds of generalizations they can capture elegantly".

A lexical account of optional heads in dangling and absolute constructions boils down to 3 core (post-inflectional) lexical constructions. A *dangling-participle* construction accounts for dangling participles in general, an *absolute* construction for absolutes in general, and a *null-copula* construction for obtaining silent copulas. In other words, the fragment scales straightforwardly without the need for extra kinds of constructions, unlike the phrasal analysis. We still adopt the part-of-speech hierarchy given in Figure 3 §4.1, as well as the account of gerundive constructions proposed in Malouf (2000). Consider the hierarchy given below in Figure 4.

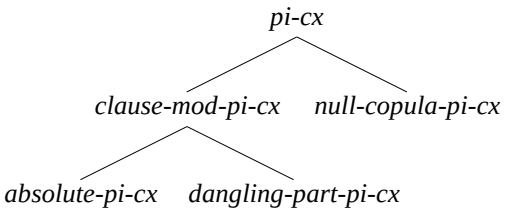


Figure 4: Post-inflectional Lexical Construction Hierarchy

Only lexical items of type *absol(ute)-lex(ical)-h(ea)d* are suitable daughters for the absolute lexical construction in (45a). More specifically, *absol-lex-hd* is a supertype of a prepositional marker '*with*' (which lexically selects for [VFORM *ger*] phrases), as well as of '*when*/*while*' (selecting [VFORM *prp*] phrases), and so on (these and other idiosyncrasies can also be captured with a multi-inheritance hierarchy). According to (45a), the head of an absolute is optionally realized:

(45) a. *absolute-pi-cx* →

$$\begin{bmatrix} \text{MTR} \begin{bmatrix} \text{PHON} \langle (\boxed{1}) \rangle \\ \text{SYN} \quad \boxed{2} \end{bmatrix} \\ \text{DTRS} \left\langle \begin{bmatrix} \textit{absol-lex-hd} \\ \text{PHON} \langle \boxed{1} \rangle \\ \text{SYN} \quad \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix}$$

b. *dangling-part-pi-cx* →

$$\begin{bmatrix} \text{MTR} \begin{bmatrix} \text{PHON} \boxed{1} \\ \text{SYN} \begin{bmatrix} \text{HD} \mid \text{VFORM} \, \textit{prp} \\ \text{SUBJ} \langle \rangle \\ \text{MOD} \mid \text{X-ARG} \boxed{1} \end{bmatrix} \end{bmatrix} \\ \text{DTRS} \left\langle \begin{bmatrix} \text{PHON} \boxed{1} \\ \text{SYN} \begin{bmatrix} \text{HD} \mid \text{VFORM} \, \textit{prp} \\ \text{SUBJ} \langle \text{NP}_{\boxed{1}} \rangle \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix}$$

c. *null-copula-pi-cx* →

$$\left[\begin{array}{l}\textsc{mtr}\left[\begin{array}{l}\textsc{phon}\ \langle\,\rangle \\ \textsc{syn}\left[\begin{array}{l}\textsc{head}\left[\begin{array}{l}\textsc{vform}\ \boxed{2} \\ \textsc{null}\ +\end{array}\right] \\ \textsc{val}\ \boxed{1}\end{array}\right]\end{array}\right] \\ \textsc{dtrs}\left\langle\left[\begin{array}{l}\textit{copul-lxm} \\ \textsc{syn}\left[\begin{array}{l}\textsc{head}\left[\begin{array}{l}\textsc{vform}\ \boxed{2} \\ \textsc{null}\ -\end{array}\right] \\ \textsc{val}\ \boxed{1}\left[\begin{array}{l}\textsc{subj}\ \ \langle\,[\,]\,\rangle \\ \textsc{comps}\left\langle\left[\textsc{syn}\,|\,\textsc{hd}\left[\begin{array}{l}\textsc{indl}\ -\\ \textsc{pred}\ +\end{array}\right]\right]\right\rangle\end{array}\right]\end{array}\right]\end{array}\right]\right\rangle\end{array}\right]$$

It is left to the null copula rule in (45c) to yield silent (i.e. [NULL+]) participle/gerunds heads (subcategorizing for stage-level predicative complements) which can in turn either feed into the absolute or the participle constructions. Accordingly, the participle construction in (45b) applies regardless of the value of NULL.

Even though dangling participles and absolutes are very different constructions, they also share many properties which are can be systematically captured by a more general construction type in the hierarchy:

(46) *clause-mod-pi-cx* →

$$\left[\begin{array}{l}\textsc{mtr}\left[\begin{array}{l}\textsc{syn}\left[\textsc{val}\left[\begin{array}{l}\textsc{mod}\quad \mathrm{S}_{fin}[\textsc{index}\ \boxed{2}] \\ \textsc{comps}\ \boxed{3}\end{array}\right]\right] \\ \textsc{sem}\ \boxed{4}\end{array}\right] \\ \textsc{dtr}\ \langle\left[\begin{array}{l}\textsc{syn}\left[\begin{array}{l}\textsc{head}\ \ |\,\textsc{pred}\ + \\ \textsc{val}\quad\ |\,\textsc{comps}\ \boxed{3}\end{array}\right] \\ \textsc{sem}\ \boxed{4}\,|\,\textsc{index}\ \boxed{5}\end{array}\right]\rangle \\ \textsc{cx-sem}\,/\left\langle\left[\begin{array}{l}\textit{causes_rel} \\ \textsc{arg}_1\ \boxed{5} \\ \textsc{arg}_2\ \boxed{2}\end{array}\right]\right\rangle\end{array}\right]$$

Basically, both dangling participle and absolute constructions yield lexical heads with the ability to project subjectless S-adjoining phrases, without changes to the COMPS subcategorization frame, and receive a default causal reading in relation to the matrix clause. Although this account differs only in small ways from the phrasal account, we end up with a much more general and parsimonious analysis, consisting of a general construction type per S-adjoining construction.

Moreover, the coordination phenomena are also obtained as Vp constituent coordination. Consider the tree depicted in Figure 5, for the example (42) above.

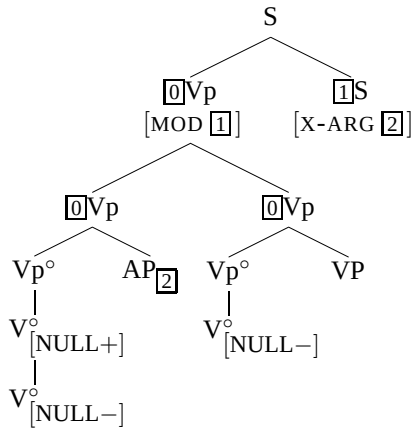


Figure 5: Tree for (apparent) unlike dangling modifier phrases: [[AP & VP] S]

The coordination of unlikes phenomena in dangling phrases are thus a consequence of an independent analysis of optional copulas in S-adjoining constructions.

4.2.1 A brief note about linearization

The usual assumption in domain-based HPSG linearization theories is that adjunct phrases are fully compacted, and allowed to interleave with the structures they adjoin to. Moreover, non-embedded clauses are only partially compacted (e.g. Kathol (2000)). By adopting this linearization constraints, the present account obtains several orderings for both dangling participle and absolute constructions. As expected, the possible modifier phrase realizations are semantically and prosodically similar.

(47) a. [Alone and without money], [John] [returned] [to his family in Alabama].
b. [John], [alone and without money], [returned] [to his family in Alabama].
c. [John] [returned], [alone and without money], [to his family in Alabama].
d. [John] [returned] [to his family in Alabama], [alone and without money].

(48) a. [With him badly injured], [the team] [was] [eliminated from the cup].
b. [The team], [with him badly injured], [was] [eliminated from the cup].
c. [The team] [was], [with him badly injured], [eliminated from the cup].
d. [The team] [was] [eliminated from the cup], [with him badly injured].

5 Conclusion

This paper proposes a unified analysis of both dangling participle constructions and absolute constructions. As a consequence of our account, problematic ‘coordination of unlikes’ phenomena that occur in these structures are obtained without further assumptions. A constructional analysis is put forth, and two variants are compared: a lexical and a phrasal approach. Aesthetic and computational considerations aside, the lexical account emerges as the more parsimonious given that it allows for a more systematic treatment requiring fewer theoretical constructs.

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Floating affixes in Polish

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Abstract

The morphosyntactic status of Polish past tense agreement markers has been a matter of considerable debate in recent years (Spencer, 1991; Borsley and Rivero, 1994; Borsley, 1999; Bański, 2000; Kupść, 2000; Kupść and Tseng, 2005). Past tense agreement is expressed by a set of bound forms that either attach to the past participle, or else "float off" to a host further to the left. Despite this relative freedom of attachment, it is often noted in the literature (e.g., Borsley, 1999; Kupść and Tseng, 2005) that the combination of verbal host and agreement marker forms a word-like unit.

In this paper I will argue that these agreement markers are best analysed as affixes uniformly introduced on the verb whose inflectional features they realise. Building on the linearisation-based theory of morphology-syntax interaction proposed in Crysmann (2003), syntactic mobility of morphologically introduced material will be captured by mapping phonological contributions to multiple lexically introduced domain objects. It will be shown that this is sufficient to capture the relevant data, and connect the placement of floating "affixes" to the general treatment of Polish word order (Kupść, 2000).

1 Data

1.1 Polish past tense agreement

Past tense in Polish is marked using a combination of a participial ending *l/ł* on the verb, inflected for number and gender, plus a person/number agreement marker that realises subject-verb agreement in first and second person (*-(e)m,-(e)ś,-śmy,-ście*).

	Singular			*Plural*	
	masc	*fem*	*neut*	*masc*	*fem/neut*
1	widzia-łe-m	widzia-ł-a-m	—	widzie-l-i-śmy	widzia-ł-y-śmy
2	widzia-łe-ś	widzia-ł-a-ś	—	widzie-l-i-ście	widzia-ł-y-ście
3	widzia-ł	widzia-ł-a	widzia-ł-o	widzie-l-i	widzia-ł-y

Table 1: Past tense paradigm

What is special about the agreement marker is that it may either attach directly right-adjacent to the verbal participle, or else float off to the left.

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(1) *(ty) widział -eś tę książkę*
you see -2SG this book
'you saw this book'

(2) *Ty -ś widział tę książkę*
you -2SG see this book
'you saw this book'

The floating past tense agreement markers may attach to a wide range of preverbal hosts, including nouns, pronouns, adverbs, adjectives, conjunctions (Spencer, 1991).

(3) *Daleko -m poszła.*
far -1SG went
'I went a long way.'

(4) *W domu -ście to zrobili?*
at home -2PL that made

However, realisation in absolute clause-initial position is barred, a property shared with syntactic clitics in Polish (e.g., pronominal clitics, see Kupść, 2000), which is standardly interpreted as an instance of Tobler-Mussafia Law.

(5) ** ś widział tę książkę*

In postverbal position, past tense agreement markers display a good deal of interaction with lexical phonological rules, namely, assignment of primary lexical stress, word final vowel raising, and yer vocalisation. However, in preverbal position, none of these interactions can be observed (Bański, 2000).

Yer vocalisation is a systematic vowel/zero alternation in Polish, argued by Booij and Rubach (1987) to be a cyclic lexical phonological rule. Within the domain of the word, an underlying "yer" is realised as [e], if followed by another yer, or else deleted. Booij and Rubach (1987) relate the vowel/zero alternation observable with the past tense agreement markers to this well-attested rule. Since the domain of application is the word, it follows that vowel/zero alternation at the juncture between the past tense agreement marker and the verbal host suggests that these forms combine in the lexicon.

(6) *robił — robiłe-m — robiła-m*

Another morphophonological rule that points in the same direction is raising of *o* to *ó* (=[u]) in word final syllables before voiced consonants (Booij and Rubach, 1987). Since attachment of past tense agreement apparently blocks the application of raising, Dogil (1987) concludes that these markers must already be attached when this lexical phonological rule applies.

(7) *Ja-m mógł. — Ja mogłem.*

Finally, lexical stress in Polish regularly falls on the penultimate syllable of the prosodic word. If a singular past tense agreement marker is attached to the participle, lexical stress assignment to the penult takes the extra syllable resulting from yer vocalisation into account (r**o**bił — rob**i**łem). For plural markers, there is some variation amongst speakers: stress placement is either on the antepenult or the penultimate syllable, including the agreement marker (rob**i**li — rob**i**liśmy — robil**i**śmy).

If we turn to preverbal realisation of said markers, we find that none of the above morphophonological effects can occur at the juncture between the floating agreement marker and its phonological host (Bański, 2000): neither yer vocalisation, nor stress shift can be observed.[1]

(8) Yer vocalisation[2]

palc-a 'finger.GEN'	*palc-a=m/ś*
palec 'finger.ACC'	**palece=m/ś*

Likewise, raising applies, as if the agreement marker were not there.

(9) Raising

krowy 'cows.NOM/ACC'	**krow=ście* 'cows.GEN=2PL'
krów 'cows.GEN'	*?krów=ście* 'cows.GEN=2PL'

Failure to undergo an expected and otherwise fairly regular morphophonological alternation constitutes evidence that, pre-verbally, these markers do not morphophonologically integrate with their host. The only phonological restrictions ("phonological friendliness") that do seem to hold between the floating agreement marker and its preverbal host concern the host's final segmental material, in particular sonority of final segments and complexity of the coda. In contrast to Kupść and Tseng (2005), who regard this as a morphophonological idiosyncrasy, Bański (2000) argues that the phonological selectivity can be explained in entirely prosodic terms, drawing on the sonority hierarchy. He argues further that the availability of phonologically less marked alternative attachment sites accounts for the low acceptability observable with suboptimal hosts. If we also consider further that nonlocal realisation of agreement is a probably a marked option by itself — although cross-linguistically attested, it is not an option chosen by too many languages of the world —, unacceptability of cliticisation to unfriendly hosts may well be accounted for by having to strikes against it: one prosodic, the other morphosyntactic.

[1] As discussed by Kupść and Tseng (2005), as well as pointed out to me by two of the reviewers, there is a small set of hosts like, e.g., *jak* 'as', *już* 'already', *chociaż* 'although' that do feature e-epenthesis when followed by a past tense marker. Although these forms are considered archaic by Kupść and Tseng (2005), an account of Polish past tense agreement should nevertheless be able to provide an account of these forms: I would therefore tentatively suggest that these forms might be analysed as modal verbs which subcategorise for an uninflected participle, akin to the conditional and future tense auxiliaries *by* and *będzie*.

[2] The vowel/zero alternation between palec and and palca suggests that palec is underlyingly yer-final. In contrast to verbal participles, attachment of the agreement marker does not make the stem-final yer surface as [e].

1.2 The conditional auxiliary *by*

The Polish conditional marker *by* displays some striking parallelism to the past tense agreement marker: first, just like the past tense, the conditional is expressed by a combination of the participial form of a verb (inflected for number and gender) plus the auxiliary *by*, which is inflected for person and number. The form of the person/number markers is identical to past tense markers.

		Singular	
	masc	*fem*	*neut*
1	widzia-ł-by-m	widzia-ł-a-by-m	—
2	widzia-ł-by-ś	widział-a-by-ś	—
3	widzia-ł-by	widzia-ł-a-by	widzia-ł-o-by

	Plural
masc	*fem/neut*
widzie-l-i-by-śmy	widzia-ł-y-by-śmy
widzie-l-i-by-ście	widzia-ł-y-by-ście
widzie-l-i-by	widzia-ł-y-by

Table 2: Conditional paradigm

Furthermore, the forms of the conditional marker *by* obey conditions on placement similar to those regulating the distribution of the past tense agreement marker: Postverbally, there is almost strict adjacency to the verb, the only exception being intervention of the particle *-no* (Kupść, see Borsley, 1999, fn. 12)

(10) *Obejrzał no byś ten film!*
see NO COND.2SG this film
'You would see this film!'

(11) * *Obejrzał no -ś ten film!*
see NO 2SG this film

Preverbally, attachment is promiscuous, again with a ban on clause-initial position.

With respect to morphophonology, however, the conditional marker does not display any of the expected properties of affixal attachment: forms of *by* are entirely stress-neutral, regardless of their host.

(12) *r**o**bił — r**o**bił-by — *rob**i**ł-by*

(13) *rob**i**li — rob**i**li-by — *robil**i**-by*

Likewise, application of raising is entirely unaffected by the attachment of *by*.

(14) *mógł — mógłby — *mogłby*

Thus, I will follow Spencer (1991); Bański (2000) and Kupść and Tseng (2005) in that morphophonological evidence points towards their status as syntactic clitics.

This difference in status is further corroborated by coordination data (cf. Kupść and Tseng, 2005; Bański, 2000): while wide scope over a coordination of hosts is by-and-large impossible with past tense agreement attached to a verbal host (participle or copula), conditional markers easily take wide scope in this position.

(15) a. *Poszedł -em i zobaczył *(-em)*
go.PAST -1SG and see.PAST.MASC -1SG
'I went and saw.'

b. *Byli -ście i jest *(-eście)*
be.PAST -2PL and be.PRES -2PL
'you were and you are'

(16) *Włączył -bym sobie radio i posłuchał (-bym) muzyki*
turn.on.PART -COND.1SG SELF radio and listen.PART -COND.1SG music
'I would turn on the radio and listen to the music.'

Preverbally, both markers may take wide scope (Kupść and Tseng, 2005).

Another difference between past tense agreement and conditional markers concerns the degree of interaction with pronominal clitic placement. As observed by Kupść (2000), Polish pronominal clitics either all precede or immediately follow the verb. Forms of clitic *-by* are always realised to the left of the pronominal clitics, regardless of whether *by* itself is realised in pre- or in postverbal position (Borsley, 1999; Witkoś, 1997)

(17) a. *Ty byś go widział jutro.*
you COND.2SG 3SG seen tomorrow
'you would see him tomorrow'

b. ?* *Ty go byś widział jutro.*
you 3SG COND.2SG seen tomorrow

(18) a. *Ty widział byś go jutro.*
you seen COND.2SG 3SG tomorrow

b. ?* *Ty go widział byś jutro.*
you 3SG seen COND.2SG tomorrow

Preverbal forms of the past tense agreement marker pattern with *-by*. Postverbal forms, however, show no interaction with pronominal clitic placement (Witkoś, 1997; Borsley, 1999)

(19) a. *Ty -ś go widział wczoraj.*
you 2SG 3SG seen yesterday
'you saw him yesterday'

b. ?* *Ty go -ś widział wczoraj.*
you 3SG 2SG seen yesterday

(20) a. *Ty widziałe -ś go wczoraj.*
you seen COND.2SG 3SG yesterday

b. *Ty go widziałe -ś wczoraj.*
you 3SG seen 2SG yesterday

It seems thus that the difference in lexical status suggested by morphophonology between postverbal past tense agreement on the one side, and the conditional marker and preverbal past tense agreement on the other, is also reflected in terms of syntactic visibility.

1.3 Summary

To summarise the empirical observations made above, I conclude that the status of Polish past tense agreement presents us with an analytical paradox: while postverbal realisation of this marker suggests affixal status — as supported by their morphophonological properties, the strict adjacency requirement, the non-interaction with pronominal clitic placement, and the failure to take wide scope over a coordination of hosts —, preverbal realisation, however, suggests syntactic clitic status — as witnessed by promiscuous attachment and the lack of morphophonological integration with the host. Nevertheless, pre- and postverbal realisations need to be systematically related in order to account for the identity of formatives and the unique marking of a verbal inflectional category. The forms of the conditional marker *by*, however, are probably best analysed as syntactic clitics, regardless of position, since there is absolutely no evidence for morphophonological integration with their host, the adjacency requirement is not strict, they can take wide scope over a coordination of hosts, and they interact with pronominal clitic placement. Still, the inflected forms of the conditional marker should be related to the past tense agreement markers.

2 Previous analyses

Probably the first study of this set of phenomena in the framework of HPSG is Borsley (1999). In this paper, he focusses on the similarity in syntactic distribution between the past tense agreement marker and the conditional marker and develops an essentially parallel analysis of these markers in terms of weak auxiliaries. In order to capture the difference in syntactic mobility between preverbal and postverbal realisation, he suggests that in preverbal position, these auxiliaries are syntactically independent signs, which take a participial syntactic complement, whereas postverbally, these auxiliaries are regarded as part of a morphologically derived verb-auxiliary complex. Syntactic realisation in postverbal position is ruled out by a suitable LP constraint. Uninflected third person forms receive special attention:

since an empty auxiliary analysis will give rise to spurious ambiguity, he suggest instead that third person finite past tense forms are derived from the non-finite participle by way of a unary conversion rule.

There are, however, a few problems with this account in the light of the data discussed above: first, as pointed out by Kupść and Tseng (2005), a uniform treatment of past and conditional cannot do full justice to the apparent differences in morphological status, as witnessed by morphophonological behaviour and the coordination facts. Second, deriving postverbal weak auxiliaries uniformly as a syntactically opaque daughter of a lexical compound cannot model the observable difference in interaction with pronominal clitic placement, which suggest that postverbal conditional markers must be syntactically visible, in contrast to postverbal past tense agreement. Third, the morphological analysis put forth in Borsley (1999) is inherently asymmetrical, postulating a lexical incorporation analysis for the conditional and non-third person past tense auxiliaries on the one hand, and an analysis in terms of zero inflection on the other. Finally, it is far from obvious how the weak auxiliary analysis of the past tense agreement markers can be generalised to derive other inflected forms that draw on the same set of markers, including the conditional marker and the present (!) tense copula *jest*. Identity of exponence across different paradigms therefore favours an analysis of the past tense agreement marker as an inflectional affix, realising person and number specifications.

In a recent paper, Kupść and Tseng (2005) have argued for a non-uniform account of conditional auxiliaries and past tense agreement, according to which the former are considered to be syntactic clitics, whereas the latter are analysed as morphologically derived agreement affixes. The authors, however, do not assign a difference in status to preverbal and postverbal occurences of the past tense agreement marker, but assume instead that the past tense agreement marker always attaches to its surface host as an inflectional affix. In order to relate the non-local realisation of the agreement marker to the verbal inflectional features they are an exponent of, they suggest a special feature percolation mechanism using marker and trigger features. Essentially, the locally uninflected participle launches a trigger feature, inflection of a host for person/number agreement launches a marking feature, and a unary clause-level schema discharges both features under unification.

Although I concur with Kupść and Tseng (2005) in regarding postverbal past tense agreement markers as suffixes directly attached to their hosts, extending this perspective to their preverbal counterparts raises several issues, which I will briefly discuss: first, the feature percolation mechanism invoked by the authors does not connect past tense agreement to any well-understood subtheory of local or non-local phenomena in Polish or across languages. Likewise, past tense agreement appears as an isolated agreement process unrelated to other agreement processes in the language. Second, the syntactic similarity between preverbal past tense agreement markers and conditional auxiliaries remains unaccounted for. Third, and most importantly, Kupść and Tseng (2005) do not provide evidence that preverbal past tense agreement markers show a similar degree of morphophonological integra-

tion with the host as their postverbal counterparts: in contrast to postverbal agreement, none of the expected lexical phonological rules may apply at the juncture between preverbal agreement markers and their hosts, like, e.g., stress shift or yer vocalisation. Conversely, the observable conditions on phonological friendliness are probably best understood in prosodic terms (Bański, 2000). Finally, promiscuous attachment (Criterion A) does not seem to support an analysis in terms of direct morphological attachment either.

3 A coanalysis approach

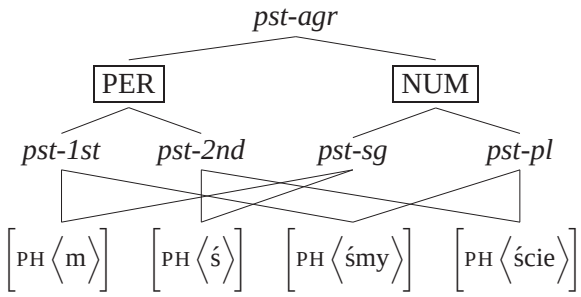
In the analysis which I am going to propose I will try to synthesise the insights gained by Borsley (1999) and Kupść and Tseng (2005) and assign the status of a syntactic clitic to the conditional marker regardless of position, yet treat the past tense agreement marker as a morphosyntactic hybrid: building on proposals by Kathol (1995) and Crysmann (2003), I suggest that Polish past tense verbs can contribute more than one domain object to linear domain structure. As a result, morphological rules of exponence will uniformly introduce exponents of agreement on the verbal host, yet the mapping of lexically introduced phonology to domain objects will permit the "affix" phonology to float off. The analysis of preverbal markers as syntactically visible floating affix phonology will prove to capture, in a straightforward way the interaction with pronominal clitic placement, predict the lack of phonological integration with prosodic hosts, and account for uniqueness of exponence. Furthermore, this analysis not only connects the placement of floating past tense agreement to the standard HPSG approach to Polish word order (Kupść, 2000), but it also relates the phenomenon at hand to the strikingly similar case of floating subject agreement in Udi (Crysmann, 2000).

3.1 Morphology

As to their morphological status I follow Kupść and Tseng (2005) and assume that the past tense markers *-m,-ś,-śmy,-ście* are best regarded as exponents of person/number agreement rather than tense auxiliaries. This view is supported by a variety of considerations: first, the forms used in the conditional are identical to the ones used in the past, yet they do not select the participial form of *by*. The very same holds for the present tense copula *jest*. Second, an analysis as tense auxiliaries would assign these forms the status of *sign*, which would make the wrong prediction concerning the interpretation of inflected forms of the present tense copula *jest*, which is clearly non-past. Third, zero marking of third person also favours an affixal treatment over a compound analysis. I therefore suggest to represent the person/number markers as an inventory of pure forms (exponents — not morphemes).[3]

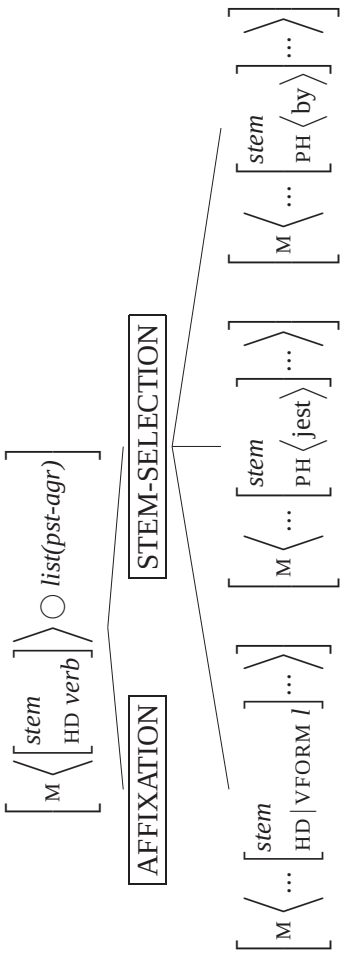
[3]The paradigms generated by the realisational schemata given here are all finite paradigms. As a consequence, we can localise the encoding of past tense with the constraint on *l*-forms given in the

(21)



The forms are then selected by realisational schemata: following previous work on type-based realisational morphology (Koenig, 1999; Riehemann, 1998; Crysmann, 2003), I suggest to organise the realisational schemata into a two-dimensional type hierarchy for affix and stem selection, where dimensions are conjunctively connected.

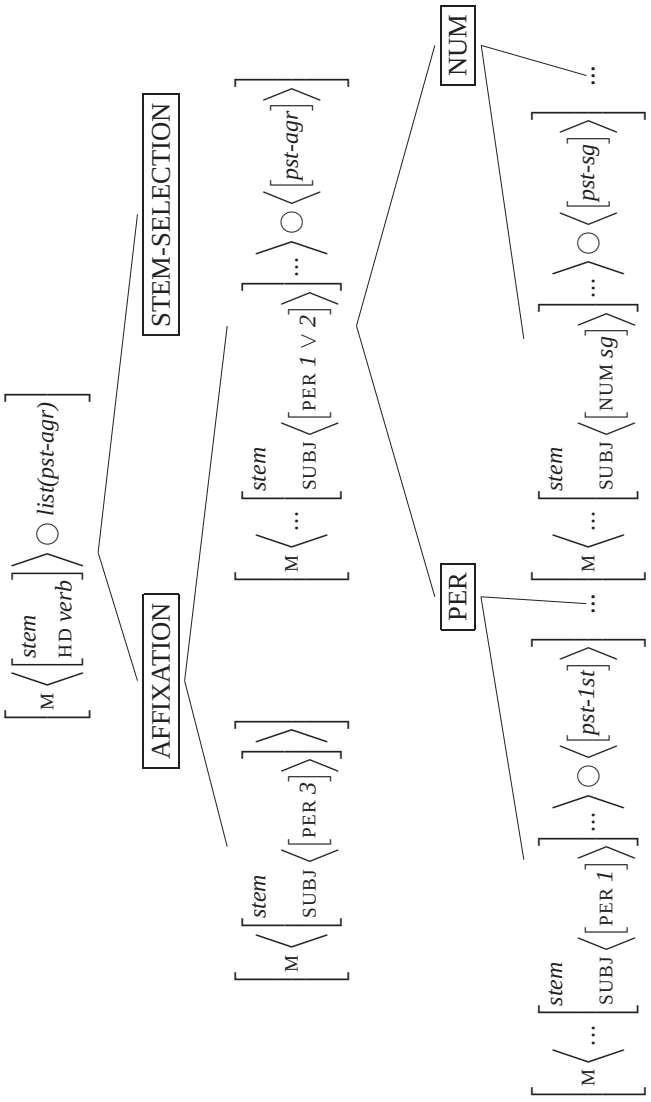
(22)



STEM dimension. Certainly, there is also a non-finite use of the *l*-form in periphrastic tenses such as future or conditional. This non-finite use may be licensed by a morphological schema of its own, which, however, is not given here.

What is crucial for our analysis is that the relative order of stem and affix not fixed on the supertype (◯).

(23)



Under the natural assumption that the domain of application for morphophonological rules is the morphological structure, presence vs. absence of morphophonological effects can be simply related to the configuration found at this level: with suffixation, yer vocalisation and stress shift will be triggered. With prefixation, the local condition for rule application is simply not met. Likewise, raising will be possible, if the stem is final, yet will be blocked by following affixal material.

The possibility for affixes to be positionally non-fixed is quite common cross-linguistically: Morphologicallly conditioned positional alternation has been attested for French and Italian pronominal affixes (Miller, 1992; Monachesi, 1999), whereas morphosyntactically conditioned placement alternation of affixes has been

observed for German separable particle verbs (Kathol, 1995), European Portuguese pronominal affixes (Crysmann, 2003; Luís and Spencer, 2004), and Udi agreement (Harris, 2000; Crysmann, 2003).

3.2 Morphosyntactic mapping

Having established how agreement formatives are introduced into morphological structure, we can now proceed to the specification of the morphology-syntax interface: as already mentioned above, the key to our analysis of morphologically introduced, yet floating agreement markers is a natural extension of Linearisation HPSG (Kathol, 1995; Reape, 1994), namely the possibility for lexical signs, just like phrasal signs, to introduce more than a single domain object, an idea that has already been explored in the analysis fo morphosyntactic paradoxa in German (Kathol, 1995), European Portuguese, Fox, and Udi (Crysmann, 2003, 2000).

In order to preserve lexical integrity, morphological entities are not directly accessible to syntactic manipulation. Rather, it is only the phonological contribution of morphological entities that gets distributed over the lexically introduced domain objects. Interaction between surface syntax and morphotactics is limited to ordering: as guaranteed by the homomorphism constraints below, the sequence of PHON values on DOM must correspond to the sequence of PHON values in morphological structure.

(24) a. $const \rightarrow \begin{bmatrix} \textsc{dom} & \left\langle \left[\textsc{ph} \quad \boxed{i_1}\right], \ldots, \left[\textsc{ph} \quad \boxed{i_m}\right] \right\rangle \\ \textsc{ph} & \boxed{i_1} \oplus \ldots \oplus \boxed{i_m} \end{bmatrix}$

b. $word \rightarrow \begin{bmatrix} \textsc{m} & \left\langle \left[\textsc{ph} \quad \boxed{i_1}\right], \ldots, \left[\textsc{ph} \quad \boxed{i_m}\right] \right\rangle \\ \textsc{ph} & \boxed{i_1} \oplus \ldots \oplus \boxed{i_m} \end{bmatrix}$

All we need to do now to account for the difference in syntactic transparency between pre- and postverbal realisations of the agreement marker is to assume that Polish past tense verbs align their stem phonology with the right-most domain object.

(25) $\begin{bmatrix} \textsc{dom} & \mathit{list} \oplus \left\langle \left[\textsc{ph}\ \boxed{1} \oplus \mathit{list}\right] \right\rangle \\ \textsc{m} & \left\langle \begin{bmatrix} \mathit{stem} & \\ \textsc{ph} & \boxed{1} \\ \textsc{hd} & \mathit{verb} \end{bmatrix} \right\rangle \bigcirc \mathit{list(pst\text{-}agr)} \end{bmatrix}$

As a result of the interaction between the morphologically variable position of the agreement affix and stem alignment, we will obtain two different surface-syntactic representations:

- a pre-stem position, which is syntactically transparent,

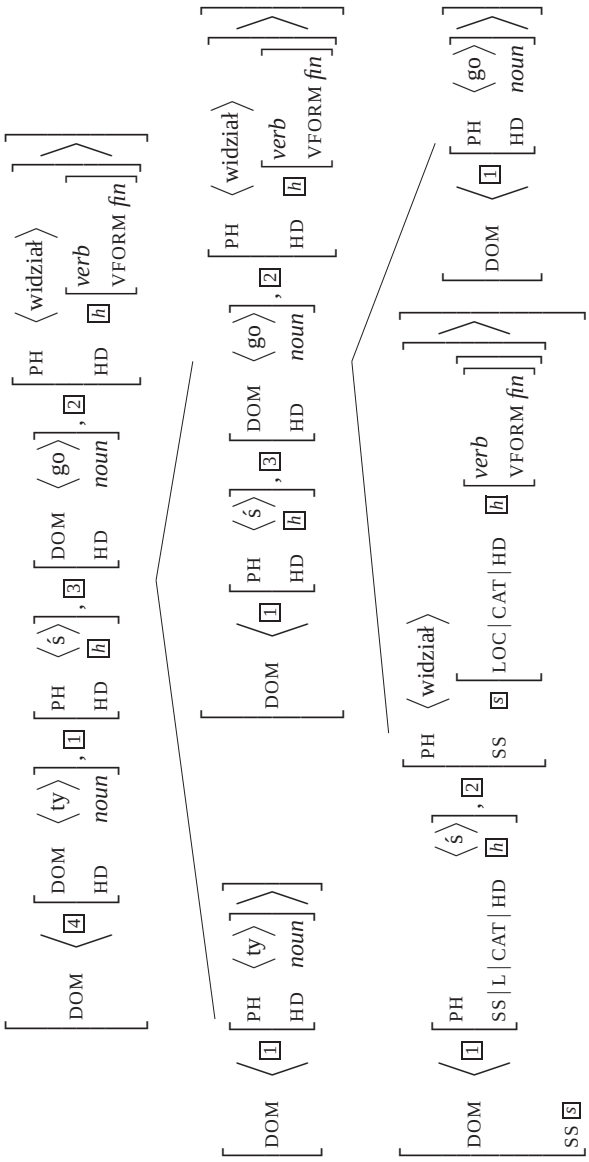
(26) $\left[\text{DOM}\left\langle\left[\text{PH}\quad\left\langle\text{ś}\right\rangle\right],\left[\text{PH}\left\langle\text{widział}\right\rangle\right]\right\rangle\right]$

- and a post-stem position, which is syntactically opaque.

(27) $\left[\text{DOM}\left\langle\left[\text{PH}\left\langle\text{widziałeś}\right\rangle\right]\right\rangle\right]$

A sample derivation of floating agreement will thus look as follows:

(28)



The syntactic inseparability of the conditional auxiliary and the morphologically attached agreement markers can straightforwardly be captured by restricting the length of the lexical DOM list to 1, enforcing realisation as an inseparable suffix.

(29)
$$\left[\begin{array}{ll} \textsc{dom} & \mathit{list} \oplus \left\langle \left[\textsc{ph}\ \boxed{1} \oplus \mathit{list}\right]\right\rangle \\ \textsc{m} & \left\langle \left[\begin{array}{ll}\mathit{stem} & \\ \textsc{ph} & \boxed{1} \\ \textsc{hd} & \mathit{verb}\end{array}\right]\right\rangle \bigcirc \mathit{list(pst\text{-}agr)} \end{array}\right] \wedge \left[\textsc{dom}\left\langle \left[\ \right]\right\rangle\right]$$

3.3 Clitic order

The final piece in our analysis of the data at hand concerns the syntactic placement of clitics. I assume that clitic status in Polish is probably best defined prosodically, e.g., in terms of prosodic extrametricality, an assumption that will directly predict the effects of Tobler-Mussafia Law (cf. Bański, 2000). In the following, I will use the types *nonclitic* and *clitic* as mere short-cuts to refer to domain objects whose PHON starts with a prosodic word boundary, or not.

In order to model the restrictions on clitic placement observed above (see Kupść, 2000 for a more in-depth study) a set of 3 LP constraints appears sufficient to derive the basic pattern:

- Verbal clitics precede pronominal clitics

(30)
$$\neg\left[\textsc{dom}\ \left\langle \ldots \left[\begin{array}{ll}\mathit{clitic} & \\ \textsc{hd} & \mathit{noun}\end{array}\right] \ldots \left[\begin{array}{ll}\mathit{clitic} & \\ \textsc{hd} & \mathit{verb}\ \ldots\end{array}\right]\right\rangle\right]$$

- Clitics either all precede or follow the verb

(31)
$$\neg\left[\textsc{dom}\ \left\langle \ldots \left[\mathit{clitic}\right] \ldots \left[\begin{array}{ll}\mathit{nonclitic} & \\ \textsc{hd} & \mathit{verb}\end{array}\right] \ldots \left[\mathit{clitic}\right] \ldots\right\rangle\right]$$

- Postverbal clitics must be verb-adjacent

(32)
$$\neg\left[\textsc{dom}\ \left\langle \ldots \left[\begin{array}{ll}\mathit{nonclitic} & \\ \textsc{hd} & \mathit{verb}\end{array}\right] \ldots \left[\mathit{nonclitic}\right] \ldots \left[\mathit{clitic}\right] \ldots\right\rangle\right]$$

Given the constraint on verb adjacency for post-verbal clitics, clustering turns out to be a mere corollary.

Thus, the patterns of placement interaction between pronominal clitics on the one side and the conditional and past tense agreemnet markers on the other will be derived as follows:

- Preverbal agreement marker must precede all other clitics

(33) $\left[\text{DOM} \left\langle \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{ty} \rangle \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{ś} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{go} \rangle \\ \text{HD} \ \textit{noun} \end{bmatrix}, \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{widział} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix} \right\rangle\right]$

(34) $*\left[\text{DOM} \left\langle \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{ty} \rangle \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{go} \rangle \\ \text{HD} \ \textit{noun} \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{ś} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix}, \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{widział} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix} \right\rangle\right]$

- Postverbal agreement marker may follow preverbal clitics

(35) $\left[\text{DOM} \left\langle \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{ty} \rangle \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{go} \rangle \\ \text{HD} \ \textit{noun} \end{bmatrix}, \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{widziałeś} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix} \right\rangle\right]$

- Conditional *by* must always precede all other clitics

(36) $\left[\text{DOM} \left\langle \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{ty} \rangle \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{byś} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{go} \rangle \\ \text{HD} \ \textit{noun} \end{bmatrix}, \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{widział} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix} \right\rangle\right]$

(37) $*\left[\text{DOM} \left\langle \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{ty} \rangle \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{go} \rangle \\ \text{HD} \ \textit{noun} \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{byś} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix}, \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{widział} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix} \right\rangle\right]$

(38) $*\left[\text{DOM} \left\langle \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \langle \text{ty} \rangle \end{bmatrix}, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{go} \rangle \\ \text{HD} \ \textit{noun} \end{bmatrix}, \begin{bmatrix} \textit{nonclitic} \\ \text{PH} \ \langle \text{widział} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix} \right\rangle, \begin{bmatrix} \textit{clitic} \\ \text{PH} \ \langle \text{byś} \rangle \\ \text{HD} \ \textit{verb} \end{bmatrix}\right]$

4 Conclusion

In the present paper, I have argued that the syntax and morphology of "floating" agreement markers in Polish can receive a unified treatment under the assumption that they are uniformly introduced as agreement affixes on the verb. Morphological introduction as exponents of person/number agreement naturally accounts for the paradigm-like properties, including zero exponence and cross-paradigm parallelism. An analysis as morphologically introduced affixes also relates syntactic opacity and morphophonological properties, and derives the lexical-phonological effects (and lack thereof) by reference to the domain of application: morphological

structure. The adoption of a lexically-controlled coanalysis approach has proven to reconcile the affixal properties of postverbal markers with the syntactic mobility of their preverbal counterparts, capturing uniformity of markers and uniqueness of exponence. The specific nature of the morphology-syntax interface in terms of multiple lexically-introduced domain objects aligns the treatment of floating "affixes" with the general approach to Polish word order (Kupść, 2000). Finally, the account presented here for Polish floating affixes is highly reminiscent to the analysis of similar phenomena in Udi (Crysmann, 2000, 2003).

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Constraining aspectual composition

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Abstract

In Modern Greek there is a rich aspectual system, which involves both morphologically expressed grammatical aspect and eventuality types, carried primarily by the meaning of the verbal predicate. Particular emphasis is paid to the interaction between grammatical aspect and eventuality types, since it is due to this interaction that the verbal predicate acquires distinct meanings. In order to explain potential changes in the meaning of the eventualities caused by the interaction with grammatical aspect, I propose a formal analysis within HPSG, using Minimal Recursion Semantics (MRS) for the semantic representations. Following the MRS architecture, I introduce a number of relations, which represent both grammatical aspect and eventuality types. The close interaction between grammatical aspect and eventuality types triggers special meanings which traditionally can be explained by inserting contextual information into the representations. In this paper, I argue against such an analysis, providing an alternative which is based on the introduction of subeventual templates formulated by Michaelis (2003) and Pustejovsky (1995). In this context, grammatical aspect combines with eventuality types and selects eventualities or subeventualities appropriate to its selection restrictions, using information that is already there in the denotation of the eventualities.

1 Introduction

Traditionally, aspectual composition refers to the combination of a verb with its arguments (NPs, PPs) and how this combination affects the aspectual denotation of the verb (Aktionsart) (Krifka, 1998; Smith, 1997; de Swart, 1998). For instance, in (2a) the eventuality *walk a mile* is an accomplishment, which changes into a process in (2b) once the argument gets pluralised (*walk miles*).

(1) a. Mary walked a mile.
b. Mary walked miles.

Another instance of aspectual composition occurs when grammatical aspect (perfective and imperfective) and eventuality types (accomplishment, achievement, process, state) carried by the verb along with its arguments combine to trigger particular meanings. This aspectual composition may change the denotation of the eventuality type resulting to aspectual shifts (Moens and Steedman, 1988; Jackendoff, 1990; Pustejovsky, 1995; Pulman, 1997; Krifka, 1998; de Swart, 1998; Filip, 2000; Bonami, 2001; Giannakidou, 2002; Egg, 2002; Michaelis, 2004).

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An instance of this phenomenon is found in Modern Greek (M.G.) where there is a contrast between perfective and imperfective aspect, being overt in the morphology of the verb. The information, grammatical aspect presents, is affected by the eventuality type it combines with, which is implicit in the meaning of the verb phrase.

The accomplishment eventuality *write the letter* in (2) denotes a situation which starts with the beginning of the *writing* and reaches a culmination with the completion of *the letter*. When this eventuality combines with perfective aspect in (2a), it retains its culmination point and the meaning does not change. When the same eventuality combines with imperfective aspect, it gets a shifted reading (2b) i.e. process or habitual reading. In this way it is no longer visible when *the letter* reaches a culmination and if it actually does.

(2) a. O Giannis e -graps -e to gramma.
the giannis Aug -write.Perf -3sg.Past the letter
'Giannis wrote the letter' (basic reading)

b. O Giannis e -graf -e to gramma.
the giannis Aug -write.Imperf -3sg.Past the letter
'Giannis was writing the letter' (process reading)
'Giannis used to write the letter' (habitual reading)

The same is the case in (3), which is an instance of an achievement eventuality combined with perfective aspect in (3a) and imperfective aspect in (3b). As was the case with the accomplishment in (2), grammatical aspect modifies the eventuality giving particular meanings.

(3) a. I Maria kerdis -e sta hartia.
the maria win.Perf -3sg.Past in-the cards
'Maria won in the game of cards' (basic reading)

b. I Maria kerdiz -e sta hartia.
the maria win.Imperf -3sg.Past in-the cards
'Maria was winning in the game of cards' (process reading)
'Maria used to win in the game of cards' (habitual reading)

In (4) the eventuality *love Anna* denotes a situation, which is not clear when it starts and when and whether it finishes. When this eventuality occurs with imperfective aspect in (4a), it gets the default meaning of the eventuality, where no culmination point is denoted and no visible endpoints. In (4b) the same eventuality combines with perfective aspect, which may focus either on the initial stages of the eventuality in which case it acquires an inchoative reading or simply adds both endpoints, in which case there is a bounded reading.

(4) a. O Giannis agapous -e tin Anna.
the giannis love.Imperf -Past.3sg the anna
'Giannis was loving Anna'
'Giannis used to love Anna' (basic reading)

b. O Giannis agapis -e tin Anna.
the giannis love.Perf -Past.3sg the anna
'Giannis loved Anna (and does not love her any more)'
(bounded reading)
'Giannis fell in love with Anna' (inchoative reading)

In the above examples grammatical aspect and eventuality types interact and the meaning of the eventuality is affected by grammatical aspect. When the perfective aspect combines with accomplishments and achievements there is no change in the denotation of the eventuality. As Smith (1997) observes perfective aspect and accomplishments - achievements have similar properties They all have endpoints and reach a culmination. That is why there is no change in the eventuality denotation once combined with perfective. The same result occurs when imperefective aspect and processes - states combine. No aspectual shifts are observed because they have no endpoints and hence no culmination happens.

In order to formalise and explain the interaction between grammatical aspect and eventuality types, it is standard in the literature to assume that there is a functor argument relation: $f(a)$, where f is the functor and a the argument. In the case of aspectual interactions, the relation between functor and argument becomes more concrete and translates into (5), where there is a functor-argument relation between grammatical aspect and eventuality types.

(5) *aspect(eventuality)*

We may further instantiate the aspectual functor into the perfective functor, which normally takes as argument accomplishments and achievements (6a), as was observed in the examples above. A similar case occurs with the imperfective functor which normally combines with processes and states in (6b).

(6) a. $perfective(accomplishment \vee achievement)$
b. $imperfective(process \vee state)$

Nevertheless, there are cases where the argument is not the appropriate input for the functor. Instances of this can be found in (4b) where the perfective aspect combines with a process and in (2b) and (3b), where the imperfective functor occurs with an accomplishment or achievement respectively. If the argument is not the appropriate input for the functor,

this does not mean that the combination is not acceptable but just that reinterpretations occur which remedy the conflict.

In the literature there is a main trend for the explanation of these type shifts. Extralinguistic knowledge may be involved where the context plays an important role in the resolution of the conflict and it is manifested with the introduction of operators licensed by the context.

Jackendoff (1997) argues that "the process of composition interpolates a 'coercing function' G to create instead the structure F(G(X)) where X is a suitable argument for G, and G(X) is a suitable argument for F." This means that in type-shifting the process of semantic composition may add meanings absent in the syntax in order to ensure that certain functors receive suitable arguments. This extra meaning added is referred to as *enriched composition*.

A similar explanation comes from de Swart (1998, 2000) who argues that coercion is "syntactically and morphologically invisible: it is governed by implicit contextual reinterpretation mechanisms triggered by the need to resolve [semantic] conflicts." (de Swart (1998):360)

In a similar way aspect shifts are treated as type coercions by Moens and Steedman (1988); Pulman (1997); Pustejovsky (1995, 1991); Pustejovsky and Bouillon (1995); de Swart (1998, 2000). The main idea is that the basic aspectual class of an eventuality description may be changed under the influence of tenses, aspectual adverbials and aspectual auxiliares. These are functions which may coerce eventuality types so as to become appropriate inputs for them. The reinterpretation in this case is achieved with the introduction of operators which alter the type of the argument so as to become appropriate for the functor. The licensing of a particular operator depends on the context.

Hence, the general relation *f(Op(a))* is used, where the operator *Op* added, is given by pragmatic context. A major drawback of these approaches is that these operators can not be appropriately constrained, so that they occur only where and when needed. [1]

Different solutions have been provided, where the operators are either constrained using a network of contigent aspectual relations (Moens and Steedman, 1988), a *qualia structure*, where the possible selections are enlisted beforehand (Pustejovsky, 1995) or underspecification in the selection is involved, where the functor does not combine immediately with an argument but there is space in between for other items to intervene, which are left underspecified (Egg, 2002).

The solution pursuit in this paper is different. Following Michaelis (2004) and Pustejovsky (1995), I develop a highly constructed inventory of eventuality types, which consists of eventualities as well as their subeventualities. These interact with grammatical aspect, which adds or selects the whole or subparts of the eventualities according to its selection restrictions. Hence,

[1] For a detailed discussion see Flouraki (2005).

there is no new material added by context but the one that is already there is appropriately constrained by grammatical aspect.

2 The analysis

2.1 Minimal Recursion Semantics

The analysis proposed uses Minimal Recursion Semantics (MRS) for the semantic representations Copestake et al. (2000). MRS is a metalanguage, which describes semantic structures within the framework of HPSG Pollard and Sag (1994). The object language may be any semantic theory ranging from predicate calculus to lambda-calculus and DRT. Semantic representations are shown using metavariables and relations between these metavariables. In this way partial semantic representations are given which allow underspecification to be used in such a way so as monotonic resolution of such partial semantic representations to be achieved. MRS deals mainly with scope ambiguities, where the key idea is that it is not necessary for a scope ambiguity to be resolved as yet at the semantic level. This can be achieved through underspecification.

For instance (7a), has two readings where *every* has wide scope in (7b) and narrow scope in (7c).

(7) a. Every woman loves some man.
b. $\forall x.woman'(x) \longrightarrow \exists y.man'(y) \wedge love'(x,y)$
c. $\exists y.man'(y) \wedge \forall x.woman'(x) \longrightarrow love'(x,y)$

In order to achieve underspecification and at the same time be able to retrieve the correct scopal readings, a flat representation is used as well as metavariables. Each lexeme corresponds to an *elementary predication (EP)*, which is a relation with its associated arguments. Every such relation is identified by a metavariable (*handle*), which should be thought of as grabbing hold of a particular *EP* and connecting it with the other *EPs*. The handles are represented with the metavariables h1, h2, ... whereas the underspecified handles hA and hB capture multiple scopes as shown in (8).

(8) *h1:every(x,h2,hA), h2:woman(x), h3:some(y,h4,hB), h4:man(y), h5:love(x,y)*

The key ideas behind MRS may be easily captured in the feature structure representation of HPSG. Thus a semantic object is created of the type *mrs* in (9), which has appropriate attributes and values. It introduces a bag of *EPs* represented as a list that functions as the value of the feature RELS, a list of constraints on the scopal relations among the *EPs* represented by the feature H-CONS and the HOOK feature. The RELS and HCONS attributes are always accumulated. The variable equivalence is represented by coindexation.

(9)
$$\left[\begin{array}{l} \textit{mrs} \\ \text{HOOK} \left[\begin{array}{l} \text{LTOP } \textit{handle} \\ \text{INDEX } \boxed{z} \end{array}\right] \\ \text{RELS} \left\langle \left[\begin{array}{l} \textit{every-rel} \\ \text{LBL } \boxed{1}\ \textit{handle} \\ \text{ARG } \boxed{x}\ \textit{ref-ind} \\ \text{RESTR } \boxed{2}\ \textit{handle} \\ \text{BODY } \textit{handle} \end{array}\right], \left[\begin{array}{l} \textit{woman-rel} \\ \text{LBL } \boxed{3}\ \textit{handle} \\ \text{ARG } \boxed{x}\ \textit{ref-ind} \end{array}\right], \right. \\ \left. \left[\begin{array}{l} \textit{love-rel} \\ \text{LBL } \boxed{4} \\ \text{ARG1 } \boxed{x}\ \textit{ref-ind} \\ \text{ARG2 } \boxed{y}\ \textit{ref-ind} \\ \text{ARG3 } \boxed{z} \end{array}\right], \left[\begin{array}{l} \textit{some-rel} \\ \text{LBL } \boxed{5}\ \textit{handle} \\ \text{ARG } \boxed{y}\ \textit{ref-ind} \\ \text{RESTR } \boxed{6}\ \textit{handle} \\ \text{BODY } \textit{handle} \end{array}\right], \left[\begin{array}{l} \textit{man-rel} \\ \text{LBL } \boxed{7}\ \textit{handle} \\ \text{ARG } \boxed{y}\ \textit{ref-ind} \end{array}\right] \right\rangle \\ \text{H-CONS} \left\langle \left[\begin{array}{l} \textit{qeq} \\ \text{HARG } \boxed{2} \\ \text{LARG } \boxed{3} \end{array}\right], \left[\begin{array}{l} \textit{qeq} \\ \text{HARG } \boxed{6} \\ \text{LARG } \boxed{7} \end{array}\right] \right\rangle \end{array}\right]$$

Both quantifiers *every* and *some* introduce scopal relations, which are represented as feature structures of type *every-rel* and *some-rel* respectively. They have as appropriate features a label (LBL), which identifies them and an argument (ARG), which corresponds to the bound variable argument. Moreover, there is a RESTR feature which represents the object they bind with and a BODY feature which shows the object they scope over. Both these features are left underspecified, since there is scopal ambiguity.

The verb *love* is represented as a *love-rel*, which is not scopal. Hence, the RESTR and the BODY attributes are not needed but only the feature LBL is introduced along with appropriate arguments for the relation. These arguments show the participants in the relation i.e. ARG x and ARG y as well as the eventuality type introduced (ARG z). This is coindexed with the INDEX feature in HOOK, which represents the eventuality type of the whole phrase.

HOOK "is used to group together the features that specify the parts of an MRS which are visible to semantic functors" (Copestake et al. (2000):24). In semantic composition the HOOK of the mother is always the HOOK of the semantic head daughter. The LTOP remains underspecified if the *EP* that takes scope over everything else is a quantifier. In this way it is guaranteed that no quantifier takes scope over the other so as the representation remains underspecified.

Each lexical item has a single distinguished main EP, which is captured by the feature KEY. In case of a phrase all the other EPs either share a label with the key EP, or are equal to it, or are equal to a scopal argument of the key EP. Usually the key EP is equal to the LTOP unless it is a floating EP in which case it is left underspecified as is the case in (9).

The *EPs* are connected with each other through an outscopes relation represented in H-CONS. An EP E immediately outscopes an EP E', if the value of one of the handle taking arguments of E is the label of E'.

2.2 MRS in Aspectual Representations

As we saw in section 1 in M.G. grammatical aspect and eventuality types are represented within the verbal lexeme itself. Hence, having in mind the *mrs* architecture as presented in 2.1, we have to enrich the semantic representation of the *verb-rel*, so as aspect to be represented. The arguments showing the participant roles stay as such but the third argument representing the verbal eventuality has to become more complex in order to show the aspectual interaction. Hence, ARG3 in (9) takes as value a feature structure, which is itself an *mrs* object introducing different relations.

These relations represent both the grammatical aspect functor and the eventuality type argument. They have to be introduced within the verbal lexeme since in M.G. grammatical aspect and eventuality types are instantiated in the verb. Koenig and Davis (2003) apply MRS to the lexemic level, where semantic decomposition is achieved by introducing more than one relation in the EP's semantic type. Based on that Bonami (2001) decomposes the verbal lexeme so as to accomodate the tense functor in French. In his analysis, the verbal lexeme introduces not one but three relations. There is a *tense-rel*, a *verb-rel* and an *asp-op-rel*, representing the contextual operators discussed in section 1. The idea is that the *asp-op-rel* binds with an eventuality through the BEV feature and reinterpets it into another eventuality with the EVY feature. Then the *tense-rel* combines with the reinterpreted eventuality through BEV as shown in (10).

(10)
$$\left[\text{RELS}\left\langle\begin{bmatrix}\textit{tense-rel}\\ \text{LBL } \boxed{1}\\ \text{SCOPE } \boxed{2}\\ \text{BEV } \boxed{y}\end{bmatrix},\begin{bmatrix}\textit{asp-op-rel}\\ \text{LBL } \boxed{2}\\ \text{EVY } \boxed{y}\\ \text{BEV } \boxed{x}\\ \text{SCOPE } \boxed{3}\end{bmatrix},\begin{bmatrix}\textit{verb-rel}\\ \text{LBL } \boxed{3}\\ \text{EVY } \boxed{x}\\ \text{ACTOR } \textit{idn-ind}\\ \text{UNDER } \textit{idn-ind}\end{bmatrix}\right\rangle\right]$$

Even though the reasoning behind Bonami's analysis is correct for reasons explained in section 1, I do not want any interference of the context or the introduction of contextual operators. Hence, in the case of aspectual composition, I claim that the relations introduced by the verbal lexeme are

just an aspectual relation of type *aspect-rel* and an eventuality relation of type *eventuality-rel*.

Each relation is part of an hierarchy of relations given in figure 1, where the *aspect-rel* is a subtype of the *scopal-rel*, which introduces the feature SCOPE. This means that this particular relation has to take scope over another one. The *eventuality-rel* is a subtype of the *non-scopal-rel*. The *aspect-rel* has as subtypes the perfective (*perf-rel*) and the imperfective relation (*imperf-rel*), corresponding to the perfective and imperfective aspect respectively. The *eventuality-rel* has as sutypes the eventualities *transition-rel*, which corresponds to accomplishments and achievements [2], *process-rel* and *state-rel*.

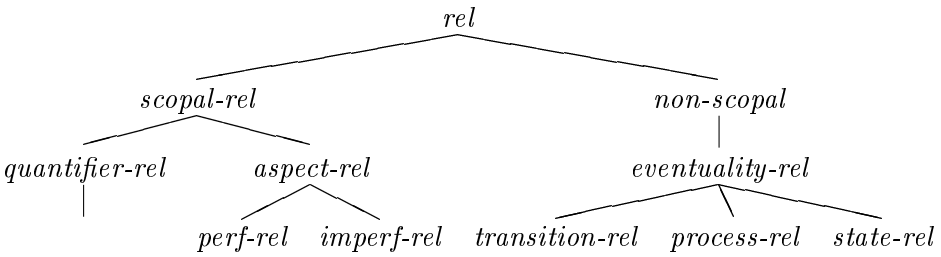

Figure 1: Hierarchy of relations

The *aspect-rel* introduces the features L(a)B(e)L and BINDS as indicated in (11). The LBL has as value the type *handle*, which identifies the relation and shows its scopal connection with the other relations. The *aspect-rel* combines with an eventuality through the BINDS feature and gives back the same or a different eventuality represented by the EVENT-STR(ucture) feature. Both BINDS and EVENT-STR take as value an *event-str*, which represents the subparts of the eventualities as we will see in the following section.

(11)
$$\begin{bmatrix} \textit{aspect-rel} \\ \textsc{lbl}\ \textit{handle} \\ \textsc{scope}\ \textit{handle} \\ \textsc{event-str}\ \textit{event-str} \\ \textsc{binds}\ \textit{event-str} \end{bmatrix}$$

[2] This categorisation belongs to Pustejovsky (1991)

2.3 Subeventual templates

As was mentioned in section 1, a way to eliminate the contextual operator is to decompose the eventualities into subparts so as grammatical aspect to be able to select the appropriate subpart in each case.

Pustejovsky (1991) argues that the predicates have a subeventual structure, which provides a template for verbal decomposition and lexical semantics. In his theory there are three basic eventuality types: the states, the processes and the transitions. The states are evaluated relative to no other eventualities, while the processes denote a sequence of events which identify the same semantic expression. The transitions are complex types and equivalent to the accomplishments and achievements. These consist of a process and a state subevent and denote a transition from the process of an eventuality coming about, to the state of being about through the culmination point. Hence if we take the accomplisment *build the house*, the process lies on the steps that lead to the completion of the house whereas the state is its completion stage.

The ordering of these subevents is guaranteed by a temporal relation: *exhaustive ordered part of* ($\prec$) which denotes that a complex event e_3 consists of two subevents e_1 and e_2, where e_1 temporally precedes e_2. Hence, in the case of the accomplishments there is an event structure which consists of a process and a state and the process temporally precedes the state.

Achievements also consist of two subeventualities i.e. process and state and the process temporally precedes the state. In the achievement *reach the top*, the process of reaching the top precedes the state of being at the top.

In order to differentiate the accomplishements from the achievements Pustejovsky introduces another kind of relation: the *event headedness*. This "provides a way of foregrounding and backgrounding of event arguments" and indicates their "relative prominence". The head indicates the most prominent subevent which contributes to the 'focus' of interpretation. In the case of accomplishments the head is the process while in the case of achievements the head is the state. As far as the processes and states are concerned their head is underspecified since they consist only of one eventuality and the focus is on that eventuality anyway.

Following Pustejovsky (1991), I support that each *eventuality-rel* has an event structure (EVENT-STR), whose value is a feature structure, that consists of different subeventualities indicated by the features EVENT1 and EVENT2.

The *transition-rel* in (12) introduces apart from the attribute LBL, the attribute EVENT-STR, which takes as values a subeventual structure that consists of two eventualities. An EVENT1 with value a *process* type and an EVENT2 with value the *state* type. Their temporal ordering is guaranteed through the RESTRiction attribute, which states that there is a precedence temporal relation between the EVENT1 and the EVENT2.

(12)
$$\begin{bmatrix} \textit{transition-rel} \\ \text{LBL } \textit{handle} \\ \text{EVENT-STR } \boxed{3} \begin{bmatrix} \text{EVENT1 } \boxed{1}\textit{process} \\ \text{EVENT2 } \boxed{2}\textit{state} \\ \text{RESTR } \left\{ \boxed{1} \prec \boxed{2} \right\} \end{bmatrix} \end{bmatrix}$$

In order to differentiate the *accomplishment-rel* from the *achievement-rel* an extra feature is introduced: the feature EVentuality-FOCus , which takes as value one of the two subevents of the event structure. In the case of the accomplishments the EV-FOC has as value the EVENT1 as shown in (13), while in the case of achievements the EV-FOC has as value the EVENT2 (14).

(13)
$$\begin{bmatrix} \textit{accomplishment-rel} \\ \text{LBL } \textit{handle} \\ \text{EVENT-STR } \boxed{3} \left[\text{EV-FOC } \boxed{1} \right] \end{bmatrix}$$

(14)
$$\begin{bmatrix} \textit{achievement-rel} \\ \text{LBL } \textit{handle} \\ \text{EVENT-STR } \boxed{3} \left[\text{EV-FOC } \boxed{2} \right] \end{bmatrix}$$

The *process-rel* in (15) introduces an EVENT-STR, where there is only one eventuality attribute EVENT1, which denotes a *process*. The RESTR is left underspecified, since this *eventuality-rel* consists only of one subevent.

(15)
$$\begin{bmatrix} \textit{process-rel} \\ \text{LBL } \textit{handle} \\ \text{EVENT-STR } \boxed{3} \begin{bmatrix} \text{EVENT1 } \boxed{1}\textit{process} \\ \text{RESTR } \textit{restr} \end{bmatrix} \end{bmatrix}$$

The second step in the representation of aspectual meaning is to combine these subeventual templates with grammatical aspect.

2.4 Composition

The relations introduced by the verbal lexeme i.e. *aspect-rel* and *eventuality-rel* have to combine to denote the semantics of the overall verbal lexeme. The HOOK feature is introduced in order to achieve semantic composition. HOOK as we saw in section 2.1 has as values the LTOP and the INDEX. The LTOP is equated with the highest scopal relation and the INDEX represents the eventuality of the overall phrase.

In the case of the verbal EP in M.G. there is an interaction between grammatical aspect and eventuality types and this interaction indicates the

eventuality type of the overall verbal lexeme. This interaction is represented by the *aspect-rel* and the *eventuality-rel*. The *aspect-rel* has a fixed scope over the *eventuality-rel* and bears the feature SCOPE. How is then the LTOP of the overall EP determined? When there is a scopal combination the LTOP of the verbal EP is equated with the LTOP of the relation that bears the SCOPE feature and the INDEX is coreferential with the EVENT-STR of the relation that scopes over all the others.

(16)
$$\left[\begin{array}{l} \textit{mrs} \\ \text{HOOK} \left[\begin{array}{l} \text{LTOP } \boxed{1} \\ \text{INDEX } \boxed{4} \end{array}\right] \\ \text{RELS} \left\langle \left[\begin{array}{l} \textit{perf-rel} \\ \text{LBL } \boxed{1} \\ \text{SCOPE } \boxed{2} \\ \text{EVENT-STR } \boxed{4} \\ \text{BINDS} \left\langle \boxed{3} \right\rangle \end{array}\right], \left[\begin{array}{l} \textit{transition-rel} \\ \text{LBL } \boxed{2} \\ \text{EVENT-STR } \boxed{3} \left[\begin{array}{l} \text{EVENT1 } \boxed{4}\textit{process} \\ \text{EVENT2 } \boxed{5}\textit{state} \\ \text{RESTR} \left\{ \boxed{4} \prec \boxed{5} \right\} \end{array}\right] \end{array}\right] \right\rangle \end{array}\right]$$

In this way combination between grammatical aspect and eventuality types is achieved. Another issue that arises though is how we can indicate that grammatical aspect combines with certain eventuality types and changes nothing in their denotation while with others there are aspectual shifts as we saw in section 1. This is an issue, I am going to explore in the following section where certain selectional constraints on grammatical aspect will be introduced.

3 Aspectual combinations

Following Michaelis (2003, 2004), I support that as in Romance languages, perfective and imperfective aspect in M.G. are type-selecting operators reflecting the eventuality type of their arguments. Hence, the perfective functor in (17a) combines with non-stative eventualities and returns bounded ones while the imperfective functor in (17b) combines with stative ones and returns unbounded ones. Essentially the non-stative are equivalent to bounded and the stative to non-bounded.

(17) a. $\lambda e_{+BD}.perf(\lambda e'_{-ST}.write'(mary', the.letter')(e'))(e)$
b. $\lambda e_{-BD}.imperf(\lambda e'_{-ST}.run'(mary')(e'))(e)$

Even though these two classes of operators have a distinct function they both can potentially modulate when it is necessary the aspectual properties of their argument and both operators denote event types and place constraints upon the lexically expressed types they combine with. This kind of

combination between the functor and the argument is guaranteed with the *Aktionsart preservation principle*, which states that that no extra material is needed intervene in the functor argument relation. Michaelis supports that "In an aspectual mapping, whether implicit or explicit, input and output types must share some portion of their respective causal and/or temporal representations. " (Michaelis (2004):16)

The *Aktionsart Preservation principle* as well as the assumption that no extra material is needed interve in the functor-argument relation is the basis of the theory assumed here. Hence, the perfective and imperfective functor take as argument particular eventualities and when the argument is not the appropriate input for the functor then the functor selects or adds a subpart to the eventuality it combines with. The mechanism works thanks to the introduction of the subeventual structure where subeventualties can be added or chosen in each case.

In order to depict these selectional restrictions of grammatical aspect in HPSG, I assume that there is a perfective and an imperfective functor which place different constraints according to what the argument is.

3.1 Perfective functor

The perfective is a two argument functor F_{perf} defined in (18), which normally selects transition eventualities. Since the output of this functor is the same as the input, it is a type-selecting operator. This is guaranteed by the constrain in (18b) which states that when Y is an EVENT-STR of type *transition-rel*, which consists of EVENT1 with value *process* and EVENT2 with value *state*, then Z is equal to Y.

(18) a. $\mathrm{F}_{perf}(\mathrm{X},\mathrm{Y})=\mathrm{Z}$

b. if $\mathrm{Y}=\begin{bmatrix}\textsc{event1} & \textit{process}\\ \textsc{event2} & \textit{state}\end{bmatrix}$, then $\mathrm{Z} = \mathrm{Y}\begin{bmatrix}\textsc{event1} & \textit{process}\\ \textsc{event2} & \textit{state}\end{bmatrix}$

c. if $\mathrm{Y} =\left[\textsc{event1}\ \textit{process}\right]$, then $\mathrm{Z} = \mathrm{Y} \oplus\left[\textsc{event2}\ \textit{state}\right]$

However, the *perf-rel* may combine with a *process-rel* in which case the functor operates on the eventuality and adds a subeventuality to alter the whole event structure into a *transition-rel*. This is ensured by the constraint in (18c) which states that when Y is an eventuality consisting of EVENT1 of value *process*, then Z is equal to Y where the EVENT2 of value *state* is added with the add operation.

Hence, when there is a *transition-rel*, the *perf-rel* selects through the BINDS feature the whole EVENT-STR indicated with the tag [3] in figure 2. The output of this combination is the same as the input as it is licensed by the constraint in (18b).

$$\left[\begin{array}{l} \textit{mrs} \\ \textsc{hook}\ \left[\begin{array}{l}\textsc{ltop}\ \boxed{1}\\ \textsc{index}\ \boxed{6}\end{array}\right] \\ \textsc{rels}\ \left\langle \left[\begin{array}{l}\textit{perf-rel}\\ \textsc{lbl}\ \boxed{1}\\ \textsc{scope}\ \boxed{2}\\ \textsc{event-str}\ F_{perf}\left(\boxed{6},\boxed{3}\right)\\ \textsc{binds}\ \left\langle \boxed{3} \right\rangle\end{array}\right], \left[\begin{array}{l}\textit{transition-rel}\\ \textsc{lbl}\ \boxed{2}\\ \textsc{event-str}\ \boxed{3}\left[\begin{array}{l}\textsc{event}1\ \boxed{4}\textit{process}\\ \textsc{event}2\ \boxed{5}\textit{state}\\ \textsc{restr}\ \left\{\boxed{4} \prec \boxed{5}\right\}\end{array}\right]\end{array}\right] \right\rangle \end{array}\right]$$

Figure 2: combination perfective-transition

When the *perf-rel* combines with a *process-rel*, the constraint in (18c) is applied. Hence,the *perf-rel* selects an eventuality of type *process* through the BINDS feature but adds to it a *state* subevent that alters the *process* eventuality into a *transition* in figure 3.

$$\left[\begin{array}{l} \textit{mrs} \\ \textsc{hook}\ \left[\begin{array}{l}\textsc{ltop}\ \boxed{1}\\ \textsc{index}\ \boxed{6}\end{array}\right] \\ \textsc{rels}\ \left\langle \left[\begin{array}{l}\textit{perf-rel}\\ \textsc{lbl}\ \boxed{1}\\ \textsc{scope}\ \boxed{2}\\ \textsc{event-str}\ F_{perf}\left(\boxed{6},\boxed{3}\right)\\ \textsc{binds}\ \left\langle \boxed{3} \right\rangle\end{array}\right], \left[\begin{array}{l}\textit{process-rel}\\ \textsc{lbl}\ \boxed{2}\\ \textsc{event-str}\ \boxed{3}\left[\begin{array}{l}\textsc{event}1\ \boxed{1}\textit{process}\\ \textsc{restr}\ \textit{restr}\end{array}\right]\end{array}\right] \right\rangle \end{array}\right]$$

Figure 3: combination perfective-process

3.2 Imperfective functor

The imperfective functor consists of two arguments and is a type-selecting operator as well. It selects process eventualities and returns an output of the same eventuality as the input. When it combines with transition eventualities, it selects only the *process* subeventuality which is appropriate for its selection type.

This is guaranteed with the constraint in (19b), where when the input is a *process* the output is a *process* as well. When the input is a *transition* then the output is just the *process* subevent (19c).

(19) a. $F_{impf}(X,Y) = Z$

b. if Y=$\left[\text{EVENT1 } \textit{process}\right]$, then Z= Y$\left[\text{EVENT1 } \textit{process}\right]$

c. if Y =$\begin{bmatrix}\text{EVENT1 } \boxed{1}\textit{process}\\ \text{EVENT2 } \boxed{2}\ \textit{state}\end{bmatrix}$, then Z =$\left[\text{EVENT1= } \boxed{1}\ \textit{process}\right]$

When the imperfective functor indicated by the *imperf-rel* combines with eventualities of type *process-rel*, it selects through the BINDS feature the whole EVENT-STR of the *eventuality-rel*. The EVENT-STR of the *imperf-rel* is the same as the EVENT-STR of the *process-rel* and this is indicated with the coindexing of the tag [3] in figure 4.

$$\begin{bmatrix} \textit{mrs} & & \\ \text{HOOK} & \begin{bmatrix}\text{LTOP } \boxed{1}\\ \text{INDEX } \boxed{6}\end{bmatrix} & \\ \text{RELS} & \left\langle \begin{bmatrix}\textit{imperf-rel}\\ \text{LBL } \boxed{1}\\ \text{SCOPE } \boxed{2}\\ \text{EVENT-STR } F_{impf}\left(\boxed{6},\boxed{3}\right)\\ \text{BINDS } \boxed{3}\end{bmatrix}, \begin{bmatrix}\textit{process-rel}\\ \text{LBL } \boxed{2}\\ \text{EVENT-STR } \boxed{3}\begin{bmatrix}\text{EVENT1 } \boxed{1}\textit{process}\\ \text{RESTR } \{\}\end{bmatrix}\end{bmatrix} \right\rangle \end{bmatrix}$$

Figure 4: combination imperfective-process

When the *transition-rel* combines with the *imperf-rel*, then the *imperf-rel* strips the *transition-rel* of its culmination point and consequent state which is the EVENT2 (figure 5). This is guaranteed by the constraint in (19c).

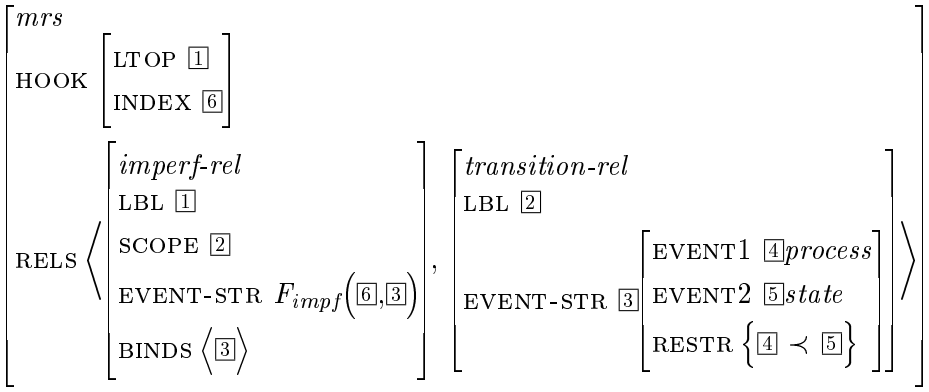

Figure 5: combination imperfective-transition

4 Conclusion

In this paper, I have presented a formal analysis of the combination between grammatical aspect and eventuality types. I have shown that in M.G., there are eventuality types , which combine with the morphologically overt grammatical aspect. This combination triggers particular meanings, which depend on the eventuality type used. There is the view that when the meanings inferred are the non-standard ones, then they can be explained with the use of contextual operators.

I argue against such a contextual interpretation on the ground that it is not possible to appropriately constrain contextual operators. Thus, I provide an analysis where the eventualities consist of subeventual templates and grammatical aspect selects each time an appropriate subeventuality as input according to its selectional restrictions. Particular meanings are inferred which are already there in the denotation of the eventuality and they just need to be picked up by grammatical aspect. Hence, no extra material is needed intervene in the denotation.

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Control, raising and case: From the perspective of passives

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Abstract

Since Pollard and Sag (1994) it has been assumed that raising involves full structure sharing, whereas a control verb merely shares content information of one of the lower verb's arguments. In this paper we discuss the difference between raising and control from the perspective of Dutch and German passives. It has already been shown by Van Noord and Kordoni (2005) that the secondary object passives in these languages are raising structures, in which the case of the raised argument changes. In this paper we provide additional evidence for the raising analysis, and we propose a new analysis, which allows for a uniform account of Dutch and German passives as raising structures. Przepiórkowski and Rosen (2004) show that control may exhibit case transmission; the data presented in this paper shows that raising may not. Therefore, we claim that the distinction between raising and control is found in theta-role assignment. Syntactically they tend to behave differently, but they may also behave in the exact same way.

1 Introduction

In this paper we examine the definitions of raising and control in relation to passives in German and Dutch. Both languages have two (non-stative)[1] passives; in German we distinguish the "agentive" passive with the auxiliary *werden* and the dative passive with the auxiliaries *erhalten*, *bekommen* and *kriegen*. Arguments in accusative case become the subject of an agentive passive, whereas arguments in the dative case becomes subject of a dative passive. In Dutch we distinguish an agentive passive with the auxiliary *worden* and a secondary object passive with the auxiliary *krijgen* (the *krijgen*-passive). Direct objects become subject of an agentive passive, secondary objects become subject of a *krijgen*-passive. The (Dutch) example in (1) reveals an active sentence in (a), its agentive passive in (b) and its *krijgen*-passive in (c).

(1) a. Peter biedt hem een biertje aan.
Peter.subj offers him.obj2 a beer.obj PART
"Peter offers him a beer."

b. Hem wordt (door Peter) een biertje aangeboden.
him.obj2 becomes (through Peter) a beer.subj offered
"A beer is offered to him (by Peter)."

[†]Many warm thanks to Gertjan van Noord for making the CLEF corpus with search tools available to us, and for his useful remarks and feedback. We also thank Emilia Ellsiepen, Alexandros Poulis and an anonymous reviewer for their feedback on earlier versions of this paper, and the participants of the HPSG conference 2006 for comments and discussion during the presentation. Finally we would like to thank Stefan Müller for providing useful comments and criticism.

[1]The stative passives in German and Dutch formed with *sein* (German) and *zijn* (Dutch) go beyond the scope of this paper and will not be discussed here.

c. Hij krijgt (van Peter) een biertje aangeboden.
he.subj gets (from Peter) a beer.obj offered
"He is offered a beer (by Peter)."

In the first part of this paper, the Dutch *krijgen*-passive will be compared to the German dative passive (henceforth the dative passive and *krijgen*-passive will be refered to as *passive2*). It will be argued that both Dutch and German passive2 differ from the English *get*-structure. Additional evidence supporting this claim for Dutch will be provided. In previous work on the German and Dutch passive2 carried out by Müller (2002) (for German) and Van Noord and Kordoni (2005) (for Dutch), it has been shown that these passives are raising structures. The evidence provided by Van Noord and Kordoni (2005) will be presented briefly with new data from the CLEF-corpus.[2]

The second part of this paper will provide a description of the treatment of raising in HPSG. It will be shown that current assumptions concerning the syntax of raising in combination with the standard vision of structural case do not allow these passives to be analysed as pure raising structures. Different solutions to this problem which do not alter the treatment of raising have been proposed by Gunkel (2003) and Van Noord and Kordoni (2005). We will discuss these solutions, and in addition, provide an alternative that will reconsider the syntactic behaviour of raising.

The conclusion and outlook will present the advantages and disadvantages of proposals made in the previous part. We will argue that the Dutch and German data presented in this paper suggests that the syntax of raising needs to be reconsidered. However, additional research including more languages is necessary to see whether the treatment of raising in HPSG needs to be revised.

2 The syntax of passive2

2.1 The difference between Dutch and German second passives

The German dative passive takes dative arguments and turns them into subjects. The datives that become subjects can be part of a ditransitive, but this is not necessarily so as the example[3] below reveals.

(2) a. Viele haben ihm geholfen /gratuliert /applaudiert.
many.nom have him.dat helped /congratulated /applauded
"Many have helped/congratulated/applauded him."

[2]The Dutch CLEF corpus was formed during the CLEF (Cross-Language Evaluation Forum) workshop in 2001. It consists of over 4 million sentences coming from newspaper articles (coming from NRC handelsblad and Algemeen Dagblad) published in 1994, 1995.

[3]Example (2b) comes from Wegener (1985) (p. 134). Several linguists that are native speakers of German (among others Gerdes (2002), and Müller (2002)) have shown examples where *helfen* is passivised in a dative passive, but not all German speakers accept them. We use this example, because it is relevant for the analysis suggested by Gunkel (2003).

b. Er kriegte von vielen geholfen /gratuliert /applaudiert.
he.nom got by many helped /congratulated /applauded
"He was helped/congratulated/applauded by many."

(3) a. Ich sage dir wann es fertig sein soll.
I.nom tell you.dat when it ready be must
"I will tell you when it must be ready."

b. Du bekommst (von mir) gesagt wann es fertig sein soll.
you.nom get by me told when it ready be must
"You'll be told (by me) when it must be ready."

In general only nominative and accusative are marked in Dutch. Only the third person plural pronoun has three forms, the nominative form *zij* and the forms *hen* and *hun*. Officially, the pronoun *hun* is used for secondary objects and a small set of direct objects. For other direct objects and complements of prepositions *hen* should be used. Therefore, *hun* could be seen as a dative and *hen* as the accusative case. However, most Dutch speakers do not distinguish the two forms and it is often claimed that Dutch does not distinguish dative case. In the Dutch *krijgen*-passive, as was mentioned above, the subject of the sentence corresponds to the secondary object of the active counterpart. Transitive verbs in Dutch cannot occur as the verbal complement of a *krijgen*-passive, even if the direct object should (officially) occur with the 'dative' pronoun *hun*. Dutch examples which are similar to (2b) and (3b) are ungrammatical, as shown in (4b).

(4) a. Peter heeft hun geantwoord.
Peter.nom has them.dat answered
"Peter has answered them."

b. * Zij krijgen geantwoord.
they.nom get answered
"They were answered." (intended)

(5) a. Ik zeg hun wanneer het af moet zijn.
I.nom tell them.dat when it ready must be
"I will tell them when it must be ready."

b. * Zij krijgen (door mij) gezegd wanneer het af moet zijn.
they.nom get by me told when it ready must be
"They will be told (by me) when it must be ready."

Examples (2) and (4) show that the Dutch and German passive2 are different; in German the auxiliary selects an argument based on its case, whereas in Dutch the auxiliary selects the secondary object. Note that in neither language the passivisation is completely systematic. A detailed discussion goes beyond the scope of this paper, but we refer the reader to Müller (2002), who suggests that the possibility to use the dative passive is related to accusativity. Some German speakers do

not accept (2b). For these speakers the German dative passive may have the similar restrictions as the Dutch *krijgen*-passive.[4]

2.2 The Dutch *krijgen*-passive and the English *get*-structure

It has been argued that the German passive2 is not a real passive, and that it behaves like the English *get*-structure. The English *get*-structure allows for the introduction of a new argument, as shown by Woolford (2006). Her example is presented in (6) below.[5]

(6) a. Pat got/had three papers accepted.
b. * They accepted Pat three papers.

The correspondence between a (possible) dative argument and the German dative passive and a secondary object and the Dutch *krijgen*-passive is obligatory. The German dative passive and the Dutch passive2 differ, thus, from the English *get*-structures. Additional evidence for the correspondence between a *krijgen*-passive in Dutch and the presence of a secondary object comes from Dutch causative-movement verbs. Verbs like *werpen* (throw), *schoppen* (kick) and *slaan* (hit) have two subcategorisation frames in Dutch. They are either transitive or they subcategorise for a subject, a direct object, a secondary object and a locative prepositional phrase. Ditransitive structures with these verbs are ungrammatical. As the examples below reveal, the locative is obligatory in case of a *krijgen*-passive as well.

(7) a. * Ik werp hem de bal.
I throw him the ball

[4]Van Noord and Kordoni (2005) show that the Dutch *krijgen*-passive may also occur when the direct object is not overtly realised. They present the following examples with the verbs *(door)betalen* ((to continue) to pay) and *uitkeren* (to pay out (benefits)), which may form a dative passive, even when their direct object (*salaris* (salary), for instance, in the case of *(door)betalen*) is not syntactically overt:

(1) a. Hij wordt doorbetaald.
he.subj is paid-through
"He is being paid."
b. Hij krijgt doorbetaald.
he.subj gets paid-through
"He is getting paid."

(2) a. Hij krijgt uitgekeerd.
he.subj gets paid-out
"He is getting paid out benefits."
b. Hij wordt uitgekeerd.
he.subj is paid-out
"He is being paid out."

[5]Example from Woolford (2006) (examples (41) and (42), p.17).

"I throw the ball at him." (intended)

b. * Hij krijgt de bal geworpen.
he gets the ball thrown
"The ball is thrown at him." (intended)

c. Ik werp hem de bal in de handen.
I throw him the ball in the hands
"I throw the ball in his hands."

d. Hij krijgt the ball in de handen geworpen.
he gets the ball in the hands thrown
"He receives the ball thrown in his hands."

Examples (7a) and (7d) show that in Dutch the *krijgen*-passive can only occur if the passivised verb takes a secondary object. Additional evidence for this claim can be found in the evidence that the *krijgen*-passive is a raising construction, provided by Van Noord and Kordoni (2005). This evidence will be briefly presented in the next section.

2.3 Evidence for a raising analysis

Having established that the subjects of these passives correspond to arguments of the passivised verb, the question now rises whether the passive2 of German and Dutch are instances of raising or control. Müller (2002) provides evidence that in the German dative passive the subject is raised, Van Noord and Kordoni (2005) show that this is also the case for Dutch *krijgen*-passives. Due to lack of space, we will restrict ourselves to a brief representation of the evidence provided by Van Noord and Kordoni (2005).

Pollard and Sag (1994) discuss various differences between raising and control; the essential (and a well established) difference concerns theta-role assignment. A control verb assigns a theta-role to its controlled argument, whereas a raising verb does not, as stated in the raising principle. Throughout this paper, we will use this criterion to decide whether a construction is an instance of raising or control. The evidence provided by Van Noord and Kordoni (2005) supports the claim that the auxiliary *krijgen* does not assign a theta-role to its subject.

Raising structures — in contrast to control structures — do not allow for their verbal complement to be pronominalised. Van Noord and Kordoni (2005) show that the *krijgen*-passives behave in the same way as the raising verb *schijnen* (seem) in (8b)-(9b), and differently from a control verb such as *proberen* (try) in (8c)-(9c). Examples (8) and (9) reveal that *krijgen* behaves like a raising verb in matters of verb phrase pronominalisation (VPP).[6]

(8) a. * Hij krijgt uitbetaald en Piet krijgt dat ook.
he gets paid and Peter gets that too

[6]These examples were taken from Van Noord and Kordoni (2005), (examples (24)-(29) , p.418-419).

"He gets paid and so does Peter. (intended)"

b. * Ik schijn te winnen en mijn tegenstander schijnt dat ook.
I seem to win and my opponent seems it too
"I seem to win and so does my opponent. (intended)"

c. Ik probeer te winnen en mijn tegenstander probeert dat ook.
I try to win and my opponent tries that too
"I try to win and so does my opponent."

(9) a. * Uitbetalen bij ziekte? Nee, dat krijg ik niet.
PART-pay in case of illness? No, that get I not
"To pay in case of illness? No, that I don't get."

b. * De wedstrijd winnen? Ja, dat schijn ik.
the match win? yes, that seem I
"To win the match? Yes, that is what I seem."

c. De wedstrijd winnen? Ja, dat probeer ik.
the match win? yes, that try I
"To win the match? Yes, that is what I try."

Additional evidence comes from the fact that *krijgen*-passives are found, in expressions where the direct object and the ditransitive verb form an idiom. Van Noord and Kordoni (2005) provide several examples of 'more fixed primary objects'. We only present one example here: the passive comes from the CLEF-corpus, an active variant is presented in (10b).[7]

(10) a. Weet je wel wat-ie allemaal naar z'n hoofd krijgt geslingerd?
know you well what.obj-he.subj all to his head gets PART-swing
"Do you have any idea how much he is insulted?"

b. Weet je wel wat ze hem allemaal naar z'n hoofd slingeren?
know you well what.obj they.subj him.obj2 all to his head gets-swing
"Do you have any idea how much they insult him?"

Moreover, the main verb *krijgen* means "to receive"; in many examples of *krijgen*-passives, the subject clearly cannot have a role of a receiver:[8,9]

[7] Example (10a) from the CLEF-corpus AD19940221-0098-702-11.

[8] Example (11) from the CLEF-corpus AD19940221-0098-702-11.

[9] As was mentioned above, we limit ourselves to evidence that the Dutch *krijgen*-passive is raising. The point made with (11) has been made before for German. Classical examples can be found in Müller (2002), who refers to Reis (1976), Eroms (1978), Askedal (1984) and Wegener (1985) for discussion on this matter. For additional examples in Dutch see Van Noord and Kordoni (2005).

(11) ... Later kreeg Raas in de donkere hal een pistool tegen het
... later got Raas.subj in the dark hall a pistol.obj1 against the
hoofd gedrukt.
head pressed
"Later, in the dark hallway a pistole was pressed against Raas' head."

This can also be seen in the fact that we found *krijgen*-passives in our corpus with verbs such as *influisteren* (to whisper in), *lezen* (to read), *toeschreeuwen* (to shout at) and *vragen* (to ask). Taking this evidence in consideration, it is clear that the auxiliary *krijgen* should be considered a raising verb.

3 Raising and the Dutch and German passive2

3.1 The problem of the Dutch and German passive2

Although Müller (2002) provides —in our opinion— convincing evidence that the German passive2 is a raising structure, the analysis he proposes for the dative passive does not conform to the syntactic properties that raising has under current assumptions in HPSG. In this part we will discuss why the passive2 is problematic for the standard analysis of raising in HPSG.

As was mentioned above, raising and control are distinguished through theta-role assignment. Pollard and Sag (1994) also point out a syntactic difference between raising and control, mainly based on work on Icelandic by Sag et al. (1992). It is assumed that in the case of raising, the entire synsem of the raised argument is structure shared with an argument of the verbal complement, whereas in the case of control merely information from the NP's content is token identical. However, as noted in Pollard and Sag (1994), this syntactic difference is not as well established as the semantic difference. Some Icelandic speakers for instance, accept sentences in which the controlled argument has kept the case assigned by the lower verb.[10] We will maintain the idea that raising and control differ in theta-role assignment. The syntax of raising may differ from the syntax of control in the sense that it always entails full structure sharing, but this is still an open question.

The idea that raising involves structure sharing of the entire synsem, whereas control does not, has been generally adopted by researchers dealing with these phenomena in HPSG. Token identity of the synsem of an NP entails token-identity of the case it bears. Many languages have matrix verbs that trigger subject-to-object raising, where an argument normally bearing nominative case occurs in accussative case when it is raised. In order to account for these structures, the distinction between structural and lexical case previously used in theories such as *Government and Binding Theory* has been introduced in HPSG. An argument bearing a structural case may bear a different case when raised to a different syntactic position. If

[10] In the meantime, additional evidence from other languages has shown that control indeed may or may not exhibit case transmission, and thus can behave like raising on the syntactic level.

an argument bearing a lexical case is raised, its case will be preserved. Following Przepiórkowski (1999), we will assume that structural cases are assigned according to their position on the dependency list, and that raised arguments, marked [RAISED +] are exempt from this case assignment principle. This analysis allows for structural cases to change when an argument is raised. Lexical cases will be preserved, because they are not assigned by a case assignment principle.

Heinz and Matiasek (1994) show which cases in German are structural and which cases are lexical.[11] They show that accusative, nominative and genitive cases are generally structural, though both accusative and genitive may be lexical, as well. The dative is a lexical case in German. Under the definition of lexical case used in Heinz and Matiasek (1994), the analysis proposed in Van Noord and Kordoni (2005) may also be taken to assume that the Dutch secondary object could bear a lexical case, as well. If the German and Dutch passive2 are instances of raising, as has been proposed by Müller (2002) and Van Noord and Kordoni (2005), the raised argument should keep its lexically assigned case. However, as the examples in Section 2 have shown, the subjects of the Dutch and German passive2 bear a nominative case. It is therefore not possible to analyse these passives as true raising structures under standard assumptions of HPSG. The next section will present previously proposed solutions to this problem.

3.2 Three solutions to analyse German and Dutch passives as raising

There are several ways to analyse the passive2 as raising, despite the contradiction presented in the previous section which differ from a theoretical point of view. The origin of the problem lies in the combination of two assumptions: the assumption that the argument raised in a passive2 bears a lexical case, and the assumption that raising involves case transmission. One solution may be to maintain the assumptions concerning the syntax of raising as well as the definitions of structural and lexical case. In this case an additional mechanism must be introduced to allow for the passive2 to be analysed as a true raising structure. Such a mechanism has been proposed by Van Noord and Kordoni (2005).

Another solution, which has been persued by Gunkel (2003) for German, maintains the syntactic analysis of raising, but changes the status of the dative case in German and the case of the secondary object in Dutch: if these cases are structural instead of lexical, they are expected to change into a nominative when the argument is raised to a subject position. A third way this problem may be solved would be to abandon the assumption that raising necessarily involves structure sharing of the complete synsem. To our knowledge this solution has not been proposed before, though if the analysis of the auxiliary *bekommen* proposed by Müller (2002) is to be taken as a true raising analysis, it has been adopted implicitly in Müller (2002).

[11] As was pointed out to us by Stefan Müller, the distinction proposed in Heinz and Matiasek (1994) goes back to Haider (1985). Not all linguists agree on the status of the dative (as can be seen for instance in the proposal made by Gunkel (2003)). Evidence has been provided by Haider (1985), and can also be found in Müller (2002).

This section will briefly present the first two solutions, the third solution will be presented in Section 3.3. Advantages and disadvantages of each proposal will be discussed. During the discussion we will respect the following assumptions: firstly, it depends on theta-role assignment whether a structure is an instance of raising or control. It is an empirical question whether they reveal different syntactic behaviour, as well. Secondly, we assume that the syntactic behaviour of raising may universally involve structure sharing of the entire synsem, but this may as well be a language specific property, or it may depend on the raising verb. Thirdly, if a verb has an argument which bears a lexical case, this case is maintained when a raised (or controlled) argument has a token-identical synsem. Furthermore, we assume that "agentive" passives and the passive2 ought to be analysed in a similar way.

Van Noord and Kordoni (2005) propose an object-to-subject raising function which allows for the case to change when raising occurs. Their function is presented in Figure 3.2 below.

$$\text{raise_to_subject}\left(\left[\begin{array}{l}\text{LOC}\ \left[\begin{array}{l}\text{CAT}\ \left[\begin{array}{ll}\text{HEAD} & \left[\text{CASE}\ \mathit{case}\right]\\ \text{SUBCAT} & \boxed{1}\\ \text{LEX} & \boxed{2}\end{array}\right]\\ \text{CONTENT}\ \boxed{3}\\ \text{CONTEXT}\ \boxed{4}\end{array}\right]\\ \text{NONLOC}\ \boxed{5}\end{array}\right]\right) \longrightarrow$$

$$\left[\begin{array}{l}\text{LOC}\ \left[\begin{array}{l}\text{CAT}\ \left[\begin{array}{ll}\text{HEAD} & \left[\text{CASE}\ \mathit{nom} \vee \mathit{acc}\right]\\ \text{SUBCAT} & \boxed{1}\\ \text{LEX} & \boxed{2}\end{array}\right]\\ \text{CONTENT}\ \boxed{3}\\ \text{CONTEXT}\ \boxed{4}\end{array}\right]\\ \text{NONLOC}\ \boxed{5}\end{array}\right]$$

Figure 3.2: Definition of the function raise_to_subject()

When the raise-to-subject function applies, all features of the synsem are structure shared, except for the case value. Linguists who have criticised this analysis have argued that this analysis is a computational trick. This might be true, but it is the only way to analyse the German and Dutch passive2 as true raising structures under current HPSG assumptions. Moreover, if we want to maintain that the complete synsem is shared in raising, their analysis describes exactly what is going on: all values of the synsem are token-identical, but somehow the case value "slips through" this unification constraint and the case changes. On the other hand, the passive2 is a raising structure and the case of the raised argument is not main-

tained, contrary to the prediction made by full structure sharing. Therefore, this passive may indicate that either assumptions about raising, or assumptions about the case of the raised argument are not correct. The other proposal presented here, as well as the proposal made in the next section, assume that the passive2 provides evidence for one of these two claims.

Lutz Gunkel proposes an analysis that assumes that a dative in German may be structural. A difficulty with this assumption, when assigning structural case as proposed by Przepiórkowski (1999), is that structural case is assigned according to the position of the argument on the list of the dependents of the verb. In general, it would be possible to assume that the structural dative is assigned to the secondary object, but as example (2b) above has shown, a dative passive may also occur with a bivalent verb.

Gunkel (2003) proposes that German has two structural cases: the first, *struc1*, is either nominative or accusative, the second, *struc2* is either nominative or dative. Ditransitives, as well as transitive verbs, like *helfen*, select for an argument bearing a *struc2* case. When this argument is not raised, it will bear a dative case. When raised to the subject, it becomes the external argument of the structure and it will bear a nominative case. This analysis works, but it renders the perception of case more complicated. It seems that only dative passives support the claim concerning the existence of two structural cases. Unless there is supplementary evidence for these two different kinds of structural cases, an alternative analysis avoiding such a complication would be preferable.[12]

Both of the solutions presented above involve a complication of the grammar (by assuming a more elaborate case system in German or by an additional mechanism) in order to maintain the idea that a raising structure must involve structure sharing of the complete synsem. The next section will present a third solution, which provides a simple analysis for Dutch and German passives. This analysis consists in a revision of the syntactic behaviour of raising.

3.3 Bringing raising and control closer

As was mentioned above, the hypothesis that raising entails token-identical synsems is based on evidence coming from Icelandic quirky cases. In their discussion of this analysis, Pollard and Sag (1994) suggest that control may (sometimes) have the same properties as raising. In order to solve the problems with the German and Dutch analysis, we suggest to turn this idea around: raising may (sometimes) have the same properties as control. Looking at Dutch and German examples in this paper, it is not clear what can be gained by structure-sharing the complete synsem. It seems to introduce more problems than it solves. It is an empirical question whether the syntactic behaviour of raising in Icelandic is a universal property of raising.

[12] For a detailed critical discussion of Gunkel (2003)'s proposal, see Müller (2007).

Przepiórkowski and Rosen (2004) describe the behaviour of raising and control in Czech. Their paper shows that raising generally involves full structure sharing, whereas control may or may not share the complete synsem. However, it does not seem to be the case that raising necessarily involves full structure sharing. Przepiórkowski and Rosen (2004) observe the following:

"From this perspective, it is worrisome that (...) some speakers of Czech (about 12 percent) accepted the following raising construction without case transmission:

(12) a. ??Bylo vidět dost lidí vracet se od okénka
was seen enough.nom people.gen return from counter
nespokonjení.
dissatidfied.nom
"One could see quite a few people return from the counter dissatisfied."

(Przepiórkowski and Rosen (2004) p.41)"

Apparently, not all raising structures entail structure sharing of the entire synsem. If this is the case, the problem presented in Section 3.1 could be solved by simplifying the analysis of raising and assume that raising — at least in Dutch and German — may involve structure sharing of content information only. This would mean that the analysis for the German dative passive remains as proposed by (among others) Müller (2002), but they will now be considered a "true" raising structure. In order to provide a uniform analysis of passives in Dutch and German without supplementary mechanisms, the analyses proposed for the German agentive passive and for the two Dutch passives are changed. To illustrate the analysis, a part of the lexical entry for the passive auxiliaries *krijgen* and *worden* are presented in (13) and (14), respectively.

(13) *krijgen* (secondary object raising auxiliary)

$$\left[\begin{array}{l} \textsc{subcat} \left\langle \left[\begin{array}{l} \textsc{cat}|\textsc{head}\ \textit{noun}\left[\textsc{case}\ \textit{nom}\right] \\ \textsc{content}\ \boxed{1} \end{array}\right] \right\rangle \oplus \boxed{2} \oplus \boxed{3} \\ \textsc{xcomp} \left\langle \mathrm{V} \left[\begin{array}{l} \textsc{lex}\quad + \\ \textsc{subcat}\ \boxed{2} \oplus \left\langle \left[\begin{array}{l} \textsc{cat}|\textsc{head}\ \textit{noun}\left[\textsc{case}\ \textit{dat}\right] \\ \textsc{content}\ \boxed{1} \end{array}\right] \right\rangle \oplus \boxed{3} \\ \textsc{xcomp}\ \langle\rangle \end{array}\right] \right\rangle \end{array}\right]$$

(14) *worden* (object raising auxiliary)

$$\left[\begin{array}{l}\text{SUBCAT}\ \left\langle\left[\begin{array}{l}\text{CAT}|\text{HEAD}\ \textit{noun}\left[\text{CASE}\ \textit{nom}\right]\\ \text{CONTENT}\ \boxed{1}\end{array}\right]\right\rangle\oplus\boxed{2}\oplus\boxed{3}\\ \text{XCOMP}\ \left\langle\text{V}\left[\begin{array}{ll}\text{LEX} & +\\ \text{SUBCAT} & \boxed{2}\oplus\left\langle\left[\begin{array}{l}\text{CAT}|\text{HEAD}\ \textit{noun}\left[\text{CASE}\ \textit{acc}\right]\\ \text{CONTENT}\ \boxed{1}\end{array}\right]\right\rangle\oplus\boxed{3}\\ \text{XCOMP} & \langle\rangle\end{array}\right]\right\rangle\end{array}\right]$$

In this analysis *krijgen* and *worden* are analysed in the same manner as *bekommen* is analysed by Müller (2002). The difference lies in the fact that under our analysis raising does not entail full structure sharing. Therefore, these structures are instances of raising, despite the fact that they do not exhibit case transmission. Another difference between the analysis for *bekommen* proposed by Müller (2002) and our analysis is that no distinction has been made between structural and lexical case. We have not used this distinction in our representation, for we are not convinced that structural and lexical case need to be distinguished in Dutch. A detailed discussion on this matter goes beyond the scope of this paper. If it would turn out to be linguistically motivated, the analysis can easily be adapted to use structural and lexical case.[13]

Van Noord and Kordoni (2005) note that the raised argument in a passive does not always bear a nominative case. If the passive occurs as the complement of the verb *zien* (see), it will bear the accusative case. This is demonstrated in the following example.[14]

(15) Ik zie hem gekust worden.
I.nom see him.acc kissed be
"I see him being kissed."

(16) Ik zie hem het boek toegestuurd krijgen.
I.nom see him.acc the book PART-sent get
"I see that he gets the book sent to him."

This data does not present a problem for the analysis proposed above: the verb *zien* in these examples assigns an accusative case to the subject of its complement. The passive auxiliaries behave thus in the same way as any other verb, as shown in example (17).

[13]Note that in our analysis, we assume the feature structure of the sign as presented in Pollard and Sag (1994); CONTENT contains person, number and gender. If one were to base the analysis on Sag et al. (2003), agreement information is a head feature, and will not be shared. However, this does not pose a problem in the case of passives because the raised argument need not agree with anything in the lower clause. If one does want to maintain agreement information and assume Sag et al. (2003), these passives can only be analysed with the raise_to_subject function proposed by Van Noord and Kordoni (2005).

[14]Example from Van Noord and Kordoni (2005) examples (20) and (21) p.417.

(17) Ik zie hem lopen.
I.nom see him.acc walk
"I see him walking."

A detailed analysis of the structure presented in examples (15), (16) and (17) goes beyond the scope of this paper. Following the analysis we propose for passives, a logical solution would be to suppose that *zien* (see) in these structures raises the subject of the verb in the lower clause without structure sharing the case value. The analysis presented in this section seems preferable to the analyses presented in Section 3.2, for it provides a simple uniform account for passives, without using an additional mechanism or a second structural case. It must be noted, though, that this analysis can only be used, if one abandons the assumption that raising involves full structure sharing. As mentioned in Section 3.2, if one wants to maintain the idea that full structure sharing — and thus case transmission — is a universal property of raising, a mechanism as proposed by Van Noord and Kordoni (2005) must be used to account for these passives.

4 Conclusion and Outlook

In this paper we have provided a description of Dutch and German passives and introduced corpus-based observations of the Dutch *krijgen*-passive. Following Müller (2002) and Van Noord and Kordoni (2005), we consider Dutch and German passives to be instances of raising. Evidence showing that the Dutch *krijgen*-passive is indeed a raising structure has been presented. Section 3.1 has shown that it is not possible to analyse these passives as true raising structures, if one wants to maintain the standard vision on the syntax of raising, the status of the German dative and the case of secondary objects in Dutch. Two solutions have been proposed: both maintain the syntactic description of raising given in Pollard and Sag (1994). The first solution requires the use of an additional mechanism, such as the raise_to_subject function proposed by Van Noord and Kordoni (2005). The second analysis changes the status of the German dative. It has been shown that this analysis results in a more complex case system for German.

The solution proposed by Van Noord and Kordoni (2005) is in our opinion preferable to the solution proposed by Gunkel (2003) for two reasons. Firstly, as mentioned above, there is hardly any evidence for the existence of two structural cases in German. Secondly, when raising must always (universally) entail structure sharing of the complete synsem, a mechanism similar to the object-to-subject-raising function proposed by Van Noord and Kordoni (2005) can be used to account for examples like (12a), which showed that some Czech speakers allow for the lexical case of a raised argument to change.

Section 3.3 has introduced a more radical solution, which would allow for a simple uniform analysis for the four passives. In this solution the syntactic difference between raising and control is abandoned. The advantage of the last solution

is that it provides a simpler and more straightforward account than the other two. If additional research would show that the syntactic behaviour of raising is not universal, we believe that the analysis given in Section 3.3 provides the best account for German and Dutch passives.

However, as we mentioned above, it is an empirical question whether raising syntactically differs from control. Dutch and German passives seem to indicate that raising and control can be syntactically similar and raised arguments may only share content. On the other hand, Icelandic provides evidence that the complete synsem must be structure shared in raising structures. It has been shown in this paper that, even though sharing of content only seems preferable, it is possible to share the complete synsem in Dutch and German raising with the analysis proposed by Van Noord and Kordoni (2005). Therefore, it is too early to completely abandon the hypothesis that the complete synsem should be structure shared.

The Czech data presented by Przepiórkowski and Rosen (2004) seems to be the best evidence for the behaviour of raising at this point: a raising verb tends to raise the complete synsem of the raised argument, but, just like control sometimes behaves like raising and shares the entire synsem, raising sometimes behaves like control and does not exhibit case transmission. Raising generally entails structure sharing of the complete synsem, but this property may either be universal, or language specific. It might also depend on the raising verb or even on the speaker. We therefore suggest that the syntactic behaviour of raising should be re-investigated. Further research will expand the data and look for cross-linguistic evidence to clarify the syntactic behaviour of raising.

At this point, Dutch and German passives can either be analysed using the *raise_to_subject* function proposed by Van Noord and Kordoni (2005), or according to the analysis proposed in Section 3.3. Regardless of the analysis used to account for this data, German and Dutch passives show that it is not possible to maintain that raising always involves case transmission. This observation, in combination with the survey presented by Przepiórkowski and Rosen (2004), which shows that control can exhibit case transmission, leads to the conclusion that the syntactic differences between raising and control must be considered as tendencies and are not properties of the phenomena themselves.

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Reinforcing negation: The case of Italian

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We study the formal and pragmatic properties of the 'reinforced negation construction' in Italian, which, unlike the regular negative sentence, contains both *non* and an n-word in preverbal position. On the one hand, this construction relies on a more general construction (positive or negative), which is pragmatically associated with reprise assertion, on the other hand, it uses *non* without the usual constraints attached to it. We propose that this unfaithful recycling is a pattern for creating a form dedicated to metalinguistic negation. Our analysis integrates both negative types of negative forms with their formal and pragmatic properties.

1 Introduction

Italian negation displays a well-known asymmetry concerning the co-occurrence of the adverb *non* and a n-word (*nessuno* 'nobody', 'no', *niente*, *nulla* 'nothing'): if the n-word is preverbal, *non* does not occur, if it is post-verbal, *non* must occur.

(1) a. *Paolo non viene*
Paolo NEG comes ('Paolo is not coming')
b. *Nessuno viene / *Nessuno non viene*
Nobody comes / Nobody NEG comes ('Nobody is coming')
c. *Paolo non vede nessuno* / **Paolo vede nessuno*
Paolo NEG sees nobody / Paolo sees nobody
('Paolo does not see anybody')

Nevertheless, there are different cases where *non* does co-occur with a preverbal n-word: (i) the sentence has a double negation reading, with stressed *non* (*Nessuno non viene* = 'Nobody is not coming'); (ii) the n-word is included in a complex NP (*%Nessuna delle piante non sembra malata / *Nessuna non sembra malata* 'None of the plants NEG looks sick'); (iii) the negation is 'reinforced'. Cases (ii) and (iii), which are noted in Benincà et al. 1988, Manzotti and Rigamonti 1988, are characterized by variable acceptability (noted %). Here we concentrate on case (iii) which belongs to an informal register. It is illustrated in (2) where small capitals stand for some recognizable prosodic marking. For this study, our informants are under 40 and from Northern Italy.

(2) *%NIENTE non ho fatto*
Nothing NEG I.have done ('I have not done anything')

In this paper, we show that the construction in (2) is used to express proposition denial, the core case of metalinguistic negation. Assuming with Kiparsky and Condoravdi 2006 that the existence of reinforced negation alongside the regular negation ('emphatic' vs 'simple' in their terms) stems from the need to formally express metalinguistic negation, we propose that

there exist two different ways to achieve this goal: in addition to including indefinites in the negative system, which has been the focus of much attention, there is the possibility of recycling negative material, under conditions which violate their properties in the descriptive use (for a more detailed presentation, see Godard and Marandin 2006). We analyze the construction in (2), integrating the syntax and the syntax-semantic interface of the reinforced negation with those of the regular negation in (1), and relating its formal properties to its pragmatics.

2 Properties of the Reinforced Negation Construction

2.1 Formal Properties

The 'reinforced negation' construction illustrated in (2) has the following properties:
– The sentence begins with a constituent containing an n-word, which can have different grammatical functions. It can be a subject (3a), a filler (2), (3b,c), or an adjunct (3d).

(3) a. *%NESSUNO non è venuto!* ('Nobody is here')
b. *%Con NESSUNO non ama parlare qui*
('With nobody does he like to talk here')
c. *%A nessuno degli STUDENTI non ha parlato*
('To none of the students has he talked')
d. *%Da nessuna PARTE, non ho visto Paolo*
('Nowhere have I seen Paolo')

– The initial constituent receives a special prosodic contour (noted by capital letters), anchored on the last word, which is not necessarily the n-word, as in (3c,d).

– The association between a specific contour and the initial constituent is not specific to the negative construction in (2); it is equally found in positive sentences (4).

(4) *A suo ex-RAGAZZO ha parlato* (Maria)
('she talked to her former boyfriend')

Finally, reinforced negation (5a,b) alternates with (3a,b), with the same pragmatic effect.

(5) a. *NESSUNO è venuto!*
b. *Con NESSUNO ama parlare qui.*

2.2 No common Information Structure behavior

It has been claimed that the initial constituent in (3)-(5) should be a Focus or a Contrastive Focus (e.g. Benincà et al. 1988). We show in this section that such a claim is wrong. We use question-answer pairs to define *Focus*, which is then the constituent that resolves the question, and we equate *Contrastive* with *Kontrastive*, viz. "it involves a set of alternatives" (Vallduví & Vilkuna 1998). Indeed, the initial constituent can be a Kontrastive Focus as in (6).

(6) A. *Suo fratello e suo cugino sono appena arrivati. Sai chi inviterà?*
('Her brother and her cousin have just arrived. Do you know who she will invite?')
B. i. *Suo* FRATELLO *non inviterà* ('She will not invite her brother')
ii. *Nessuno dei* DUE *(% non) inviterà*
('She will invite neither one nor the other')

It can be a non-Kontrastive focus as well, just as felicitously in utterances featuring a reinforced negation (7) as in positive utterances (8).

(7) A. *A chi non ha parlato Maria per tutta la serata?*
('To whom didn't Maria speak for the whole evening')
B. *%A nessuno degli* STUDENTI *non ha parlato*
('To none of the students did she speak')

(8) A. *A chi ha parlato Maria per tutta la serata?*
'To whom did Maria talk the whole evening?'
B. *A suo ex-*RAGAZZO *ha parlato* (Maria) (= (4))

Crucially, the initial constituent need not be a narrow focus. It also occurs in all focus utterances, although they are not felicitous in out-of-the-blue contexts, a restriction we take up in section 2.3 below. Again, the positive and the negative utterances behave alike as shown in (9).

(9) [A and B know each other. A tells B how the meeting went]
A. *Nanno Moretti ha fatto il suo intervento*
('Nanno Moretti gave his talk')
B. *E poi?* ('And then?')
A. i. GIOVANNI *ha applaudito fragorosamente.*
('Giovanni applauded frantically')
ii. *%*NESSUNO *non ha applaudito.* ('Nobody applauded')

And finally, the initial constituent can be a Kontrastive Topic, more precisely an S-Topic in Büring's 1997 sense, i. e. part of the Ground, as in (10).

(10) [A and B are colleagues in linguistics; they know that the exam had a syntactic and a semantic part]
A. *I tuoi studenti hanno riuscito l'esame?*
('Did your students do well at their exam')
B. i. *La* SINTASSI *hanno capito, la semantica, invece, non c'è verso!*
('They understood the syntax, but the semantics is a disaster')
ii. *%Nessuna questione di* SINTASSI *(quei cretini) non sono riusciti a risolvere! Le due questioni di semantica, invece, tutti le hanno risolte.*
('None of the syntax question did they manage to answer, the idiots, but the two semantic questions, they all solved them')

To conclude, the initial constituent does not have a fixed role in the Focus-Ground partition. It seems warranted to say that it has some sort of saliency, associated with its prosodic marking, but such a saliency should not be identified within the Ground-Focus partition. We come back to this in the next section.

2.3 Reinforced negation is associated with proposition denials

Informants report that, in question-answer pairs (6)-(10), the answers are not straightforward answers, rather they express some attitude of the speaker towards some state of affairs. For instance, in (4), it was expected that Maria would not speak to her former boyfriend, in (10) that the students do not do well in syntax or not better than in semantics. Concentrating on negative utterances with the properties described in section 2.1, we observe that they regularly convey the denial of a proposition (Geurts 1998). The proposition targeted by the denial should be activated in the current dialogue space (Dryer 1996). The target proposition may be either explicitly expressed in the preceding turn (11), or inferred as in (12), where B's assertion goes against the proposition that justifies A asking the question.[1]

(11) A. *Pietro ha letto tutti gli scritti di Einstein*
'Pietro has read all texts by Einstein'
B. *%Scherzi,* NESSUNO *(non) ne ha letto*
'You are joking, he has read none of them'

(12) A. *Allora sono arrivati i pacchi?*
'So, the packets have arrived?'
B. *%No,* NESSUNO *non ne è ancora partito!*
'No, none of them has even gone'

[1] According to our informants, for the speakers who do have the reinforced negation system, its use is obligatory when the target proposition is inferred : see (11) *vs* (12).

It is thus expected that such constructions may not occur in out-of-the-blue contexts, as already mentioned. This is illustrated in (13) with a positive utterance: answer (Bi) is not felicitous, while answers (Bii) and (Biii) without the initial salient constituent are appropriate (with or without subject inversion).

(13) [A cannot attend a certain talk; he calls the secretary to know how things are going]
A. *Come sta andando?* (How are things going?)
B. i. *# Molti* STUDENTI *sono venuti* (Many students have come)
ii. *Sono venuti molti studenti*
iii. *Molti studenti sono venuti*

Remember that the reinforced negation is never compulsory to achieve the propositional denial effect; in (11) or (12), a simple negation would do with the same pragmatics. How do we account then for the use of the reinforced negation?

We follow here Kiparsky and Condoravdi's 2006 interpretation of the 'Jespersen cycle'. Jespersen 1917 observes a tendency for languages to drag indefinites into the negation system (for instance as minimizers); they eventually become themselves negative, and may replace the initial negative item. These authors propose the following explanation. The cycle results from the working of two driving forces: (a) the need to formally express metalinguistic negation differently from descriptive negation; (b) the recurrent weakening of the metalinguistic negation form, precisely because of its expressive use. Accordingly, new forms of reinforced negation are created again and again in order to express metalinguistic negation, whose core case is proposition denial. Given that this is a process of linguistic change, it is expected that there be speaker variation, under the well-accepted view that linguistic change operates via the competition of different forms, used in different socio-linguistic conditions.

Adopting this analysis, we propose that, besides the well-known way of reinforcing negation by including indefinites in the negative system, there exists another way, which consists in the recycling of the regular negative material, the recycled items being associated with constraints that are different from those of the descriptive negation. Italian uses both forms of reinforced negation. The former relies on an indefinite and yields the *non … mica* negation (Cinque 1976, Tovena 2000, Schwenter 2006). The latter corresponds to the construction illustrated in (2): it recycles *non*, but without the ban against the co-occurrence between preverbal n-words and *non* that characterizes descriptive negation (1). The same type of reinforcement is observed in Brazilian Portuguese: it involves two negative adverbs, the former being in an ordinary pre-verbal position, and the latter in an unusual

one since it is VP final (*não V ... não*, see Schwenter 2005, 2006).

To sum up, we analyze the cooccurrence of a preverbal n-word with *non* as a form of reinforced negation. It occurs in a construction that is not restricted to negative sentences. Formally, this construction is characterized by an initial constituent compatible with several grammatical functions and which is set apart by a specific contour. Pragmatically, it conveys a reprise move expressing the speaker's non-commitment to some propositional content. Although we cannot dwell on the topic here, the initial XP represents the specific part of the content that triggers the speaker's rejection. In case the initial constituent hosts an n-word, the construction is used to express proposition denial. Some speakers choose to formally express this metalinguistic negation by using the reinforced negation "preverbal n-word + non".

3 An HPSG Grammar of Italian Negation

In this section, we propose a grammar for Italian negation, which integrates both the regular and the reinforced forms. We do not aim at discussing the numerous proposals concerning the status of n-words, negative concord (a single negation reading obtained when there are several negative items in the same domain), or the analysis of the asymmetry in (1). Essentially, we adopt the approach proposed in de Swart and Sag 2002 for French; we depart from them in extending the analysis to cases where the negation is not in an argument position, and in proposing that negative quantifiers are retrieved at phrasal nodes rather than lexical nodes. For different approaches in HPSG, see e.g. Borsley 2006, Branco and Crysmann 2001, Richter and Sailer 2006.

3.1 The analysis of *non*

We analyze *non* as an adverb adjoined to a light V, where 'light' means either a lexical V or a coordination of lexical Vs (see Abeillé and Godard 2000, 2003). The argument is as follows: while *non* may have scope over a coordination of lexical Vs, and license an n-word in a complement shared by two Vs (14), it does not have scope over a coordination of Vs with their complements, whether the V is finite, infinitive or gerund, as shown by the inacceptability of an n-word in the second conjunct in (15): [2]

(14) a. *Paolo non compra o legge nessun giornale*

[2] Note that *non* can be separated from the V by the adverb *sempre* (Kim 2000):

(i) *%Non sempre la facciamo, ma vale la pena di continuare a richierdercela.*
'We don't always do it, but it is worth continuing asking for it'

This is consistent with the present analysis if *sempre* is a light adverb adjoined to the lexical V (hence, forming a light phrase with the V head).

'Paolo does not buy or read any newspaper'

b. *Paolo non sembra comprare o leggere nessun giornale*
'Paolo does not seem to buy or read any newspaper'

(15) a. **Paolo non legge giornali e / o guarda nessuna notizia in televisione*
Put. Paolo does not reads newspapers and / or watches any news program on TV

b. **Paolo sembra non leggere giornali o guardare nessuna notizia in televisione*
Put. Paolo seems not to read newspapers or watch any news program on TV

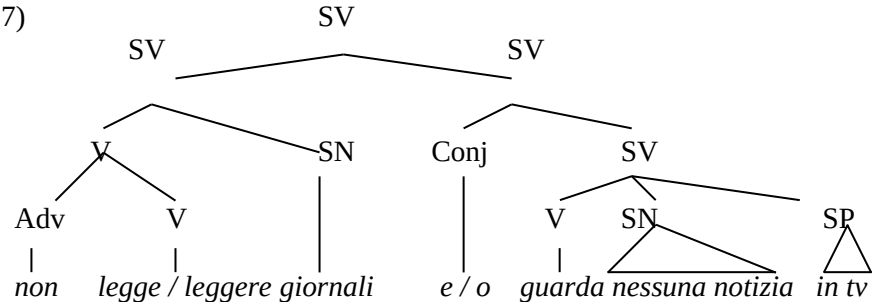
c. **Non comprando giornali e / o guardando nessun programma in televisione, Paolo vive fuori dal mondo*
Put. Not buying newspapers and / or watching any news program on TV, Paolo lives away from the world

Accordingly, we analyze unstressed *non* as in (16) (we leave aside stressed *non*), and the structure of (15a-b) as in (17). We explain below why *non* cannot have scope over the second conjunct. We assume that the negative adverb is an operator (a scopal element which does not have the semantic structure of a quantifier, but whose content is put in STORE).

(16) unstressed *non*

$$\begin{bmatrix} \text{PHON} & \textit{leaner} \\ \text{CAT}\,|\,\text{HEAD}\,|\,\textit{adverb} & \begin{bmatrix} \text{MOD} & \textit{verb} \begin{bmatrix} \text{WEIGHT} & \textit{light} \\ \text{CONT} & [2] \\ \text{STORE} & [3] \end{bmatrix} \end{bmatrix} \\ \text{CONT} & [1] \begin{bmatrix} \textit{neg-op-rel} \\ \text{SCOPE} & [2] \end{bmatrix} \\ \text{STORE} & \{[1]\} \cup [3] \end{bmatrix}$$

(17)

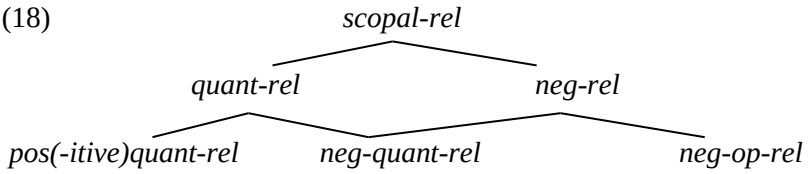


3.2 The analysis of n-words

A full discussion and justification of our analysis is outside the scope of the paper. We make the following choices:
(i) n-words are negative quantifiers in Italian (rather than indefinites or ambiguous between the two).
(ii) negative concord is obtained by the construction of a polyadic quantifier (de Swart and Sag 2002).
(iii) constraints on the retrieval of negative quantifiers account for the asymmetry in the system for descriptive negation (1).

Let us briefly justify point (i). Italian n-words have a very limited use nowadays as negative polarity items rather than negations (Przziepiórkowski 1999, Corblin and Tovena 2003). There is a consensus that they behave as NPIs when they are post-verbal in root interrogative sentences (i). There are also two other contexts where they do, but with variable acceptability: (ii) when they are post-verbal within the complement S of a negated V or an adversative predicate; and (iii) when they are preverbal in an embedded interrogative sentence. In particular, they cannot be NPIs in non negative contexts where n-words may be found in other Romance languages (such as expletive negation contexts, conditionals, comparatives). We assume that uses (i)-(iii) are the rest of an older use as polarity item, and do not belong to contemporary Italian syntax. In other words, we accept that there is a small amount of ambiguity for n-words, but unlike what is generally assumed in the ambiguity approaches to n-words, it does not take place within a homogeneous system. It comes from the co-existence of different subsystems, inherited diachronically (see Corblin 1994, Godard 2004 for French). We do not consider non negative n-words in this paper.
Accordingly, we have the partial hierarchy of scopal elements in (18):

(18)



3.3 Constructions and negation retrieval

Let us turn to the syntax-semantics interface. First, negations can occur as a non-head daughter in the following headed constructions: head-subject-cx, head-comps-cx, head-adjunct-cx, head-filler-cx.

(19) a. *head- subject -construction*
=>

$$\begin{bmatrix} head-subject-construction & \\ MOTHER & [SUBJ\ \langle\rangle] \\ HEAD\text{-}DTR & [SUBJ\ \langle [1] \rangle] \\ NON\text{-}HEAD\text{-}DTR & [SS\ [1]] \end{bmatrix}$$

b. *head- comps-construction*
=>

$$\begin{bmatrix} head-comps-construction & \\ MOTHER & [CONT\ [1]] \\ HD\text{-}DTR & \begin{bmatrix} CAT & \begin{bmatrix} WEIGHT\ light \\ COMPS\ nelist([A] \oplus list) \end{bmatrix} \\ CONT & [1] \end{bmatrix} \\ NON\text{-}HD\text{-}DTRS & [A] \end{bmatrix}$$

c. *head- filler-construction*
=>

$$\begin{bmatrix} head-filler-construction & \\ MOTHER & [SLASH\ [A]] \\ HEAD\text{-}DTR & \begin{bmatrix} HEAD & verb \\ SLASH & \{[1]\} \cup [A] \end{bmatrix} \\ NON\text{-}HD\text{-}DTR & [LOC\ [1]] \end{bmatrix}$$

d. *head-adjunct-construction*
=>

$$\begin{bmatrix} head-adjunct-construction & \\ HEAD\text{-}DTR & [SS\ [1]] \\ NON\text{-}HD\text{-}DTR & [MOD\ [1]] \end{bmatrix}$$

Second, our grammar includes a Cooper storage mechanism of the type proposed in Pollard and Sag 1994. We assume that scopal elements in a general way are retrieved either lexically (Ginzburg and Sag 2000) or constructionally (Pollard and Yoo 1998). Scopal elements are put in STORE, and inherited by the predicate when they originate in arguments (21). The phrasal construction shares the STORE according to the GHFP (20). Scopal adjuncts inherit the STORE of the head (22), although we assume here that scoping is done on the mother, the head-adjunct-cx.[3]

(20) Generalized Head Feature Principle (Ginzburg and Sag 2000)

$$\begin{bmatrix} headed-cx \\ SYNSEM\ /\ [1] \end{bmatrix} \Rightarrow \left[HD\text{—}DTR\ [SYNSEM\ /\ [1]]\right]$$

[3] Scopal adjuncts cover more cases than is sometimes assumed: are scopal all adjuncts that have scope over the head (or take as their argument the content of the head), independently of the resulting interpretation (thus a manner adverb is scopal as well as a frequency adverb). Are non scopal those that have been called 'free adjuncts', whose interpretation relies on an external relation, such as 'cause' (cf. *Having missed his train, Paul was sure to be late*). Free adjuncts do not have scope over the head, both the adjunct and the head being the argument of an external (and unexpressed) relation.

(21) Lexical STORE Amalgamation Constraint (Ginzburg and Sag 2000)

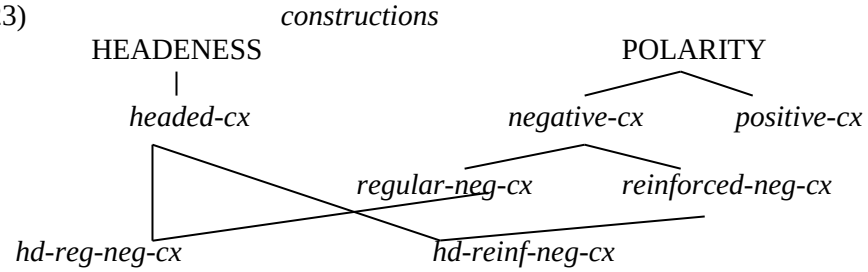
$$\textit{word} \Rightarrow / \begin{bmatrix} \text{SS|LOC} \begin{bmatrix} \text{CONT}\,[\text{QUANTS}\ \textbf{retrieve}\,([\text{A}0])] \\ \text{STORE}\,([\text{A}1] \cup \ldots \cup [\text{A}n]) - [\text{A}0] \end{bmatrix} \\ \text{ARG-ST} \langle [\text{STORE}\,[\text{A}1]], \ldots, \text{STORE}\,[\text{A}n] \rangle \end{bmatrix}$$

(22) *head-scopal-adjunct-construction* =>

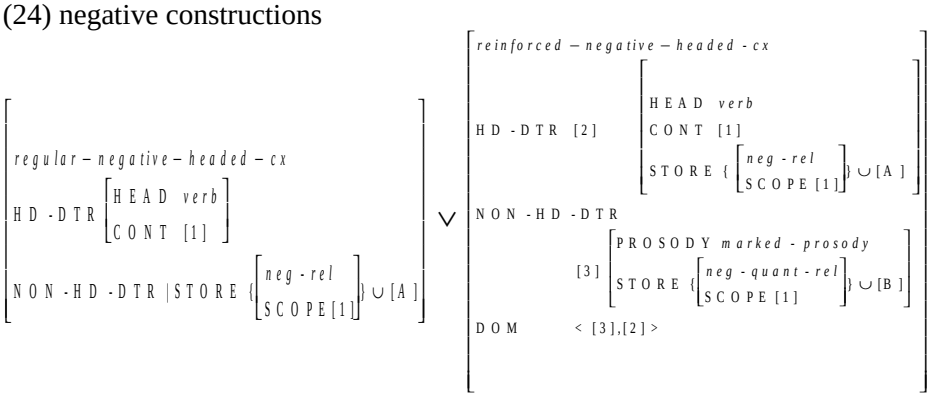
$$\begin{bmatrix} \text{MOTHER} & \begin{bmatrix} \text{CONT|QUANTS}\ \textbf{retrieve}\,([\text{D}]) \\ \text{STORE}\,[\text{C}] - [\text{D}] \end{bmatrix} \\ \text{HEAD-DTR} & \begin{bmatrix} \text{CONT}\ [1] \\ \text{STORE}\,[\text{A}] \end{bmatrix} \\ \text{NON-HEAD-DTR} & \begin{bmatrix} \text{CONT|SCOPE}\ [1] \\ \text{STORE}\,[\text{C}]\{[\text{A}] \cup [\text{B}]\} \end{bmatrix} \end{bmatrix}$$

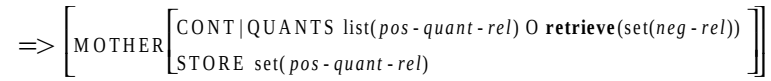
With this in mind, we can analyze Italian negations. We propose that Italian negations are always retrieved at the phrasal construction level (unlike what de Swart and Sag 2002 propose for French). If the verb could retrieve negations, we would not be able to understand the contrast between (1b) and (1c). If *non* and the V formed a word, we could say that *non*-verbs retrieve negations from complements while non *non*-verbs retrieve negations from subjects. But they do not form a word since *non* may have scope over a coordination of Vs (14a). If *non* adjoins to a verb which retrieves a negation only if it originates in the complement, how is its adjunction made obligatory ? It would also be necessary to make a distinction depending on whether the complement is a gap or canonical, since a negative filler does not co-occur with *non* (in the regular negative system).
Instead, we propose that Italian negations are retrieved by the head-subject-cx, the head-adjunct-cx, the head-filler-cx, but not the head-comps-cx. This follows if the content of the head-complements-cx is identified with that of the head daughter (19). Moreover, we distinguish constructions depending on their polarity, and have two different constructions, the former for the regular negative system, the latter for the reinforced negative system. The relevant hierarchy is in (23), and the polarity constructions are described in (24)-(25):

(23)



(24) negative constructions





(25) *positive-construction* => [MOTHER | CONT | QUANTS list (*pos-quant-rel*)]

In both negative constructions, the head daughter is the VP or S, and the constraint on the mother is the same: no negation is left in STORE. As in de Swart and Sag 2002, the operator **retrieve** applies to a set, creating either a list of quantifiers or a polyadic quantifier (responsible for negative concord) when there are several negations. We leave aside here the difference between the two interpretations (however a double negation reading is difficult in Italian, see Corblin and Tovena 2003). In the regular construction, the negation comes from the non-head-daughter (the adjunct, the subject or the filler), may be either the negative adverb *non* or an n-word, and is constrained to have scope over the content of the head. In the reinforced construction, both daughters have a negation in their STORE, which, for the non head, is constrained to be an n-word. In the first construction, a negation in a non-head daughter must be retrieved at the level of the mother, as soon as it has scope over the head daughter; hence, the adjunct *non* must be retrieved as soon as it adjoins to the verb. This explains why *non* may not license an n-word in the second conjunct in (15): the negation is retrieved at the head-adjunct-cx node, and is part of the content of the first conjunct only. On the contrary, such retrieval is postponed in the second case until the non head daughter also has a negation in its store. Some speakers only have the regular negative headed construction, while others have both, and can choose to apply either one.

Finally, we assume that there are unary rules that turn the soa content into the message content of a clause (Ginzburg and Sag 2000). Regarding negation, we constrain the clause as in (26). Nothing, as yet, forces *non* to adjoin to the verb if there is a complement containing an n-word. In fact, as in French, in

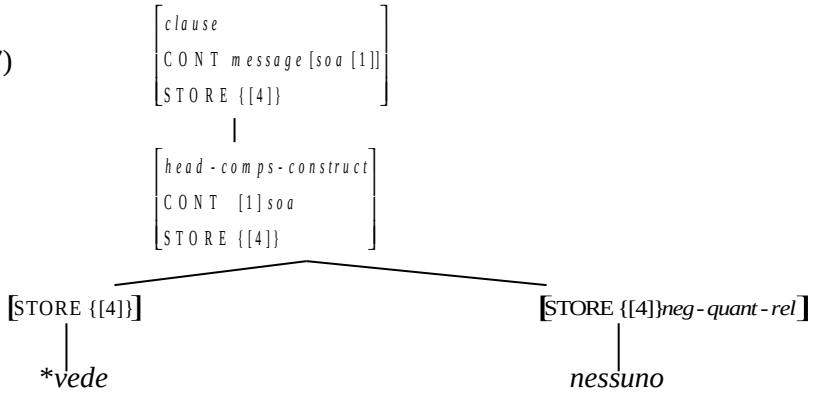
some cases the complement n-word may be retrieved by a higher verb (*Paolo non vuole vedere nessuno*, 'Paolo does not want to see anybody'). Leaving such cases aside (which require a more sophisticated constraint, see Godard 2004 for French), we adopt a simplified constraint. Following (26), a sentence with a complement n-word is unacceptable if *non* does not adjoin to the verb, since it cannot be retrieved by a phrasal construction, violating the constraint on clauses.

(26) Clause and negation retrieval (simplified)

$$\begin{bmatrix} clause \\ CONT\ message \end{bmatrix} \Rightarrow [\text{STORE set } (pos\text{-}quant\text{-}rel)]$$

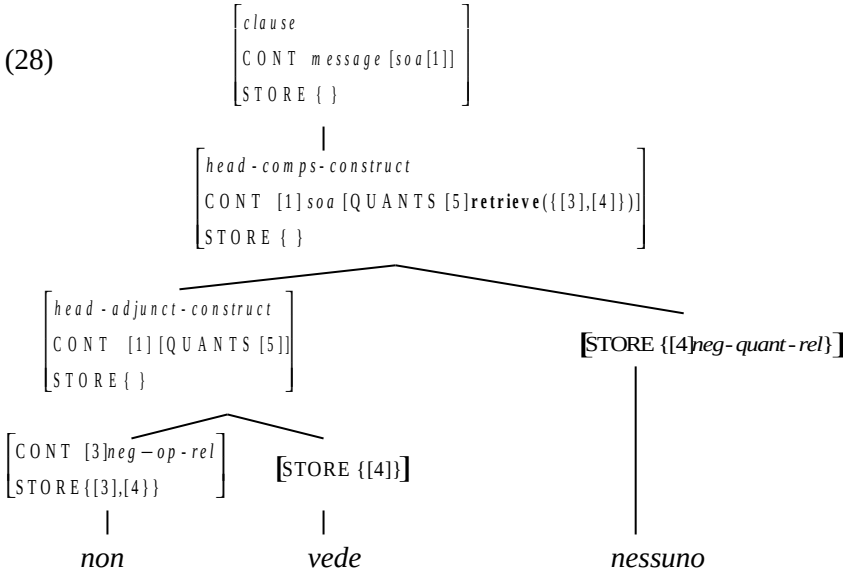
We now illustrate the proposal with a few examples. Starting with an object n-word in the regular negation system, we contrast *non vede nessuno* with **vede nessuno*. The phrasal construct in (27) cannot retrieve the negation, since it does not conform to the constraints for the negative constructions (24). Hence, the clause violates constraint (26).

(27)



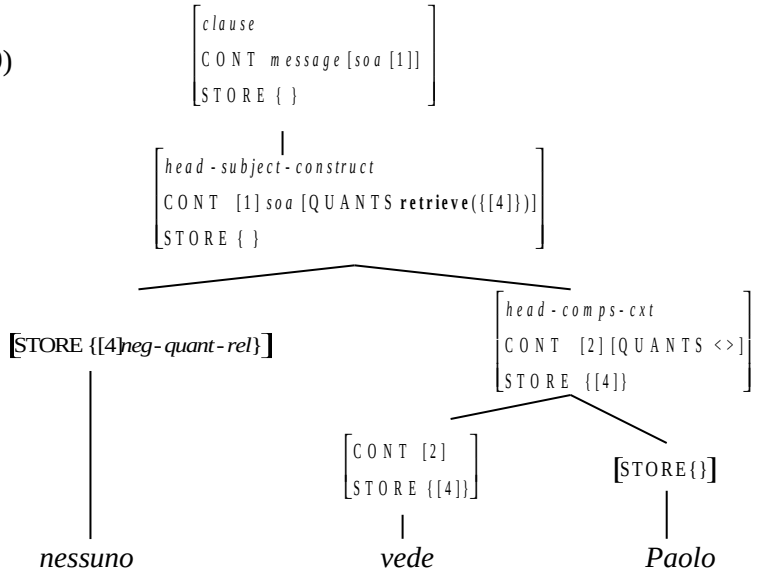
In (28) the head-adjunct-construct does retrieve the negations coming from the adjunct daughter, that is, both the neg-op-rel and the neg-quant-rel, which the head daughter (the verb) inherits from its complement. Hence, constraint (26) is observed, and the sentence is acceptable.

(28)



Remaining in the regular negation system, we turn to the constrast with a subject n-word, *nessuno vede Paolo* and **nessuno non vede Paolo*. The constraints account directly for the first sentence. In (29), the head-subject-cxt retrieves the negation, and the clause has no negation in its store.

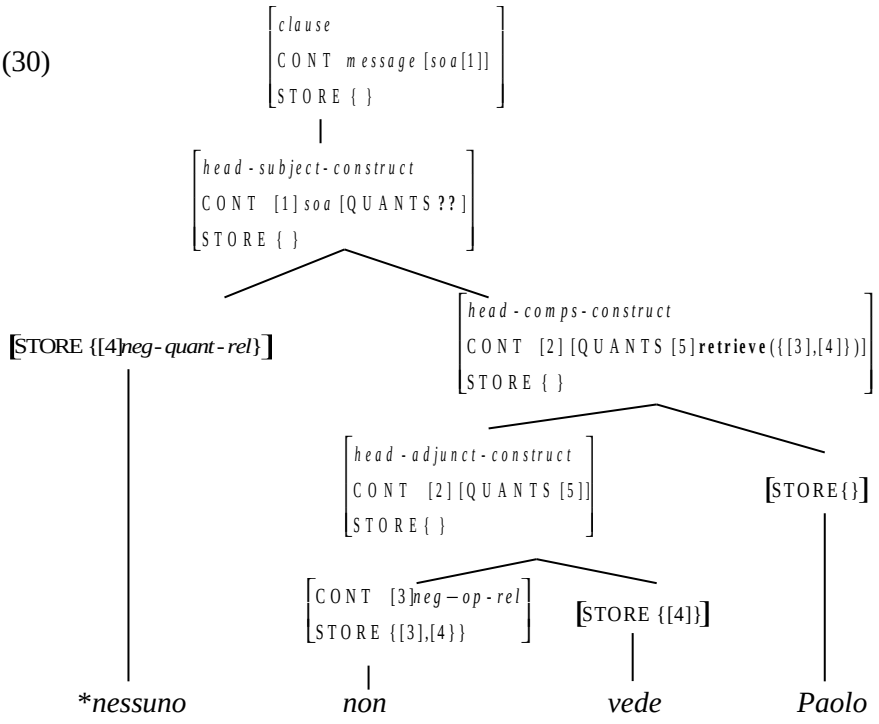
(29)



Something more has to be said for the second sentence: why is **nessuno non vede Paolo* not acceptable, with the negations retrieved by the head-adjunct-cxt? The problem is that applying (24) is mandatory. Thus, the negative

relation associated with *nessuno* has to be interpreted twice, once at the head-adjunct-cxt node, once at the head-subject-cxt node. This results in an uninterpretable structure (30).[4]

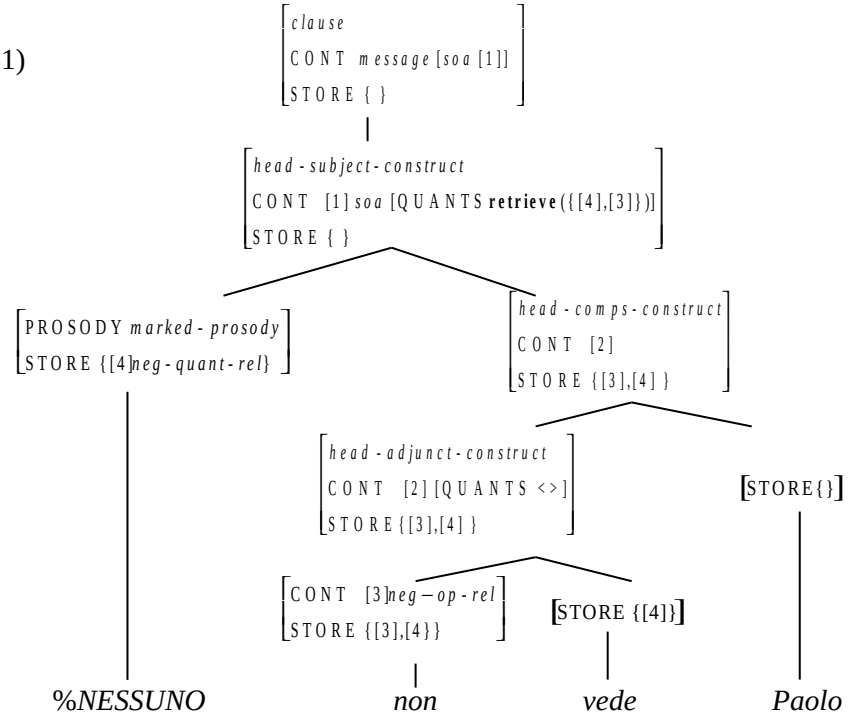
(30)



Finally, we illustrate the reinforced negation system with *%NESSUNO non vede Paolo* in (31). The subject is correctly analyzed as the non-head-daughter in that construction: it has the right prosody, and a negation in store. Accordingly, although the negations are in the STORE of the adjunct *non*, exactly as in (30), they are not retrieved at the head-adjunct-cxt node, because this adjunct does not qualify as the non-head daughter in the reinforced negation construction. Rather, the negations are passed up to the head-comps-cxt, and the head-subject-cxt. At that node, [4] is passed up from the subject daughter to the phrasal node, as in the previous example; however, this negative relation has not yet been interpreted, and the two instances of [4] are recognized as just one element of the set. Thus, at that node, the set which has to be interpreted is just : {[3],[4]}, and the structure is interpretable and licit.

[4] This account leaves open the question of why it is possible to interpret an indefinite lower than its dominating node, contrary to universals or negations (as in e.g. *A unicorn seemed to be wandering in the garden*).

(31)



4. A description of the reinforced negation construction

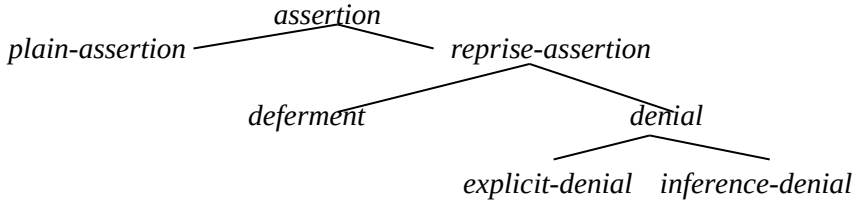
4.1. Types of dialogue moves

In order to describe the pragmatic import associated with the reinforced negation construction (2), we explain our general approach to speech acts, assertion in particular, of which proposition denial is a variety. We adopt the view that speech acts can be described as moves in dialogue, which effectuate a context change. To represent this analysis in an HPSG grammar, we use Ginzburg's framework based on the notion of dialogue gameboard, and include its representation as the context of a root clause (Bonami and Godard 2006).

We admit four basic illocutionary forces or dialogue moves: assertion, interrogation, directive, and exclamation. Each of them subsumes several subtypes that are identified by formal features and that give rise to a rich gamut of speech acts in context. Focussing on assertion, we propose the partial taxonomy of assertive moves in (32); it introduces a subtype that we call *reprise-assertion*. Following Ginzburg (to app.), we analyze plain assertions as committing the speaker to a propositional content and, simultaneously, calling on the addressee to acknowledge that content. By uttering a reprise assertion, the speaker makes a statement whose content is

reprised from the ongoing context and which conveys his / her distance from this content. This is the type of move associated with the sentences in (2)-(5), among which the negative ones express denials.

(32) Types of assertive moves



Deferments convey a move by which the speaker suspends his / her commitment toward the proposition (either out of surprise or anger, etc.). Deferments are illustrated in (8), (9Ai) (10Bi) above); B's utterances in (33) is another instance of deferment with a overtone of surprise ('I can't believe it') or outrage ('she's done that!') depending on the situation. Denials convey a move by which the speaker refuses the proposition (s)he takes up from the context.

(33) A. *Maria ha bevuto vodka* (Maria has drunk vodka)
B. *VODKA ha bevuto* (vodka she has drunk)

In Ginzburg's framework the key tool to analyze the contextual import of utterances is the Dialogue Participant's, or Speaker's, mental state which is conceived of as a board to record the moves in a game. It is partitioned into a public component (the PUB(LIC)), and a non-publicized one (the PRI(VATE)). The PUB records the commitments which the speaker endorses by uttering his / her utterance, while the private component stores his / her beliefs, desires and intentions. We adopt the architecture in (34) which is slightly different from Ginzburg's proposal (we follow Bonami and Godard 2006 for PUB and Marandin 2005 for PRI).

(34) The two components of a speaker's Dialogue Board

$$\begin{bmatrix} \text{PUB} \begin{bmatrix} \text{SP-CMT} & set(p) \\ \text{AD-CMT} & set(p) \\ \text{QUD} & list(questions) \begin{bmatrix} \text{QUD-MAX} \\ \text{QUD-Non-MAX} \end{bmatrix} \\ \text{LATEST-MOVE} \end{bmatrix} \end{bmatrix} \quad \begin{bmatrix} \text{PRI} \begin{bmatrix} \text{GOAL} & outcome \\ \text{GROUND} & \begin{bmatrix} \text{TOPic} & set(p) \\ \text{Non-TOPic} & set(p) \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

By uttering a plain assertion, the speaker updates his / her commitment (SP-CMT) by adding the proposition (s)he asserts ('p') to the set of propositions (s)he might have already endorsed; simultaneously, (s)he updates QUD with a

polar question ('p?') constructed from the proposition expressed in his / her utterance, which enables the addressee to acknowledge or not his / her statement (see (35a)). Unlike assertions, deferments are contextually restricted: their content is reprised from the latest move (L-MOVE). By uttering a deferment, the speaker does not update his / her commitment, rather (s)he updates his / her representation of the addressee's commitments (AD-CMT). What makes plain assertions and deferments alike is that, in both moves, the speaker updates QUD with a polar question, which amounts to calling on the addressee to take a stand on the content of his / her utterance (35b).
Explicit denials work like deferments except for the polarity of the propositional content and the polar question incrementing QUD (35c). Inference-denials works like explicit denials except that the contextual restriction is not located in L-MOVE, but rather in the private part of the dialogue board. At a given turn in a dialogue, not all of the speaker's knowledge or belief is activated, only the elements that are 'lit up' by the ongoing issues. We capture this by partitioning the speaker's knowledge / belief (GROUND) into two components: the topical part (TOP) and the rest. Each new question added to QUD selects a set of propositions that are about the issue (those that belong to TOP). The targets of inference denials belong to such a set. By uttering an inference denial, the speaker presents the content of his / her utterance as possibly relevant for the issue raised by the addressee's move (frequently, with the overtone that it is relevant for the addressee) and rejects both its content and its relevance (35d).

(35) Dialogue moves as changes in the dialogue board

a. ***plain-assertion*** =>

$$\left[\begin{array}{l} \mathrm{CNXT}\left[\begin{array}{l} \mathrm{SP\text{-}CMT}\ \{p\}\cup[\mathrm{S}(i)] \\ \mathrm{AD\text{-}CMT}\ [\mathrm{S}(j)] \\ \mathrm{QUD}\ \ \langle p?\rangle\oplus[\mathrm{Q}] \\ \mathrm{L\text{-}MOVE}\left[\begin{array}{l} \mathrm{SP\text{-}CMT}\ [\mathrm{S}(j)] \\ \mathrm{AD\text{-}CMT}\ [\mathrm{S}(i)] \\ \mathrm{QUD}\ \ [\mathrm{Q}] \end{array}\right] \end{array}\right] \\ \left[\begin{array}{l} participants \\ \mathrm{SP}\ \ i \\ \mathrm{AD}\ \ j \end{array}\right] \end{array}\right]$$

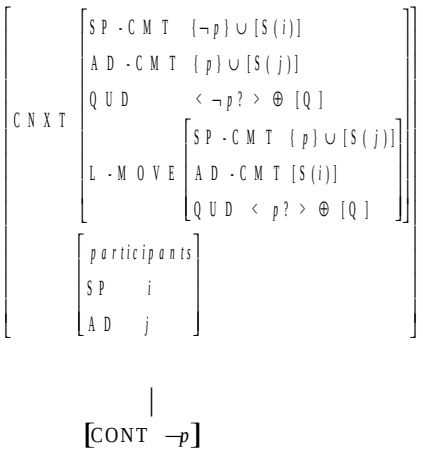
$$\left[\mathrm{CONT}\ \ p\right]$$

b. ***deferment*** =>

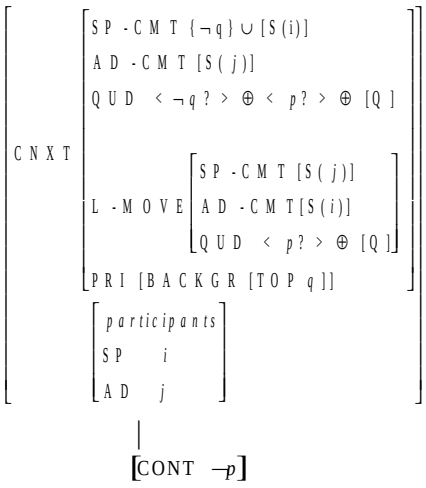
$$\left[\begin{array}{l} \mathrm{CNXT}\left[\begin{array}{l} \mathrm{SP\text{-}CMT}\ [\mathrm{S}(i)] \\ \mathrm{AD\text{-}CMT}\ \{p\}\cup[\mathrm{S}(j)] \\ \mathrm{QUD}\ \ \langle p?\rangle\oplus[\mathrm{Q}] \\ \mathrm{L\text{-}MOVE}\left[\begin{array}{l} \mathrm{SP\text{-}CMT}\ \{p\}\cup[\mathrm{S}(j)] \\ \mathrm{AD\text{-}CMT}\ [\mathrm{S}(i)] \\ \mathrm{QUD}\ \langle p?\rangle\oplus[\mathrm{Q}] \end{array}\right] \end{array}\right] \\ \left[\begin{array}{l} participants \\ \mathrm{SP}\ \ i \\ \mathrm{AD}\ \ j \end{array}\right] \end{array}\right]$$

$$\left[\mathrm{CONT}\ \ p\right]$$

c. ***explicit-denial*** **=>**



d. ***inference-denial*****=>**



4.2. Relating the formal and the pragmatic properties

The last step in the description of the reinforced negation construction in Italian consists in relating the formal (24) and the pragmatic properties (35c,d). This can be done using the implication in (36), which relies on the geometry of clauses used above in (27)-(31). The clause node dominates a construction whose content is of type soa, which it turns into a message. In our case, since the use associated with the construction is denial, the clause must be a root clause, assuming, as is generally accepted, that only root clauses can have a speech act import. As mentioned above, the pragmatics of the root clause is represented as its context.

(36) $\left[\text{HD-DTR } \textit{headed-reinforced-negation-cx}\right] \Rightarrow \begin{bmatrix} \textit{root-clause} \\ \text{CNXT } \textit{denial} \end{bmatrix}$

Such an analysis predicts that sentences (2)-(5) may only occur as root clauses. This is borne out as shown by the unacceptabilility of the construction in complement sentences (37).

(37) A. *Sai chi Maria inviterà per il suo compleanno?*
'Tu sais qui Maria va inviter pour son anniversaire ?'
B. **Dovresti sapere che* NESSUNO *(non) inviterà*
tu devrais savoir que personne NEG elle.invitera

To conclude, we claim that sentence (2) in Italian illustrates a pattern of reinforced negation which relies on the recycling of negative expressions as well as an independently existing construction with the required pragmatics.

Moreover, we show that an information structure approach to such a construction is empirically inappropriate, and substitute a speech act or illocutionary force approach, which we model as a dialogue move, and which captures the pragmatic properties of metalinguistic as opposed to descriptive negation.

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Person and number agreement in American Sign Language

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Abstract

American Sign Language (ASL) has a group of verbs showing agreement with the subject or/and object argument. There has not been analysis on especially number agreement. This paper analyzes person and number agreement within the HPSG framework. I discuss person and number hierarchy in ASL. The argument of agreement verbs can be omitted as in languages like Italian. The constraints on the type *agreement-verb* have the information on argument optionality.

1 Introduction[1]

During the past fifty years sign languages have been recognized as genuine languages with their own distinctive structure. Signed languages and spoken languages have many similarities, but also differ due to the different modalities: visual-gestural modality vs. auditory-vocal modality.

This paper examines a common natural language phenomenon, verb agreement in American Sign Language (ASL, hereafter) through the recordings of a native signer within the framework of Head-Driven Phrase Structure Grammar (HPSG).[2] Most analyses of signed languages have been based largely on transformational grammar. Cormier et al. (1999) discusses locus agreement in ASL, which is the first work in the HPSG framework. However, their work is limited to locus agreement with singular arguments.

This paper examines person and number verb agreement. One type of verb shows agreement with object or/and subject arguments. Main focus in this paper is to show what constraints agreement verbs have, to explain the subject/object-verb agreement. The arguments of agreement verbs can be omitted. I suggest that the inflectional morpheme on agreement verbs can be either agreement markers or incorporated pronoun arguments, depending on whether the subject/object arguments of verbs are expressed or not.

The other focuses are person and number hierarchy in ASL, which are essential to explain the agreement patterns. All languages can have different grammatical person or number systems. I consider whether ASL, in a visual-

[1] The examples in this paper are what I gathered from a ASL native signer, unless I specify the source. Great thanks to Franky Ramont for help, who is a Deaf and also an ASL instructor in the Linguistics department, UT Austin.

[2] ASL is a natural language used by most deaf people in the United States and Canada. It is a topic oriented language much like Chinese and has a classifier system comparable to Navajo's. ASL typically exhibits SVO word order, but due to its agreement inflection, many other word orders are possible (Cormier et al. 1999).

gestural modality, has the same universal person hierarchy as in spoken languages in auditory-vocal modality. Person hierarchy says that the first person is ranked above other persons in person hierarchy (1>2>3) (Greenberg 1963, Corbett 2000, etc.). Observing verb agreement, I propose that ASL has the same hierarchy in that first person is more highly ranked than non-first person.

As for number hierarchy, ASL shows a different aspect from the common one in spoken languages. ASL shows plural vs. non-plural distinction and dual number is grouped together with singular. Even though many number incorporated pronouns (e.g. TWO-OF-US) can exist in ASL (about up to 9, depending on signers), I propose that the grammatical number values in hierarchy includes only singular, dual, and plural.

In the next section, I provide a general description of pronouns and verbs in ASL. Section 3 provides a discussion on the agreement feature type hierarchies, while section 4 discusses lexical constraints on the agreement verbs explaining agreement patterns.

2 ASL pronouns and verbs

2.1 Pronouns and person system

Pointing signs serve a number of functions in ASL. Within nominals, it functions as a determiner. Articulation of a pronoun in NOM/ACC case is also accomplished by a pointing sign with the index finger, which points to the location in space associated with the intended referent. For first person reference, the pointing sign is directed toward the signer's chest, while for second person reference it is directed out toward a point in front of the addressee's chest. For third non-participant reference, when the referents are physically present, their locations are generally used. In the case where the referents are not present, usually other arbitrary locations are established, which have to be consistent in the discourse. Thus, each pronoun can identify particular referents.

Pronoun signs do mark number. Plural number in pronouns is mostly marked by a sweeping or circular movement, such as in YOU-ALL/THEY and ALL-OF-US. There is a set of pronouns called number-incorporated pronouns (e.g. TWO-OF-US/YOU/THEM, THREE-OF-US/YOU/THEM, etc.).

The traditional person system assumes three persons – first, second and third. Meier (1990) observes that there is no evidence for a grammatical

distinction in ASL between second and third person. He observes that the location of the addressee (as opposed to other referents) is not something the grammatical system by itself can determine. That is, it requires access to the specific discourse situation to determine which referent is currently addressed. And, a description of the third person form cannot be specified for location as any location in the signing space can be used for a referent, and this requires a non-finite number of locations.[3]

Instead of a three person system, Meier (1990) argues that the pronominal system of ASL is best described in terms of a first/non-first person distinction. One of his arguments for a distinct first person hinged on certain idiosyncratic properties of first person forms, in particular the pronouns WE and OUR, which do not specify the number or locations of their referents in any direct way and point to only the signer.[4]

2.2 Different types of verbs in ASL

Padden (1988) categorized verbs into the following three classes: plain, spatial, and agreement verbs.[5] Plain verbs (e.g. LIKE) are not marked morphologically for subject or object agreement. Spatial verbs (e.g. PUT) and agreement verbs (e.g. GIVE) both use the signing space referentially. But spatial verbs show agreement with locations associated with the initial and final positions of motion. Agreement verbs use spatial locations to mark subject and/or object agreement. Agreement verbs are further divided into two subtypes: single-agreement verbs, agreeing only with the object (e.g. SEE) and double-agreement verbs, agreeing with both the subject and object (e.g. HELP). These agreement verbs mark for Person and Number, and make use of the association between NPs and distinct locations.

3 Verb agreement – Locus and Number

This section explores person and number agreement features using a double agreement verb, HELP to examine both subject and object agreement.[6] For

[3] My informant's signing also clearly confirms his observation.
[4] As in ASL, the spoken language Qawesqar, an Alcalufan language from Chile, has independent pronouns that show 1st vs. non-1st person distinction. *ce* is used for 1st person pronoun and *caw* for second and third person (Cysouw 2003: 44).
[5] Agreement verbs are also called inflecting verbs (Padden 1988), indicating verbs (Liddell 2000), and agreeing verbs (Sandler and Lillo-Martin 2006).
[6] The verb HELP can be analyzed more easily than some other verbs due to the two-handed sign, allowing no overlap with other signs.

double agreement verbs, there are two affixes, a subject agreement prefix and an object agreement suffix that constitute the manual expression of the person and number features of the relevant argument. Through an observation of the data, the person and number hierarchies are proposed in this section.

3.1 Locus agreement and person/locus hierarchy

The verb HELP starts at (or is oriented towards) the location in space associated with the subject and ends at (or is oriented towards) the location in space associated with the object. For example, $_1$HELP$_2$ as in Figure 1 indicates that the verb moves from the location associated with the signer to the location associated with the addressee.[7]

Figure 1. $_1$HELP$_2$ 'I help you.'

When the subject is WE, whether the other referent is the addressee (e.g. YOU AND I) or not (e.g. SHE AND I), the initial point of the verb should be in front of the signer's body which shows 1st person agreement. If the verb starts from the addressee or non-addressee's body, the sentence becomes ungrammatical as in (1a) and (2a):[8]

(1) a. *$_i$PT LEARN SIGN $_{1,2}$TWO-OF-US $_2$HELP$_i$
b. $_i$PT LEARN SIGN $_{1,2}$TWO-OF-US $_1$HELP$_i$
'You and I will help her$_i$ to learn sign.'

(2) a. *$_i$PT LEARN SIGN $_{1,j}$TWO-OF-US $_j$HELP$_i$
b. $_i$PT LEARN SIGN $_{1,j}$TWO-OF-US $_1$HELP$_i$
'He$_j$ and I will help her$_i$ to learn sign.'

[7] The subscripts on both side of the sign HELP mean that this verb is a dual agreement verb, and the *1* subscript refers to one signer (and others), *2* refers to the addressee(s) (and others), and i, j, etc. will refer to non-addressed participants.
[8] PT means a pointing sign. I put the loci of the pronoun TWO-OF-US on the left side of it. SM means subject marking; OM object marking.

However, when the subject is YOU-ALL or THEY, the initial point of the verb tends to be the midpoint between the referents or the locus in neutral signing space, regardless of whether the other referent is an addressee or non-addressed participant as in the example (3), which confirms Meier (1990)'s observation that there is no distinction between 2nd and 3rd person values.

(3) MARY $_{i}$PT $_{2,i}$TWO-OF-YOU $_{b/w2,i}$HELP$_{1}$
'Mary$_i$ (not present) and you will help me to sign.'

Person agreement with object argument shows the same patterns:[9]

(4) a. *$_{2}$PT TEST G-R-A-D-E CHECK $_{i}$PT $_{i}$HELP$_{\mathbf{2}}$
$_{1,2}$TWO-OF-US GRADE
b. $_{2}$PT TEST G-R-A-D-E CHECK $_{i}$PT $_{i}$HELP$_{\mathbf{1}}$
$_{1,2}$TWO-OF-US GRADE
'She$_i$ will help you and me to grade the tests.'

(5) a. *LEARN SIGN $_{2}$PT $_{2}$HELP$_{\mathbf{i}}$ $_{i,1}$TWO-OF-US
b. LEARN SIGN $_{2}$PT $_{2}$HELP$_{\mathbf{1}}$ $_{i,1}$TWO-OF-US
'You will help her$_i$ and me to learn sign.'

(6) $_{i,2}$TWO-OF-YOU LEARN SIGN
$_{1}$HELP$_{\mathbf{b/w2,i}\ \textit{or}\ \mathbf{neut}}$ $_{i,2}$TWO-OF-YOU
'I will help her$_i$ and you to learn sign.'

When the referent of the argument includes the signer, the verb has to show first person agreement – i.e. the ending point of the verb HELP should be in front of the signer's chest. Example (4) is a case where the object is the combination of 1st person and 2nd person. In the example (5), the object is a combination of 1st person and 3rd person. When the object argument does not refer to the signer, the ending point of the verb is in midpoint or in neutral space. Thus, what matters is only whether the locus for person value is near the signer's body or not, confirming 1st vs. non-1st person distinction.

In typological studies, it has been argued that languages show universal person hierarchy – the first person is ranked above second and second person above third person in person hierarchy '1st > 2nd > 3rd' (Greenberg 1963,

[9] When a sign is written with dashes between each letter like G-R-A-D-E, it means that it is finger-spelled.

Corbett 2000, etc.). For example in Italian, when the subject is conjoined, the verb agreement follows this person hierarchy:

(7) a. 1st + 2nd person resolution: 1st person on verb

Io	e	tu	**siamo**	onesti/e
I	and	you	**be.1PL**	honest.PL.M/F

'You and I are honest.'

b. 2nd + 3rd person resolution: 2nd person on verb

Tu	e	tua	sorella	**siete**	onesti/e
you	and	your	sister	**be.2PL**	honest.PL.M/F

'You (sg.M/F) and your sister are honest.'

c. 3rd + 3rd person resolution: 3rd person on verb

Lei	e	Sua	sorella	**sono**	oneste
she	and	her	sister	**be.3PL**	honest.PL.F

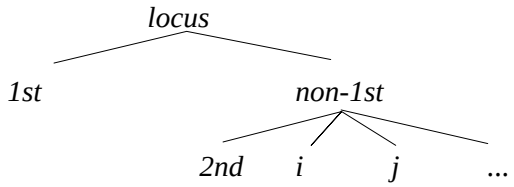
'She and her sister are honest.'

When the subject includes 1st person, the verb agrees in 1st person. If the subject includes 2nd person, but not 1st person, verb is in 2nd person. Otherwise, verbs should be in 3rd person.

One of this paper's goals is to compare the person resolution in ASL with the one in spoken languages. In the above examples (1) – (6), the original sentences I asked the informant included specific pronouns, (e.g. *me and you*) as in the English glosses. In ASL, there is no sign corresponding to the English conjunction '*and*'. Thus, the signer consistently used number incorporated pronouns instead of the coordinated phrases. Those number incorporated pronouns do not have a different form. They point the referents. Thus, person value of agreement verb tells us the person hierarchy. The person hierarchy in ASL and spoken languages are the same in that first person is more highly ranked than others. That is why the verbs showed 1st person agreement with any plural argument including 1st person referent. But, there was no clear grammatical distinction between *1st* vs. *non-1st* person.

As I have discussed, pointing signs and agreement verbs are all heavily depended upon location, or *locus*. Cormier et al. (1999) propose a type [LOCUS *locus*] in INDEX, whose values are equivalent to *1*, *2*, *i*, etc. in this paper's notation. I follow their idea. This locus agreement in ASL is equivalent to person agreement in spoken languages. Thus, with the assumption of *1st* vs. *non-1st* person distinction in ASL, the hierarchy of type *locus* is proposed as the following:

(8)



These values of type *locus* are used to refer to locations associated with the signer, addressee, or non-participant. The locus related to the signer is the location in front of the singer's chest. The locus related to the addressee or non-participants (for example, *i*, *j*, etc.) is the location within the signer's own sign space but toward and associated with the addressee or those non-participants.

3.2 Number agreement

Singular verbs are the uninflected verb stems. These verbs agree with a singular nominal, number-incorporated pronouns or collective arguments, while plural verbs require a plural argument, as shown in the following examples:[10]

(9) a. $_{2}$PT TEST G-R-A-D-E CHECK $_{i}$PT
$_{i}$HELP$_{\mathbf{1SG}}$ $_{1,2}$TWO-OF-US GRADE
'She$_i$ will help you and me to grade the tests.' (= 4b)

b. MARY JOHN $_{i,j}$TWO-OF-THEM SIGN
BOB $_{k}$PT $_{k}$HELP$_{\text{nuet.}\mathbf{SG}}$
'Bob$_k$ will help Mary$_i$ and John$_j$ to sign.'

c. ASL STUDENT $_{j.\mathrm{PL}}$PT SIGN $_{2}$HELP$_{\mathrm{j},\mathbf{SG}}$
'You$_{(sg)}$ will help them$_{[\text{ASL students}]j}$ to sign.'

Klima & Bellugi (1979) and Padden (1988) argue that the verb can show dual or exhaustive agreement with the object argument. In my data, a native ASL Signer uses "singular" verbs as a default with any number-incorporated

[10] Showing singular agreement in the predicate with the collective plural is not unusual in spoken languages like the following Maltese example:
Ex. Dak id-dubbien il-kbir dahal mit-tieqa
that.SG.Masc the-flies.**PL** the-large.SG.Masc entered.**SG**.Masc from.the-window
'Those large flies came in through the window' (Corbett 2000; p.131)

pronouns (e.g. TWO-OF-YOU, THREE-OF-YOU, etc.) unless she really wants to emphasize the individual argument.[11] Padden (1988) describes the dual or exhaustive number form of the verbs as follows: The verb stem is executed two (for dual) or more (for exhaustive) times with the inflected end points displaced. Thus, I propose that the grammatical numbers that verbs can have is either singular or plural although the nominals can have dual number. Also, I assume that the forms, which Klima and Bellugi (1979) or Padden (1988) analyzed as dual or exhaustive, are results from two or more instances of singular agreement, one for each conjoined noun phrase. Also we should keep in mind that the verbs do not agree in number with the subject argument.

As Padden (1988) noted, the verb cannot show subject number agreement in plural.[12] Signed languages show object agreement more than subject agreement, which is contrary to the typological generalization of spoken languages. The initial point of the verb HELP cannot show the sweeping movement to show plural number agreement:

(10) a. *$_i$PT LEARN SIGN WE $_{1,\mathbf{PL}}$HELP$_{i,SG}$
b. $_i$PT LEARN SIGN WE $_{1,\mathbf{SG}}$HELP$_{i,SG}$
'We will help her$_i$ to learn sign.'

So far, we have seen how number agreement works. Now, we need to consider what the grammatical number values are in ASL. All languages can express any number of referents. But, that does not mean that grammatical numbers are infinite. For example, in English sentence *Two of us left*, the subject argument refers to 2 people. However, we do not say that English has *dual* number. ASL has many number incorporated pronouns (up to 9ish). Can any number like *trial*, *quad*, and so on be grammatical number values due to the existence of number incorporated pronouns like THREE-OF-US?

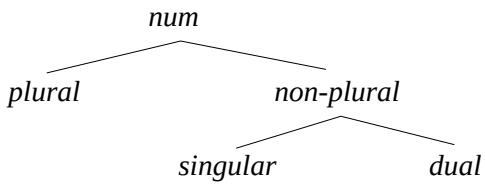
McBurney (2002) argues that the grammatical number in ASL is singular, dual, and plural and it does not include *trial*, *quadral*, etc. Her arguments are supported by the following facts: First, dual number incorporated pronoun (TWO-OF-US/YOU/THEM) have an idiosyncratic form (K-handshape), which differs from the form of numeral 2 (V-handshape). However, other number incorporated pronouns have the same handshape as the numeral ones. Second, numeral incorporation is very productive in ASL. Signs having to do with

[11] Padden (1988) also mentions that number agreement may be unmarked for singular or collective plural. Here, unmarked form is singular. Thus, this is analogous to my result.

[12] There are exceptional cases where a few signs show plural agreement with subject as an idiolect (e.g. one signer shows plural form for 'we analyze'.).

time (e.g. DAY, WEEK), age, etc. incorporate numeral handshapes to indicate a specific number of units. Thirdly, the dual form (TWO-OF-US/YOU/THEM) appears to be obligatory in most contexts but it does not appear that the forms in trial, quadral, etc. are obligatory. Some signers use pointing signs with sweeping movement instead of THREE/FOUR-OF-US, etc. Adopting her idea on grammatical number, I propose the following hierarchy for the type *number*:

(11)



We have seen that verbs agree in singular as a default. Singular verbs used with plural argument have number *non-plural*. This hierarchy differs from the one in English and many other spoken languages – singular is more highly ranked than other numbers. For example, even though English does not have dual grammatical number in English, when the subject is 'two of you', the verb is in plural, not singular. This illustrates that in English more than one referent is considered as plural, not singular. In Hebrew, the verbs in plural agree with dual nouns (*hayomayim*$_{[\text{the.day.}\mathbf{dual}]}$ *ʕavru*$_{[\text{passed.}\mathbf{pl}]}$ *maher*$_{[\text{quickly}]}$, Corbett 2000: 95). Thus, I want to point out that number hierarchy in ASL which groups *singular* and *dual* together shows the difference from spoken languages.

So far, I suggested that the grammatical number values in ASL are *singular*, *dual*, and *plural*. Verb agreement tells us that ASL has a *plural/non-plural* number distinction and that the *plural* number is marked. Verbs do agree either in *plural* or *non-plural* number although the arguments, including number-incorporated pronouns, can denote any specific number of referents. Verbs in *plural* number agree with only *plural* agreement triggers. Otherwise, the default form of the verbs in *singular* is used.

4 Lexical entries of agreement verbs and related issues

Before proposing the lexical constraints on agreement verbs, let's consider the optionality of arguments. Languages vary in the way that they may or may not permit the null arguments of verbs. Languages like Italian, which has rich verbal morphology identifying the person and number of the argument, allow

the argument to be left unexpressed (e.g. *Parlo inglese* '(I) speak English' in Italian). Topic oriented Languages like Korean and Chinese with no verbal agreement morphology allow any argument to be missing in the right discourse contexts.

ASL has been recognized by many researchers as a discourse-oriented, topic-prominent language like Chinese, as opposed to a sentence-oriented, subject-prominent language like English (Fischer 1975). Thus, as in Chinese, null arguments are allowed in ASL like the following:

(12) A: Did John send Mary the paper?
(In which John has been established at a location and Mary at b.)

B: YES, $_{a}$SEND$_{b}$ Ø$_{i}$
'Yes, (he-) sent it$_{i}$ to (-her). (Lillo-Martin 1986: 421)

On the other hand, ASL has a type of verbs showing agreement. Thus, null arguments are found with agreement verbs as well. The argument of the agreement verbs can be omitted as in Italian, which will be discussed below. The constraints on the verb will explain the optionality of the arguments. Like Lillo-Martin (1986)'s arguments, the null arguments of plain verb and agreement verb seem to behave differently. Her evidence comes from different constructions. I will discuss on these matters and move on to the analysis of the verbs.

Let's consider the topic constructions in English first. As Sandler and Lillo-Martin (2006) notice, when we want NP *the cat* to be the topic in the sentence '*The dog chased the cat*,' we can say '*The cat, the dog chased*' by topicalization or we can say '*As for the cat, the dog chased it*.' In the latter sentence, NP *the cat* is not an argument of the verb *chased*. Its argument is the resumptive pronoun *it*, which co-refers to NP *the cat*. In ASL, there is no sign corresponding to the English *as for*. Therefore, it is hard to distinguish if the topic in a sentence is a topicalized argument of the verb or an independent topic in left-dislocation structure.

The following examples (13) – (14) are the situations where the argument of the plain verb cannot be omitted, but the argument of the agreement verb can:[13]

[13] In the examples here, notations for non-manual markers are omitted and the gloss is modified to be consistent in this paper.

(13) $_{i}$PT COOKIE, $_{1}$PT HOPE SISTER SUCCEED $_{j}$PERSUADE$_{k}$ MOTHER EAT *($_{i}$PT)
'That cookie$_{i}$, I hope my sister$_{j}$ manages to persuade my mother$_{k}$ to eat it$_{i}$.' (Lillo-Martin 1986)

The above sentence is ungrammatical when the argument of the plain verb EAT is omitted since ASL does not permit such long-distance movement. However, the following sentence in the same construction allows the omission of the argument since the verb is agreement verb TAKE-UP:

(14) EXERCISE CLASS, $_{1}$PT HOPE SISTER SUCCEED $_{j}$PERSUADE$_{k}$ MOTHER $_{i}$TAKE-UP.
'The exercise class$_{i}$, I hope my sister$_{j}$ manages to persuade my mother$_{k}$ to take (-it$_{i}$).' (Padden 1988)

This lets us know that NP *exercise class* is not a topicalized argument. The verb TAKE-UP has a null argument in the above sentence.

Lillo-Martin (1986) also shows the similar cases with wh-island construction as in (15) below:

(15) a. MOTHER, $_{1}$PT DON'T-KNOW WHAT *($_{i}$PT) LIKE
'Mother$_{i}$, I don't know what$_{j}$ (she$_{i}$) likes t$_{i}$.'

b. MOTHER, $_{1}$PT DON'T-KNOW WHAT ($_{i}$PT) $_{i}$SEND$_{1}$
'Mother$_{i}$, I don't know what$_{j}$ (she$_{i}$) sent me t$_{i}$.'

The argument of the agreement verb can be optional whereas the plain verb has to have an argument. Thus, sentence (15b) is not involved in topicalization construction.

Following examples show coordinated structure where the argument of plain verbs cannot be omitted but the one of agreement verb can:

(16) a. *FLOWER, $_{i}$GIVE$_{1}$ MONEY, $_{j}$GIVE$_{1}$
'Flowers, he$_{i}$ gave me money but $_{j}$she gave me.' (Padden 1988: 93)

b. *$_{i}$PT MOVIE, $_{j}$STEVE LIKE t$_{i}$ (BUT) $_{k}$JULIE DISLIKE t$_{i}$
'That movie$_{i}$, Steve$_{j}$ likes t$_{i}$ but Julie$_{k}$ dislikes t$_{i}$.'

c. $_{i}$PT MOVIE, $_{j}$STEVE LIKE t$_{i}$ (BUT) $_{k}$JULIE HATE$_{i}$ t$_{i}$
'That movie$_{i}$, Steve$_{j}$ likes t$_{i}$ but Julie$_{k}$ hate t$_{i}$.'
(Sandler and Lillo-Martin 2006)

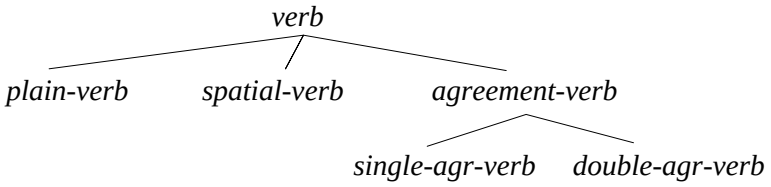
ASL, as in other languages, allows the same element to be extracted from all the conjuncts as in (16b), but does not allow extracting one element from one of the conjuncts as in (16a). Although the meaning of verbs DISLIKE and HATE is similar, one is a plain verb and the other is an agreement verb. The sentence (16c) with an agreement verb HATE allows the argument to be omitted and, thus, the topic NP *that movie* is not an argument of the verb *hate*.

Summarizing, the arguments of agreement verbs can be omitted in any situation without any discourse context and those null arguments behave like a pronominal argument. Null arguments with plain verbs, on the other hand, do not generally show the characteristics of pronouns and can be omitted in the proper discourse context.

I propose that inflecting morphemes of agreement verbs seem to behave the same as the agreement markers on Chichewa verbs. Bresnan and Mchombo (1987) show that the subject argument is optional in Chichewa. They propose the dual behavior of the subject marker on the verb: The subject agreement marker on the verb behaves as an agreement marker in the presence of an overt subject argument; otherwise, it is an incorporated pronoun, which is an argument of the verb itself. That is, they explain the former as grammatical agreement, while the latter as anaphoric agreement. Miller and Sag (1997) also treats the French clitic as an argument of the verb. The null arguments with agreement verbs in ASL can be explained just like those in Chichewa.

In section 2.2, three different types of verbs were described, one of which has two different subtypes. Therefore, the type *verb* has three subtypes. The verbal type hierarchy is simple as follows:

(17)



Again, the type *plain-verb* is without agreement; while the type *spatial-verb* is verbs showing the movement of entities in space. The type *agreement-verb* is verbs showing the grammatical argument and has two subtypes, *single-agr-verb*, showing object agreement, and *double-agr-verb*, showing subject and object agreement.

The type *agreement-verb-lexeme* has constraints on object agreement and the type *single-agr-verb* inherits the constraints of its supertype without

posing any extra constraints. The type *double-agr-verb* has constraints on subject person agreement. Partial constraints on the types *agreement-verb-lxm* and *double-agr-verb-lxm* are proposed below:[14]

(18) a. *agreement-verb*:

$$\begin{bmatrix} \text{PHON} & F(..,[4],[3],x) \\ \text{SYNSEM} & [5]\begin{bmatrix} ... \\ \text{ARG-ST} < [1]\text{NP}, & [2]\text{NP}\begin{bmatrix}\text{INDEX}\begin{bmatrix}\text{LOCUS} & x \\ \text{NUM} & [3]\end{bmatrix}\end{bmatrix}, ... > \\ \text{VAL} & \begin{bmatrix}\text{COMPS} & \langle([2])\rangle\end{bmatrix}\end{bmatrix} \\ \text{STEM} & \begin{bmatrix}\text{PHON} & [4] \\ \text{SYNSEM} & [5]\end{bmatrix}\end{bmatrix}$$

b. *double-agr-verb:*

$$\begin{bmatrix} \text{PHON} & F(y,\ [4],..) \\ \text{SYNSEM} & [5]\begin{bmatrix} ... \\ \text{ARG-ST} < [1]\text{NP}\begin{bmatrix}\text{INDEX}\begin{bmatrix}\text{LOCUS} & y\end{bmatrix}\end{bmatrix}... > \\ \text{SUBJ} & \langle([1])\rangle\end{bmatrix} \\ \text{STEM} & \begin{bmatrix}\text{PHON} & [4] \\ \text{SYNSEM} & [5]\end{bmatrix}\end{bmatrix}$$

All verbs included in the type *agreement-verb* have locus and number information on object in ARG-ST (argument structure). The type *double-agr-verb* has constraints on locus agreement, not on number agreement, with the subject. All of the arguments of the agreement verbs are optional, which is constrained as optional value of the argument in valence features, SUBJ and COMPS. When they are omitted, the verb itself has an incorporated pronoun, otherwise the verbs agree with the overt argument. The subject argument of the type *single-agr-verb* is impossible to be omitted without context since this verbal type does not have information on the subject argument.

As proposed in the above constraints, ASL verb agreement is INDEX agreement. As for the number agreement, we have seen that singular verbs agree with plural arguments when those arguments are conceived as a "single" group collectively. In that case, the collective plural nominals are in

[14] In signed languages, phonological components include handshape including (palm) orientation, movement, and location. Thus, phonological value of inflected verbs includes locus and number agreement information.

ASL is articulated not only through manual signs but also through co-occurring non-manual expressions, which play an important role in the grammar (e.g. wh- or yes/no question, negation, etc.). But, this paper will not cover those features.

plural morphologically but singular semantically. Thus those nominals have *pl* in [CONCORD|NUM] and *sg* in [INDEX|NUM], so that verbs, showing INDEX agreement, agree in number *non-plural* with collective plural nominals.

5 Conclusion

Recent researches of signed languages tell us they should be considered as natural languages with their own grammar although they are still in an early stage. This paper analyzes person and number verb agreement in ASL through the recordings of a native signer (a Deaf) within the framework of HPSG.

ASL has three types of verbs – plain, spatial, and agreement verbs. Agreement verbs are divided into two subtypes – one showing object agreement in person and number and the other showing this information plus subject agreement in person. This differs from the typological generalization governing spoken languages in which subject agreement is favored over object agreement.

The constraints on the agreement verbs suggest that their argument can be optional. The inflecting morpheme of the verbs can be either agreement markers or incorporated pronoun arguments depending on whether the verbal arguments are expressed or not, like Chichewa (Bresnan and Mchombo 1987).

The ASL person paradigm has a 1st vs. non-1st person distinction. Based on spoken languages, many scholars (Greenberg 1963, Corbett 2000, etc.) have argued that the first person is ranked above other persons in the person hierarchy (1 > 2 > 3): an NP denoting a group that includes the speaker triggers first person agreement. In ASL (1 > 2, 3), NPs including the signer trigger 1st person verb agreement, and the verb in non-1st person is ungrammatical. Hence ASL resembles spoken languages with respect to the person hierarchy.

Turning to number, this paper proposed grammatical numbers in ASL divided into *plural* vs. *non-plural* and the latter includes *singular* and *dual*. ASL shows a different aspect from the common one in spoken languages – singular stands alone but dual etc. are grouped with plural. While there exist number-incorporated pronouns (up to about 9), I proposed that the grammatical number values in hierarchy includes only singular, dual, and plural.

The verb has either *plural* or *non-plural* (*singular*). The plural verbs agree with only plural arguments. Otherwise, the verbs are in *non-plural*. The verb

does not show number agreement with the subject at all. These facts are captured by the constraints on the types *verb* and *number*.

Signed languages have been recently considered as natural languages. Thus, the studies on signed languages are still in the beginning stages. In visual-gestural modality, non-manual marker plays an important role in grammar. Further research is required to investigate the role of non-manual markers in agreement.

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Long and short adjunct fronting in HPSG

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Abstract

The purpose of this paper is to consider the proper treatment of short- and long-fronted adjuncts within HPSG. In the earlier HPSG analyses, a rigid link between linear order and constituent structure determines the linear position of such adjuncts in the sentence-initial position. This paper argues that there is a body of data which suggests that adjunct fronting does not work as these approaches predict. It is then shown that linearisation-based HPSG can provide a fairly straightforward account of the facts.

1 Introduction

The purpose of this paper is to consider the proper treatment of short- and long-fronted adjuncts within HPSG.[*] The following sentences are typical examples.

(1) a. *On Saturday*, will Dana go to Spain? (Short-fronted adjunct)
b. *Yesterday* I believe Kim left. (Long-fronted adjunct)

In earlier HPSG analyses, a rigid link between linear order and constituent structure determines the linear position of such adverbials in the sentence-initial position. I will argue that there is a body of data which suggests that adjunct fronting does not work as these approaches predict. I will then show that linearisation-based HPSG can provide a fairly straightforward account of the facts.

The organisation of this paper is as follows. In the next section we will provide detailed descriptions of the differences between long and short fronting of adjuncts. In section 3 we will point out some problems of the earlier HPSG analyses of adjunct fronting constructions. Our analysis of adjunct fronting, partly based on Bonami et al.'s treatment of incidentals, will be given in section 4. In section 5, we will see how our approach to fronted adjuncts handles the data observed in earlier sections. Section 6 is the conclusion.

2 The data

In this section, we will see that short-fronted adjuncts should be differentiated from fronted noun phrases and long-fronted adjuncts in important respects.

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2.1 Information structure

Short fronted adjuncts can occur in a sentence focus context.

(2) A: What happened?
B: *Five minutes ago*, my car broke down.

A sentence with sentence focus can be an answer to *What happened?* The fact that a sentence with a short-fronted adjunct can be an answer to this question indicates that such an adjunct does not have a topic nor a narrow focus interpretation.

The following data indicates that the fronted noun phrase cannot be part of wide focus.

(3) A: What happened?
B_1: John broke the computer.
B_2: # *The computer*(,) John broke.

B1 has SVO word order: it can carry a sentence focus, as illustrated by the fact that it can be a felicitous answer to *What happened?* B2, with the fronted noun phrase, cannot be a felicitous answer to the question requiring a sentential focus domain.

Long fronted adjuncts do not occur in such a context, either.

(4) A: What happened?
B: # *With a hammer* I think he broke the window.

The data in (4) suggest that long-fronted adjuncts cannot be part of a broad focus domain, unlike short-fronted adjuncts.

The above observation suggests that short-fronted adjuncts can be a part of a broad focus domain, but long-fronted adjuncts and fronted NPs cannot.

2.2 Blocking of *wh*-extraction

It is difficult for fronted arguments to follow a fronted *wh*-phrase (See also Baltin 1982; Rizzi 1997).[1]

(5) ?? the student to whom, *your book*, I will give tomorrow
(Haegeman 2003: 642, (3))

In Haegeman's (2003) terms, fronted arguments 'block *wh*-extraction'.

Now let us look at long adjunct fronting. The fronted adjuncts in (6), *on Tuesday*, cannot be construed with the lower clause.[2]

---

[1] The observations in this and the following subsection depend on Haegeman (2003).

[2] (6) is grammatical with the interpretation that the adverbials modify the higher clause.

(6) I called up my mother, who, *on Tuesday*, I had told it is likely that Sandy will visit Leslie. (Haegeman 2003: 643–644)

This means that long-fronted adjuncts cannot follow fronted *wh*-phrases: they block *wh*-extraction.

However, if the *wh*-phrase is followed by a short-fronted adjunct, the sentence is fully grammatical.

(7) the student to whom, *tomorrow*, I will give your book (Haegeman 2003: 642)

Thus, short-fronted adjuncts do not block *wh*-extraction.

Thus, again, long fronted adjuncts behave like fronted arguments, rather than short-fronted adjuncts. It is possible to say that positioning of short-fronted adjuncts is relatively free compared with the others in that the former can follow fronted *wh*-phrases while the latter cannot.

2.3 Restriction to root/root-like clauses

Argument fronting is restricted to root clauses or clauses with root behaviour.

(8) * If *these exams* you don't pass, you won't get the degree. (Haegeman 2003: 642)

The sentence in (8) has a fronted argument in a non-root clause, and it is ungrammatical.

Turning to long fronted adjuncts, (9) shows that they resist non-root environments.

(9) If *this afternoon* they say that it will rain, we won't go. (Haegeman 2003: 644)

The fronted adverb *this afternoon* is only construed with the higher clause, which means that in such non-root environments as the *if*-clause in (9), long fronting of adjuncts is impossible.

However, short adjunct fronting can occur in non-root clauses as well.

(10) If *next week* you cannot get hold of me, try again later. (Haegeman 2003: 642)

This sentence shows that short adjunct fronting is grammatical in the same environment as (8).

Thus, again, long-fronted adjuncts behave like fronted arguments, rather than short-fronted adjuncts. Again, it is possible to say that positioning of short-fronted adjuncts is relatively free compared with the others in that the former can follow complementisers while the latter cannot.

2.4 Summary

Our observations in 2.1 to 2.3 are summarised in (11).

(11)

	Part of broad focus	Blocking of extraction	Root(-like) clauses
Short-fronted adjuncts	Yes	No	No
Long-fronted adjuncts	No	Yes	Yes
Fronted NP arguments	No	Yes	Yes

(11) clearly shows that long-fronted adjuncts and fronted arguments pattern alike, and short-fronted adjuncts are separate from them.

3 Earlier HPSG analyses

In this section, we look at three types of analysis of fronted adjuncts which have been proposed in the framework of HPSG: Pollard and Sag (1994), Bouma et al.'s (2001) and Levine (2003)/Levine and Hukari (2006).

In the version of HPSG developed by Bouma et al. (2001: 385) clause-internal fronting and long-distance fronting of adjuncts are treated in parallel, in terms of combination of the filler and the slashed construction, in the same way as fronting of noun phrases (Bouma et al. 2001: 45).[3,4] The only difference between short and long fronting is where the SLASH inheritance terminates. This unified treatment cannot capture the fact that there are important differences between the two types of adjuncts.

Pollard and Sag (1994: 385) analyse short fronted adjuncts as matrix modifiers, which are simply adjoined to the clause that they modify. An adjunct and its head combine via the ID schema called 'Schema 5' (Pollard and Sag 1994:56). Chapter 9 of Pollard and Sag (1994) gives a separate treatment to long adjunct fronting. They posit the Adjunct Extraction Lexical Rule (Pollard and Sag 1994: 387). Thus, Pollard and Sag's (1994) approach treats short and long fronting of adjuncts separately. It would therefore be not difficult to capture the difference between these types of adjuncts observed above.

Let us turn to the analysis of adjunct fronting developed by Levine (2003)/Levine and Hukari (2006). They assume that adverbials in adjoined positions can extract with leaving a trace behind. With this assumption, it would not be difficult to differentiate between the two types of adjuncts:

[3] See also Sag (2005).

[4] Bouma et al. (2001) and Sag (2005) assumes that the ARG-ST of the lowest verb contains an adverbial element which is slashed.

long-fronted adjuncts are extracted, and short-fronted adjuncts are adjoined to an S node.

However, the ungrammaticality of (12) is problematic for Pollard and Sag (1994), Levine (2003)/Levine and Hukari (2006).[5]

(12) * I was wondering [$_S$ during the holidays [$_S$ for what kind of jobs [$_S$ you would go into the office.]]]

There is nothing in these analyses to prevent a filler from combining with an embedded *wh*-question.

One might introduce the head feature INDEPENDENT-CLAUSE (IC) (Ginzburg and Sag 2000: 45) to rule out (12). The [IC +] specification for the sister of the adjunct could exclude (12) since embedded *wh*-questions are [IC −]. However, this gives rise to another problem.

(13) I was wondering [$_{S[IC\ -]}$ for what kind of jobs [$_{S[IC\ -]}$ during the holidays [$_{S[IC\ -]}$ you would go into the office.]]]

In (13) the preposed adjunct occurs in the clause with the specification [IC −]. This means that the S that the adjunct modifies is also [IC −] because the Head Feature Principle ensures that the HEAD value of the mother is structure-shared with the head value of the head daughter. This example is then predicted to be ungrammatical. However, it is grammatical.

In this section, we have discussed how earlier analyses of adjunct fronting work, and have pointed out problems that they are confronted with. The failure of these analyses is due to the fact that they are not aware of the distinction between extracted adjuncts and incidental adjuncts, and the peculiar properties of the latter.

4 Proposals

In this section we will provide an alternative analysis of fronted adjuncts. In the version of HPSG adopted here, linear order is determined in a level of 'order domains' (e.g., Kathol 1995, 2000; Kathol and Pollard 1995; Müller 1995, 1997, 2004; Pollard et al. 1994; Reape 1994, 1996). This is an ordered list of elements that contain at least phonological and categorical information (see, e.g., Pollard et al. 1993; Kathol 1995). Order domains are given as the value of the attribute DOM(AIN). At each level of syntactic combination, phonological and categorical information of the daughter may form a single domain element in the order domain of the mother (i.e., compaction) or the elements of the daughter's order domain may just become elements in the mother's order domain.

We further assume that each element of a clausal order domain is uniquely marked for the region that it belongs to (Kathol 1995, 2000, etc.).

[5] This data is problematic for Bouma et al. (2001) as well.

In our approach, the positioning of an element in a particular region is encoded as *first* through *fifth* on that element. We propose the following topological fields for English (cf. Kathol 2002; cf. Chung and Kim 2003).

(14) Topological fields for English

first	Extracted constituents except for subordinate *wh*-phrases
second	Finite auxiliary verbs in subject-auxiliary inversion (SAI) sentences, Complementisers, Subordinate *wh*-phrases
third	Non-*wh*-subjects
fourth	Finite verbs in non-SAI-sentences
fifth	Complements of the verb in *fourth*

There is a total order on these positional classes, enforced by the linear precedence (LP) constraint in (15).

(15) $first \prec second \prec third \prec fourth \prec fifth$

4.1 Long-fronted adjuncts and fronted NP arguments

In section 2 we saw that long-fronted adjuncts and fronted arguments behave in parallel. This fact strongly suggests that they are one and the same. We assume therefore that they are manifestations of a single extraction phenomenon, which should be handled by the SLASH mechanism. Thus, a sentence with a long-fronted adjunct and a sentence with a fronted NP argument are represented as in (16a) and (b), respectively.[6]

(16) a. [DOM <[^{first} yesterday], [^{third} I], [^{fourth} believe], [^{fifth} Kim left]>]

b. [DOM <[^{first} the computer], [^{third} John], [^{fourth} broke] >]

The long-fronted adjunct *yesterday* and the fronted NP argument *the computer* are in *first* position since they are fillers (See (14)). We further assume that a filler with an empty REL and QUE value is given either a narrow focus or a topic interpretation.

4.2 Incidentality

We will now introduce the notion of 'incidentality' (Bonami and Godard 2003; Bonami, Godard and Kempers-Manhe 2004).[7] Adverbials are inci-

[6] In the rest of this paper, position classes will be shown as superscripts as in (16a,b).

[7] Bonami and Godard (2003) and Bonami, Godard and Kempers-Manhe (2004) distinguish incidentality from 'parentheticality'. The latter term denotes the semantic/pragmatic property. Adverbials have a parenthetical interpretation when their semantic/pragmatic contribution is not integrated into the proposition which the sentence asserts.

dental when they have a special prosody which sets them apart from the rest of the sentence. Fronted adjuncts clearly have incidentality in this respect since they have 'comma intonation'. Moreover, incidentals have some flexibility with respect to positioning. For example, Bonami and Godard (2003) state that a French sentence (17) can contain incidentals in the positions indicated with dots.

(17) • Paul • a • envoyé • ses voeux • à ce vieil ami •
Paul has sent his wishes to this old friend
'Paul sent his best wishes to this old friend of his.'
(Bonami and Godard 2003: 2)

This is also characteristic of adjuncts which we are concerned with. (18) shows that the adverbial *at five* can occur in various positions.

(18) a. *At five*, John finally signed the form.
b. John finally, *at five*, signed the form.
c. John finally signed the form, *at five*.
(Adapted from Shaer 2004: 314)

Moreover, it has comma intonation wherever it occurs. It is thus reasonable to assume that these adjuncts are manifestations of the same incidental adverbial.[8]

We assume that incidental adverbials have the following description.

(19) Description of incidental adverbials

$$\begin{bmatrix} \text{PHON} & \textit{incidental - phon} \\ \text{HEAD} & \begin{bmatrix} \text{INCID} & + \\ \text{MOD} & \text{VP} \end{bmatrix} \\ \text{CONT} & [1] \\ \text{INFO-STRUC} & \begin{bmatrix} \text{LINK} & [2] \\ \text{FOCUS} & [3] \end{bmatrix} \end{bmatrix}, \text{ where } [1] \neq [2] \text{ and } [1] \neq [3]$$

The PHON value specifies that they have incidental phonology ('comma intonation'), and [INCID +] specifies that they are incidentals (Bonami and Godard 2003: 10).[9] Incidentals are ordinary adjuncts in constituent structure (Bonami and Godard 2003: 11). We assume that they are VP adjuncts (Levine 2003; Levine and Hukari 2006). We assume, following Engdahl (1999: 186–187), that each of INFO-STRUC features takes *content* objects (i.e., values of the CONTENT feature) as its value. The LINK and FOCUS features are among those appropriate for INFO-STRUC. '[1] ≠ [2] and [1] ≠ [3]' in (19) specifies that the CONTENT value of incidental adjuncts is not

[8] Shaer (2004: 314) call such adverbials 'orphans' (cf. McCawley 1982, Espinal 1991; Haegeman 1988).

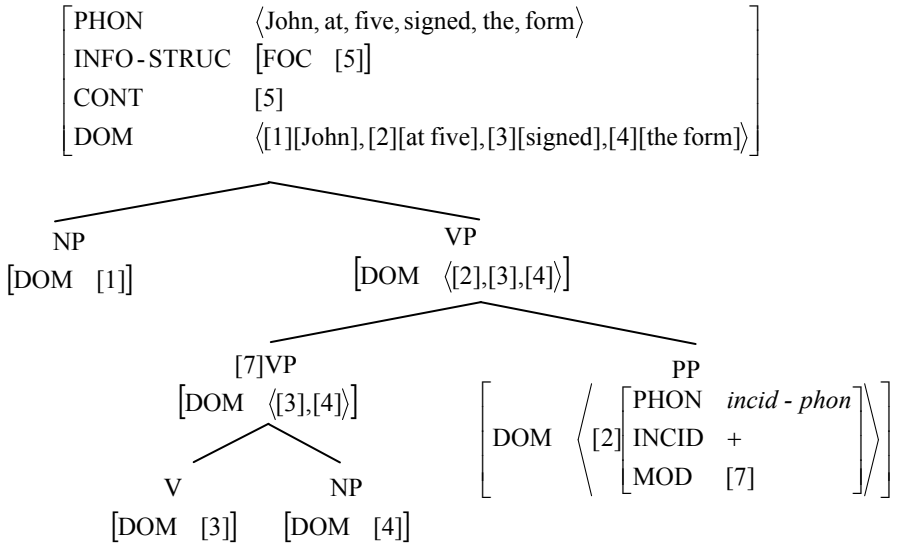
[9] Phrases phonologically fully integrated into the rest of the clause have the [INCID −] specification.

identified with the LINK and the FOCUS value: incidental adverbials should be neither topic nor narrow focus.

We assume above that incidentals are ordinary adjuncts that modify a VP. To ensure that incidental adverbials are linearised in various positions of the sentence they modify (see (18)), we assume, along with Bonami and Godard's (2003: 12), that such modifiers are domain-inserted into the domain of the VP they modify.

We assign the following representation to (18b).

(20) Structure for (18b)



The adverbial *at five* is a modifier of the VP *signed the form*, and the former is inserted into the order domain of the latter. By sequence-union (shuffle), other ordering possibilities of the top S are also permitted, as illustrated in (21).

(21) a. [DOM <[at five], [John], [finally], [signed], [the form]>]

b. [DOM <[John], [finally], [signed], [the form], [at five]>]

Thus, an approach along the lines of Bonami and Godard (2003) can give a unified treatment of the adverbials in various positions while maintaining the assumption that they are all VP modifiers. In the present approach, then, what we have called short-fronted adjuncts are incidentals which are in the initial position of a sentential order domain.

We argued that incidental adverbials can occur in various positions in a sentence (See (18) and (21)). This does not mean, however, that they are unconstrained in their positioning. Standard English does not allow anything in subordinate clauses to come before complementisers or fronted

wh-phrases.

(22) a. He said that *tomorrow* it will rain.
b. * He said *tomorrow* that it will rain.

This restriction is not universal. The following example, cited from Hudson (2003: 640), is from Greek (Tsimpli 1990).

(23) Mu-ipe to vivlio oti edhoso sti Maria.
to-me-he-said the book that he-gave to-the Mary
'He said that he gave the book to Mary.'

In this example, the topicalised object *to vivlio* 'the book' which belongs to the subordinate clause precedes the complementiser *oti* 'that'. Due to the fact that there is a language where the pattern in (22b) is possible, we will not make this restriction a universal principle. We assume the following constraint, which requires that subordinate clauses have restricted order domains (cf. Kathol 2000: 120).

(24) $\textit{subordinate} \rightarrow \left[\text{DOM} \ \langle [\textit{second}], \ldots \rangle\right]$

(24) requires that the initial element in the order domain of a subordinate clause is an element in *second* position. The order domains of the embedded clause of the examples in (22) are represented as follows.

(25) a. [DOM < [^{second} that], [*tomorrow*], [^{third} it], [^{fourth} will], [^{fifth} rain]>]
b. * [DOM <[*tomorrow*], [^{second} that], [^{third} it], [^{fourth} will], [^{fifth} rain]>]

(25b), in which the complementiser is preceded by an adverb, is excluded because it violates the constraint in (24).[10]

5 An account of the facts

In this section we will consider how our analysis outlined above accommodates the data that is problematic for the earlier HPSG analyses of fronted adjuncts.

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[10] Another constraint that is needed is the following.

(i) $\left[\text{DOM} \ \left\langle \ldots, [\text{HEAD} \ \textit{verb}], [1], \begin{bmatrix} \textit{nominal} \\ \text{MOD} \quad \textit{none} \end{bmatrix}, \ldots \right\rangle\right] \rightarrow [1][\text{INCID} \ -]$

This constraint bars incidentals from occupying the position between a verb and a noun phrase. It rules out examples like (ii), where there is an incidental adjunt between the verb and its object.

(ii) * John signed *at five* the form.

As shown in (17), incidental adverbials can be in this position in French. The constraint in (i) is therefore an English-particular constraint.

5.1 Information structure

As discussed in 4.1, incidental adverbials have the description in (19). This definition states that incidental adverbials are neither a narrow focus nor a topic. This constraint captures the fact that such adverbials occur in a sentence focus context such as (2), repeated in (26).

(26) A: What happened?
B: *Five minutes ago*, my car broke down. [= (2)]

In our analysis, a filler is only allowed to be a topic or a narrow focus (See 4.1). They cannot be part of a broad focus domain. This accounts for the unacceptability of B_2 in (3) and B in (4).

(27) A: What happened?
B_1: John broke the computer.
B_2: # *The computer*(,) John broke. [= (3)]

(28) A: What happened?
B: # *With a hammer* I think he broke the window. [= (4)]

5.2 Blocking of *wh*-extraction

We will see how our analysis captures the fact in (7), which is repeated in (29).

(29) The student to whom, *tomorrow*, I will give your book. [= (7)]

This example is given the following DOM representation.

(30) [DOM <[^{second} to whom], [*tomorrow*], [^{third} I], [^{fourth} will], [^{fifth} give your book]>]

The *wh*-phrase is in *second* in subordinate clauses. The incidental adverbial follows them. This positioning does not violate any LP constraint.

Let us see how our analysis of extracted phrases given in 4.1 handles the ordering patterns of fronted NP arguments. As we have seen in (5) fronted arguments cannot occupy the position after the fronted *wh*-phrase. The data is repeated here for convenience.

(31) ?? the student to whom, *your book*, I will give tomorrow. [= (5)]

The representation of the DOM value of the embedded clause of (31) is given in (32).

(32) * [DOM <[^{second} to whom], [^{first} *your book*], [^{third} I], [^{fourth} will], [^{fifth} give tomorrow]>]

In (32), the relative *wh*-phrase *to whom* is in *second*. The fronted argument occupies *first*. In these examples, however, they follow the *wh*-phrase. This ordering violates Topological LP Statement (15), which states, among other things, that elements in *first* should precede those in *second* and those in *third*. The representation in (32) violates this constraint, so (31) is ungrammatical.

The fact that the fronted adjuncts in (6), repeated in (33), cannot be construed with the lower clause can be accounted for along the same lines.

(33) I called up my mother, who, *on Tuesday*, I had told it is likely that Sandy will visit Leslie. [= (6)]

In our analysis, long fronted adjuncts are fillers, and they occupy *first* position. The *wh*-phrase is in *second*. Thus, the relative clause of (33) has the following representation.

(34) * [DOM <[^{second} who], [^{first} *on Tuesday*], [^{third} I], [^{fourth} had], [^{fifth} told it is likely that Sandy will visit Leslie]>]

The permutation in (33) is prohibited for the same reason as (31): it violates Topological LP Statement (15).

5.3 Restriction to root/root-like clauses

The fact that short adjunct fronting is not restricted to root/root-like clauses, as opposed to argument fronting and long adjunct fronting, can be accounted for in the same way.

(35) If *next week* you cannot get hold of me, try again later. [= (10)]

In our assumption, complementisers occupy *second* position in subordinate clauses. Therefore, we have the following representations for the subordinate clause of these sentences.

(36) [DOM <[^{second} if], [*next week*], [^{third} you], [^{fourth} cannot], [^{fifth} get hold of me]>]

The incidental adjunct is between the complementiser and the subject NP. This positioning of incidental adverbial does not violate any LP constraint.

The fact that argument fronting and long adjunct fronting is restricted to root/root-like clauses can be accounted for in the same way. The subordinate clauses in (37) and (38) are non-root clauses. In (38), *this afternoon* cannot be interpreted to modify the lower clause.

(37) * If *these exams* you don't pass, you won't get the degree. [= (8)]

(38) If *this afternoon* they say that it will rain, we won't go. [= (9)]

In our analysis, complementisers occupy *second* position. Therefore, we

have the following representations for the subordinate clause of the sentences in (37) and (38).

(39) a. * [DOM <[^{second} if], [^{first} *these exams*], [^{third} you], [^{fourth} don't], [^{fifth} pass]>]

b. * [DOM <[^{second} if], [^{first} *this afternoon*], [^{third} they], [^{fourth} say], [^{fifth} that it will rain]>]

In these structures, the complementiser in *second* is followed by a fronted argument in *first*, which violates the LP constraint in (15).

5.4 An account of (12) and (13)

Let us turn to the sentences in (12) and (13), which are repeated in (40).

(40) a. * I was wondering *during the holidays* [for what kind of jobs you would go into the office]. [= (12)]

b. I was wondering [$_{S[IC -]}$ for what kind of jobs [$_{S[IC -]}$ during the holidays [$_{S[IC -]}$ you would go into the office.]]] [= (13)]

The DOM representation of the subordinate clause of (40a) and (b) is (41a) and (b), respectively.

(41) a. * [DOM <[*during the holidays*], [^{second} for what kind of jobs], [^{third} you], [^{fourth} would], [^{fifth} go into the office]>]

b. [DOM <[^{second} for what kind of jobs], [*during the holidays*], [^{third} you], [^{fourth} would], [^{fifth} go into the office]>]

In our analysis, the initial positioning of incidental adjuncts is just one of possible alternative linearisation patterns. In (41a), the incidental adjunct is the first domain element of the subordinate clause. This violates the LP constraint in (24). The incidental adjunct in (41b), on the other hand, does not violate any LP constraint.

6 Conclusion

The arlier HPSG analyses of adjunct fronting face difficulties since they do not take into account the distinction between extracted phrases (long-fronted adjuncts and fronted NP arguments) and incidental adjuncts. In our linearisation-based analysis, extracted phrases are fillers which occupy *first* position in sentences; incidental adjuncts are not categorised into any position class, which enables them to have a rather free positioning. This characterisation of fronted adjuncts can provide a fairly straightforward account of the facts

that are problematic for earlier analyses.[11]

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[11] Once it is established that the long fronting of adjuncts is due to the SLASH mechanism, there should also be cases where the SLASH value is matched with a filler within the same clause as the trace. That is, there should be a variant of short adjunct fronting with the same effects as argument fronting and long adjunct fronting. The following examples illustrate.

(i) LAST year we were living in St. Louis. (Culicover 1991: 34)

(ii) This is John's schedule. *On Monday*, he plays a match in London and meets the press. *On Tuesday*, he plays a match in Sheffield… (Shaer 2004: 325)

In (i), the short-fronted adjuncts *last year* has narrow focus, and hence they have heavy stress. In (ii), the adjuncts *on Monday* and *on Tuesday* function as a topic or a 'link' (Birner and Ward 1998) in that the fronted adjunct stands in some salient and relevant relationship to elements that have been evoked in the prior discourse.

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Hybrid agreement as a conflict resolution strategy

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Abstract

Situations in which conflicting constraints clash can potentially provide linguists with insights into the architecture of grammar. This paper deals with such a case. When predicative modifiers of morphologically rich languages head relative clauses, they are involved in two, sometimes conflicting, agreement relationships. Different languages adopt different strategies in order to resolve situations of conflicting constraints. This paper focuses on Standard Arabic and the hybrid agreement strategy which it employs. It argues that the HPSG theory of agreement, which distinguishes between morphosyntactic and semantic agreement, constitutes an appropriate framework for accounting for the phenomenon. In addition, it shows that contrary to claims made by Doron and Reintges (2005), a non-derivational framework such as HPSG is adequate for accounting for this non-trivial agreement pattern. Moreover, with a constructional approach, whereby constraints can target syntactic structures above the lexical level, better empirical coverage is achieved.

1 Introduction

Situations in which conflicting constraints clash can potentially provide linguists with insights into the architecture of grammar. This paper deals with such a case. It examines the different strategies which languages use in order to resolve an agreement conflict which occurs in non-finite relative clauses. The strategy adopted by Standard Arabic (SA), namely hybrid agreement, poses a challenge to theories of grammar in general and agreement in particular. Indeed, Doron and Reintges (2005, p. 10) claim that the existence of this construction implies "that a linguistic structure is constructed procedurally rather than checked declaratively, in other words as a derivation rather than a representation". Thus, the main goal of the paper is to examine the implication of the SA hybrid agreement strategy on competing theories of agreement.

The structure of the paper is as follows. Section 2 lays the foundations by providing the required background and data of Standard Arabic and introducing the agreement conflict. Section 3 discusses and illustrates the four possible conflict resolution strategies, as they are realized in SA, Hebrew, Turkish, and Older Egyptian. Section 4 outlines a derivational account of the Standard Arabic construction, as proposed by Doron and Reintges (2005), and discusses its implications and predictions. The proposed analysis is introduced in section 5. The section begins with a presentation of an alternative theory of agreement (Corbett 1988; Pollard and Sag 1994; Kathol 1999; Wechsler and Zlatić 2003), which was motivated by similar yet distinct hybrid agreement phenomena and which was incorporated into

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HPSG. This is followed by a detailed HPSG-based analysis of the SA construction. The conclusion, given in section 6, is that the HPSG framework and its theory of agreement provide a sophisticated mechanism for accounting for the challenging SA construction, as well as for other alternative conflict resolution strategies, resulting in better empirical coverage.

2 Modifiers, predicates, and predicative modifiers in Standard Arabic

Nouns, participles, and adjectives in Standard Arabic (SA) are inflected for NUMBER, GENDER, DEFINITENESS and CASE. When used attributively, adjectives and participles exhibit full agreement with the noun they modify.

(1) ra'aytu l-walad-a a-TTawiil-a
I.saw the-boy.SM-ACC the-tall.SM-ACC
"I saw the tall boy."

(2) ra'aytu mara'a-t-an naa'im-a-tan
I.saw woman.SF-ACC sleeping.PTCP.SF-ACC
"I saw a sleeping woman."

When used as predicates, they agree in NUMBER and GENDER with their subject and are usually marked with nominative case.

(3) al-walad-u Tawiil-un
the-boy.SM-NOM tall.SM-NOM
"The boy is tall."

(4) al-mara'a-tu naa'im-a-tun
the-woman.SF-NOM sleeping.PTCP.SF-NOM
"The woman is sleeping."

Finite relative clauses in SA are "linked" to the relative head with a relative complementizer. The relative complementizer of finite RCs in Standard Arabic has a NUMBER-GENDER-CASE inflectional paradigm and it exhibits full agreement with the relative head.

(5) al-walad-u alladhii ra'aythu-hu
the-boy.SM-NOM REL.SM-NOM I.saw-him
"the boy whom I saw"

(6) al-muqaabalat-u allatii HaDara-haa
the-meeting.SF-NOM REL.SF-NOM attended.3SM-ACC.SF

"the meeting that he attended" (Badawi et al., 2004)

The relative complementizer is morphologically definite. When the relative head is indefinite the relative complementizer is absent.

(7) muqaabalat-un HaDara-haa
meeting.SF-NOM attended.3SM-ACC.SF

"a meeting that he attended"

Non-finite relative clauses (NF-RCs) are headed by participles and adjectives. Similarly to reduced relative clauses, NF-RCs are not "linked" to the relative head by a relative pronoun or relativizer. When the referent of the relative head is construed as the subject of the relative clause, the head of the RC, be it a participle or an adjective, exhibits full NUMBER-GENDER-CASE-DEFINITENESS agreement with the relative head.

(8) a. 'ijtama9tu bi-rajul-in saariq-in qalam-an
I.met with-man.**SM-GEN** stealing.PTCP.**SM-GEN** pen-ACC

"I met a man (who is) stealing a pen."

b. 'ijtama9tu bi-l-rajul-i a-ssaariq-i
I.met with-**the**-man.**SM-GEN** **the**-stealing.PTCP.**SM-GEN**
qalam-an
pen-ACC

"I met the man (who is) stealing a pen."

The argument structure of the participle and the Case assigned to the arguments are identical to those of its finite counterpart.

(9) saraqa l-rajul-u qalam-an
stole.3SM the-man.SM-NOM pen-ACC

"The man stole a pen."

Alternatively, the referent of the modified noun can be construed as a non-subject argument of the participle, similarly to a non-subject relative clause. In this case, the subject of the relative clause is assigned nominative case, and a resumptive pronoun obligatorily appears in the relativized position.

This constructions imposes two different agreement constraints on the head of the NF-RC. As a noun modifier, it is required to exhibit full agreement with its head. As a predicate, it is required to exhibit NUMBER-GENDER agreement with its subject. Thus, when the relative head and the RC-internal subject differ in their NUMBER and GENDER features, a conflict arises.

3 Resolving conflicting constraints

Theoretically, there are four possible strategies for resolving the conflict:

1. Hybrid agreement
2. Avoidance
3. Agreement only with the relative head
4. Agreement only with the subject

Strategy 1

Strategy 1, namely hybrid agreement, is espoused by SA. As is illustrated in (10), the participle in (10a) is definite and marked with genitive case, in agreement with the relative head *l-mara* ('woman'), and exhibits a singular masculine morphological form, in agreement with its subject *zawj* ('husband'). The sentence in (10b) illustrates a similar agreement pattern with the adjective *jamil* ('beautiful').

(10) a. 'ijtama9tu bi-l-marat-i [l-jaalis-i
I.met with-**the**-woman-**GEN** **the**-sitting.PTCP.**SM-GEN**
zawj-u-haa]
husband.**SM**-NOM-POSS.3SF
"I met the woman whose husband is sitting."

b. ra'aytu mra'a-t-an jamil-an wajh-u-haa
I.saw woman.SF-**ACC** beautiful.**SM-ACC** face.**SM**-NOM-POSS.3SF
"I saw a woman with a beautiful face."

Thus, the agreement properties of the head of the RC are split between agreement with the relative head in CASE and DEFINITENESS and with the subject in NUMBER and GENDER. In addition, the relativized argument in the RC, a possessor in both cases, is instantiated with a resumptive pronoun, which refers back to the relative head. This construction is referred to as *na't sababi* in the Arabic tradition (Badawi et al., 2004).

Strategy 2

Modern Hebrew (MH), a related Semitic language, exhibits distinct behavior with respect to NF-RCs. Non-finite predicates can appear in two types of relative clauses in Modern Hebrew: *she*-RCs and *HA*-RCs. Relative clauses with the relativizer *she* license both subject and non-subject NF-RCs (as well as finite RCs).

(11) a. ha-'anashim [**she**-mexakim ba-taxana]
the-people.PM **that**-waiting.PTCP.PM in-the-station
"The people waiting in the station"

b. ha-'isha [**she-**ba'al-a
the-woman.SF **that-**husband.SM-POSS.3SF
yoshev/yafe]
sitting.PTCP.SM/beautiful.SM
"The woman whose husband is sitting/beautiful"

Relative clauses with the relativizer *HA* are restricted to participles. The participle in MH exhibits full NUMBER-GENDER agreement with its subject, when it functions as a predicate, and with the modified noun, when it functions as a modifier. Case is not marked morphologically.

(12) (ha-)'anashim [**ha-**mexakim ba-taxana]
(the-)people.PM **HA-**waiting.PTCP.PM in-the-station
"(The) people waiting in the station"

The relativizer *HA*, which is homophonous with, and diachronically related to the definite marker *ha*, is prefixed to the participle. While the exact category of this prefix is controversial, it is nevertheless distinguished from the definiteness marker, hence the distinct glosses.[1] One distinguishing property is that while adjectival modification requires definiteness agreement, which is manifested by the co-occurrence (or absence) of the prefix *ha*, the relativizer *HA* appears regardless of the definiteness of the relative head. This is illustrated by sentence (12).

Relative clauses with the relativizer *HA* are restricted to subject NF-RCs. Thus, Modern Hebrew (MH) employs the second strategy listed above — avoidance. While subject NF-RCs with the relativizer *HA*, such as (12), are commonplace in MH, their non-subject counterparts are disallowed, as is seen in (13).

(13) *ha-'isha [**ha-**yoshev/**ha-**yafe
the-woman.SF **HA-**sitting.PTCP.SM/**HA-**beautiful.SM
ba'al-a]
husband.SM-POSS.3SF
Intended meaning: "The woman whose husband is sitting/beautiful"

Strategies 3 & 4

Evidence of the use of strategies 3 & 4 are hard to come by. At this point I have not found examples of languages which exhibit both subject-predicate and head-modifier agreement *and* which resort to either of the strategies to resolve an agreement conflict in a NF-RC construction. Doron and Reintges (2005), however, discuss the NF-RC construction of Older Egyptian and Turkish, which demonstrate agreement patterns reminiscent of strategies 3 & 4.

In Older Egyptian participles do not agree with their subject. As heads of RCs, they do agree with the relative head in NUMBER and GENDER. CASE and

[1] See discussion in Doron and Reintges (2005).

DEFINITENESS are not marked. Thus, as is illustrated in (14), Older Egyptian exhibits an agreement pattern similar to strategy 3.

(14) mxʔt tw n(j)t rʕ [fʔ-ʔ(-w)-t mʔʕt jm-s rʕ nb]
scale.**FS** this.FS of.FS Re carry-IMPF-PASS-PTCP.**FS** justice in-3FS day every

"this scale of Re in which justice is carried very day'
(Coffin Texts V 321:c-d/B1C])

Agreement only with the subject of a non-subject NF-RC is found in Turkish. Thus, in (15) below, the participle *sölye-diğ-im* ('say') agrees with its first person singular pronoun subject *ben-im*.

(15) [ben-im sölye-diğ-im] söz-ler
I-GEN say-PTCP.PRES/PAST-POSS.**1S** word/utterance-P

"the words I said"

Nevertheless, this cannot be considered a conflict resolution strategy, since the language does not exhibit head-modifier agreement.

An interesting case of alternating strategies is found in Talmudic Hebrew. Although, as was previously discussed, Modern Hebrew adopts avoidance as its strategy, in Talmudic Hebrew and especially in Hebrew texts from the Middle Ages there are examples of concurrent uses of the strategies 3 & 4 (Perets, 1967). Thus, participles which agree only with the relative head (16a) appear alongside participles which agree only with their subjects (16b).

(16) a. ha-davar [ha-mevukash yedi'a-to]
the-thing.**SM** HA-expected.PTCP.**SM** knowledge.SF-POSS.3SM
"The think whose knowledge is expected"

b. xovot [ha-kavua la-hem zman]
debts.PM HA-defined.PTCP.**SM** to-them.PM time.**SM**
"Debts for which a time was defined"

It should be noted, however, that in this historical period, Hebrew was only used as a written language. Thus, the authors of these texts were not native speakers of the language.

The instability of the alternating strategies in Talmudic Hebrew and the fact the neither strategy survived the test of time suggest that these strategies are not favorable in such circumstances. Naturally, this cannot be taken as hard evidence. However, I have yet to find examples of other languages in which an agreement conflict occurs and which favor one agreement constraint over the other.

At this point I believe it is evident that the phenomena described here poses challenges to theories of grammar in general and agreement in particular. In the

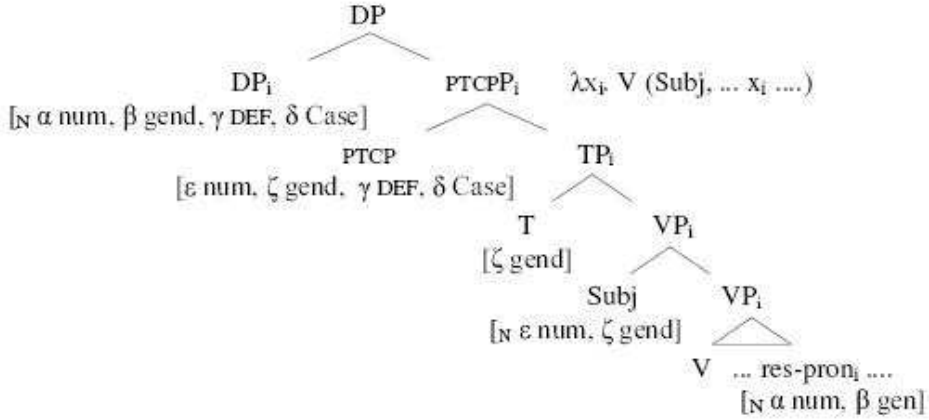


Figure 1: Non-subject NF-RCs (Doron and Reintges, 2005)

following sections I first present an outline of an analysis of the NF-RC proposed by Doron and Reintges (2005) and address the type of predictions it makes. Next I propose an alternative non-transformational analysis which builds on a theory of agreement which, as I show, provides an adequate framework for accounting for the phenomena at hand.

4 A derivational account of agreement mismatches in non-subject NF-RCs

Doron and Reintges (2005) propose an analysis of non-subject NF-RCs in Standard Arabic in a transformational framework. The locus of their analysis is the agreement checking mechanism, whereby the derivation of syntactic structures involves the movement of syntactic elements in the tree to positions where their features are checked. Doron and Reintges propose that the distinction between the hybrid agreement strategy of SA and the avoidance strategy of Modern Hebrew is in the possibility for erasure of checked agreement features. In SA, where checked agreement features are deleted in the derivation, the potential clash between the agreement features of the participle and the head noun is avoided. In Modern Hebrew, features are not erased, hence the clash and consequent avoidance of the construction. The syntactic derivation of non-subject NF-RCs in SA, as proposed by Doron and Reintges (2005), is given in figure 1.

Doron and Reintges take a step further by claiming that "[m]ore generally, these mismatches have implications for the overall architecture of linguistic structures. They imply that a linguistic structure is constructed procedurally rather than checked declaratively, in other words as a derivation rather than a representation" (Doron and Reintges, 2005, p. 42). Thus, they suggest that the parametrization of the erasure of checked features is a better account of the phenomena than the

parametrization of the procedural architecture of grammar.

Aside from the obvious challenge that Doron and Reintges pose to non-transformational syntacticians, a challenge which will be taken up in the following sections, their analysis makes two predictions. First, it predicts that non-subject NF-RCs in Modern Hebrew should be avoided only in cases where agreement features clash.[2] In other words, when the agreement features of the relative head and the subject of the RC match, non-subject NF-RCs should be possible. This prediction is not borne out by the data. Thus, MH avoids this construction regardless of the agreement properties of the two constituents, as is shown in (17).

(17) *ha-'isha [ha-yoshevet/ha-yafa axot-a]
the-woman.**SF** HA-sitting.PTCP.**SF**/HA-beautiful.**SF** sister.**SF**-POSS.3SF

Intended meaning: "The woman whose sister is sitting/beautiful"

Second, the transformational analysis predicts the preeminence of the subject-predicate agreement constraint; since the position where subject-predicate agreement is checked is lower in the tree than that of head-modifier agreement, the former is checked first (Edit Doron, p.c.). Thus, strategy 3, where the participle agrees with the relative head and not with its subject is unavailable in principle. As was mentioned earlier, I have yet to find a language which uses strategy 3 to resolve this type of an agreement conflict, excluding, of course, the alternating strategies of Talmudic Hebrew. Thus, the second prediction tentatively holds.

In what follows I take up the challenge put forward by Doron and Reintges (2005) and propose a non-transformational analysis of the different available strategies of resolving conflicting constraints on agreement in the NF-RC, focusing mainly on SA and its hybrid agreement strategy. As a first step I outline a theory of agreement which, as I subsequently show, provides an adequate framework in which to account for the data.

5 A constraint-based analysis of agreement patterns in the NF-RC

5.1 A theory of agreement

The theory of agreement developed by Pollard and Sag (1994), Kathol (1999), and Wechsler and Zlatić (2003) in the HPSG framework, and within a descriptive approach by Corbett (1988), distinguishes between two types of structural agreement: *morphosyntactic agreement* (also referred to as 'concord'), and *index agreement* (also referred to as 'semantic agreement'). The two types are distinguished in terms of the features sets that they involve and in their domain of application.

Morphosyntactic agreement is associated with the formal realization of the word and generally involves the features: CASE, NUMBER, and GENDER. The

[2] I thank Gilles Boyè for this observation.

domain of morphosyntactic agreement is generally 'local', or 'NP-internal', that is agreement between nominals, determiners and adjectives. An example of morphosyntactic agreement in Serbian/Croatian is given in (18) (Wechsler and Zlatić, 2003, p. 14).

(18) ov-a star-a knjig-a
this-NOM.F.SG old-NOM.F.SG book-NOM.SG(F)

Index agreement, on the other hand, is determined by meaning, or more specifically reference. Thus, when two elements share referential indices they in fact refer to the same entity. The feature set which is generally involved in this type of agreement includes the features PERSON, NUMBER, and GENDER. These features are grammaticalizations of semantic anchoring conditions. Thus, for example, the English noun *boy* must refer to a single masculine entity.

The domain of index agreement generally includes pronouns and finite verbs. An example of an utterance where semantic agreement overrides morphosyntactic agreement is given in (19) (Pollard and Sag, 1994, p. 69). The noun *hashbrowns*, although formally plural, refers to a singular entity and therefore triggers singular agreement on the auxiliary *is*. Thus, subject-verb agreement in this case involves semantic agreement, and not morphosyntactic agreement.

(19) The hashbrowns at table nine is getting angry.

This approach to agreement is motivated by a phenomenon referred to in the literature as 'hybrid agreement' or 'mixed agreement'. A Serbian-Croatian example of such a case is given in (20).

(20) Ta dobra **deca** su doš-l-a
that.SF good.SF children AUX.3P come.PPRT.PN

"Those good children came." (Wechsler and Zlatić, 2003, 51)

The collective noun *deca* 'children' triggers feminine singular agreement on NP-internal items, in this case the determiner *ta* ('that') and the adjective *dobra* ('good'). This is the manifestation of morphosyntactic agreement. Semantic agreement, on the other hand, is manifested in subject-verb agreement, where the finite auxiliary *su* is inflected for third person plural, in agreement with the semantic properties of the subject *deca*.

In HPSG this approach is realized by defining two distinct sets of agreement properties: morphosyntactic (CONCORD) and semantic (INDEX). In the unmarked case the overlapping features in the two sets are token-identical (21a), while in hybrid nouns the morphosyntactic NUMBER and GENDER features do not match their corresponding semantic features (21b).

(21) a. unmarked' agreement

$$\begin{bmatrix} \text{CAT} \mid \text{HEAD} \mid \text{CONCORD} & \begin{bmatrix} \text{NUMBER} & \boxed{1} \\ \text{GENDER} & \boxed{2} \\ \text{CASE} & \textit{case} \end{bmatrix} \\ \text{CONT} \mid \text{INDEX} & \begin{bmatrix} \text{NUMBER} & \boxed{1} \\ \text{GENDER} & \boxed{2} \\ \text{PERSON} & \textit{pers} \end{bmatrix} \end{bmatrix}$$

b. hybrid agreement

$$\begin{bmatrix} \text{... CONCORD} & \begin{bmatrix} \text{NUMBER} & \textit{sing} \\ \text{GENDER} & \textit{fem} \\ \text{CASE} & \textit{case} \end{bmatrix} \\ \text{...INDEX} & \begin{bmatrix} \text{NUMBER} & \textit{plur} \\ \text{GENDER} & \textit{neuter} \\ \text{PERSON} & \textit{pers} \end{bmatrix} \end{bmatrix}$$

The bifurcation of agreement properties is used in the literature to account for similar complex agreement phenomena in various languages (e.g., English, Russian, Dutch, and Spanish) in the HPSG framework (Pollard and Sag (1994); Kathol (1999); citetVan-Eynde03) and other approaches (Corbett, 1988). In what follows I will proposed that this theory of agreement is advantageous for accounting for the agreement pattern of Standard Arabic NF-RCs. There is, however, an important distinction that needs to be made between hybrid nouns, such as *deca*, and the predicative modifiers discussed here.

The conflicts that need to be resolved by hybrid nouns are 'internal', or 'self-imposed'. They are the result of a mismatch between the formal properties of a noun and its semantic reference. This is a lexical property of a particular closed class of lexemes. Put in the traditional asymmetric terms of 'controller' and 'target', the hybrid noun is an agreement controller with two targets.

$$\boxed{\text{TARGET}} \longleftarrow \boxed{\text{CONTROLLER}} \longrightarrow \boxed{\text{TARGET}}$$

The agreement conflict exhibited by non-subject NF-RCs, on the other hand, is an 'external' conflict imposed on the head by virtue of its function as both a predicate and a modifier in a completely regular and productive construction. In this case the non-finite predicative modifier is an agreement target of two controllers.

$$\boxed{\text{CONTROLLER}} \longrightarrow \boxed{\text{TARGET}} \longleftarrow \boxed{\text{CONTROLLER}}$$

This distinction notwithstanding, in the following section I will show that this theory of agreement provides a key to the analysis of the conflict resolution strategies which are in the focus of this paper.

5.2 The analysis

The proposed analysis builds on the theory of agreement described in the previous section and on "standard" HPSG assumptions. At the heart of the analysis are

four constraints, henceforth A-D, which constitute the assumptions required for accounting for the NF-RC constructions.

Nominal agreement is realized in two distinct sets of agreement properties: morphosyntactic (CONCORD) and semantic (INDEX). As shown in (21a), the NUMBER and GENDER features of 'unmarked' (i.e., not 'hybrid') nouns are token-identical in the two complexes $\{\mathbf{A}\}$. Participles, and adjectives have nominal morphosyntactic agreement properties (i.e., GENDER, NUMBER, CASE, DEFINITENESS) as well as semantic agreement properties. Moreover, they can can function as either predicates, modifiers, or predicative-modifiers.

Subject-predicate agreement is realized in the matching of the semantic INDEX properties of the NP subject with their corresponding CONCORD properties of the predicate. In the case of finite verbs, these properties include: PERSON, NUMBER and GENDER. Participles and adjective, unlike finite verbs, are not marked for PERSON. Thus, subject-predicate agreement with predicative adjectives and participles involves the properties NUMBER and GENDER $\{\mathbf{B}\}$.

(22) Subject-Verb Agreement with Non-finite Predicates

$$\left[\begin{array}{l} \text{HEAD}\left[\begin{array}{ll} \textit{non-fin-pred} & \\ \text{CONCORD}\left[\begin{array}{ll} \text{NUMBER} & \boxed{6} \\ \text{GENDER} & \boxed{7} \\ \text{CASE} & \textit{case} \\ \text{DEF} & \textit{boolean} \end{array}\right] \end{array}\right] \\ \text{VAL}\left[\text{SUBJ}\left\langle\left[\text{...INDEX}\left[\begin{array}{ll} \text{PERSON} & \textit{person} \\ \text{NUMBER} & \boxed{6} \\ \text{GENDER} & \boxed{7} \end{array}\right]\right]\right\rangle\right] \end{array}\right]$$

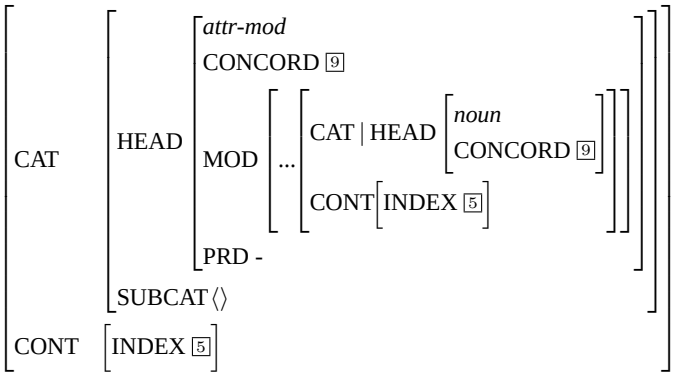
As modifiers, participles and adjectives are subject to a number of constraints. First, noun modifiers structure-share the INDEX of the noun they modify $\{\mathbf{C}\}$ (Pollard and Sag, 1994, p. 55) .

(23) Head-Modifier Coindexation

$$\left[\begin{array}{l} \text{CAT}\,|\,\text{HEAD}\,|\,\text{MOD}\left[\text{CONT}\left[\text{INDEX}\,\boxed{5}\right]\right] \\ \text{CONT}\left[\text{INDEX}\,\boxed{5}\right] \end{array}\right]$$

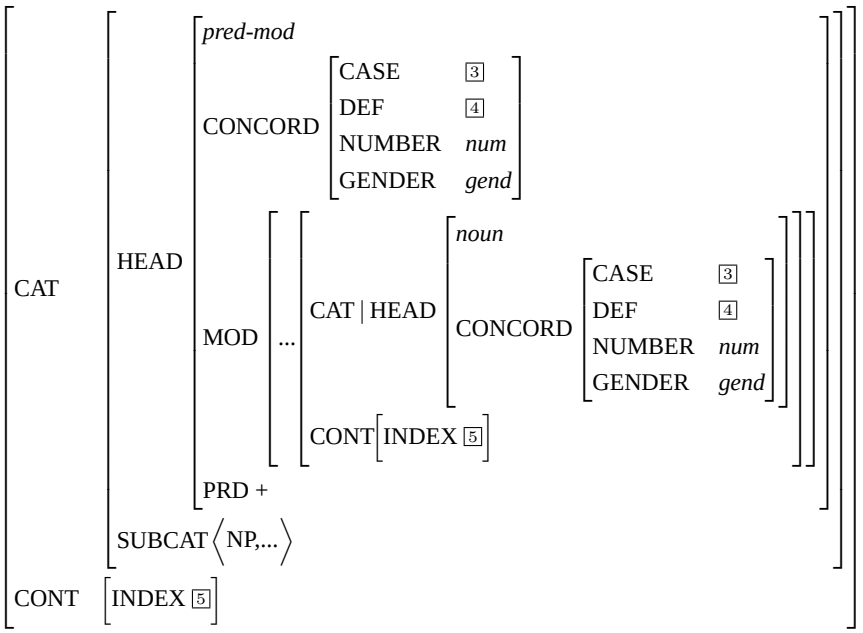
In addition, as was described earlier, attributive modifiers in Standard Arabic exhibit full morphosyntactic agreement (i.e., NUMBER, GENDER, DEFINITENESS, and CASE) with the morphosyntactic agreement properties of the noun they modify.

(24) Attributive Modifiers in Standard Arabic



When participles or adjectives are predicative-modifiers they exhibit *partial morphosyntactic agreement* with the noun they modify — only in DEFINITENESS and CASE — and full semantic agreement {**D**}. This property, a clear departure from 'unmarked' constraints, is what enables the language to adopt its particular conflict resolution strategy.

(25) Predicative Modifiers in Standard Arabic



At the constructional level, the NF-RC construction is similar to reduced relative clauses in English (e.g., *the man standing in the doorway*). Sag (1997) proposes that a reduced relative clause is a predicate that is missing a subject. This construction is licensed by a *reduced-rel-cl* type, in which the INDEX of the unexpressed subject (PRO) is coindexed with that of the MOD value.

(26) *reduced-rel-cl* $\Rightarrow$
$$\begin{bmatrix} \text{HEAD} \left[\text{MOD} \left[\text{...INDEX } \boxed{1} \right] \right] \\ \text{SUBJ} \left\langle \left[\text{...INDEX } \boxed{1} \right] \right\rangle \end{bmatrix}$$

It should be noted that for Sag the specification of a MOD value and the coindexation are not lexical properties of the head of the RC, rather they are defined constructionally, as a property of the type *reduced-rel-cl*.

Sag's analysis cannot be straightforwardly applied to NF-RCs in SA. First, unlike reduced relative clauses in English, in which the relativized position is necessarily the subject, NF-RCs in SA are not restricted to the relativization of a particular grammatical function. Moreover, I assume, contra to Sag's analysis, that the MOD property of the NF-RC is lexically specified for the participle/adjective. This captures the dual role of participles and adjectives as both predicates and modifiers. At the same time, the link between the indices of the relative head and the relativized position is defined constructionally, in order to account for the two variants (subject NF-RCs and non-subject NF-RCs).

In subject NF-RCs the INDEX feature of the relative head is token-identical to the INDEX feature of the unrealized SUBJ.

(27) *subject-non-fin-rel-cl* $\Rightarrow$
$$\begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{pred-mod} \\ \text{MOD} \left[\text{...INDEX } \boxed{1} \right] \end{bmatrix} \\ \text{SUBJ} \left\langle \left[\text{...INDEX } \boxed{1} \right] \right\rangle \end{bmatrix}$$

In non-subject NF-RCs the INDEX feature of the relative head is token-identical to the INDEX feature of the resumptive pronoun. Note that the exact HPSG analysis of resumptive pronouns is immaterial here. The proposed representation, where the nonlocal feature RESUMP stores the index of the resumptive pronoun and is propagated similarly to other nonlocal features, is taken from Vaillette (2002).

(28) *non-subject-non-fin-rel-cl* $\Rightarrow$
$$\begin{bmatrix} \text{HEAD} \begin{bmatrix} \textit{pred-mod} \\ \text{MOD} \left[\text{...INDEX } \boxed{1} \right] \end{bmatrix} \\ \text{SUBJ} \langle\rangle \\ \text{HD-DTR} \left[\text{RES-PRON} \mid \text{...INDEX } \boxed{1} \right] \end{bmatrix}$$

The avoidance of non-subject NF-RCs in Hebrew is accounted for by the absence of the *non-subject-non-fin-rel-cl* phrase type in the grammar of the language. Note, that this approach removes the burden of the account from the lexical level to the constructional level. This step is necessary in order to prevent the licensing of ungrammatical MH sentences such as (17) above, whose ungrammaticality cannot be accounted for by a feature mismatch (since no mismatch occurs).

Example analyses

As a final step, an illustration of the analysis will be given using partial descriptions of the participles which head the two constructions. Consider the following minimal pair;(29) exemplifying subject NF-RCs and (30), non-subject NF-RCs.

(29) al-banaat-u l-waahibaat-u l-maal-a
the-girls.FP-NOM the-giving.PART.FP-NOM the-money.MS-ACC

"The girls who are giving the money"

(30) al-marat-u [l-waahib-u
the-woman.SF-NOM the-giving.PART.MS-NOM
zawj-u-haa l-maal-a]
husband.MS-NOM-POSS.3FS the-money.MS-ACC

"The woman whose husband is giving the money"

Two phrase types and four constraints are used in order to account for the two constructions. In order to facilitate the exposition, table 1 lists the four constraints together with the tag labels of the values which are constrained by them, as they appear in the proposed descriptions (figures 2 & 3).

{A} noun-internal agreement	1	2
{B} subject-predicate agreement	6	7
{C} noun-modifier agreement (index)	5	
{D} partial noun-modifier agreement (concord)	3	4

Table 1: Lexical Constraints

This proposal provides a unified account of the two constructions by subjecting them to identical lexical constraints. As is evident from figures 2 and 3, the descriptions of the participles of the subject NF-RC and the non-subject NF-RC are almost identical. One crucial difference, of course, is the resumptive pronoun, which appears only in the non-subject NF-RC construction.

The interplay between the four lexical constraints entails that the morphosyntactic agreement properties of the participle are split and matched against two different elements, namely the subject and the relative head. Although appropriate for the hybrid agreement pattern of non-subject NF-RCs, constraint D, which requires only *partial* modifier-head agreement, does not seem to apply to subject NF-RCs, where the relative head and the participle exhibit *full* agreement. Thus, this unified account can potentially license ungrammatical sentences such as the one given in (31), where the participle exhibits partial DEFINITENESS-CASE agreement with the relative head, as required, and NUMBER-GENDER agreement properties which do not match those of the relative head.

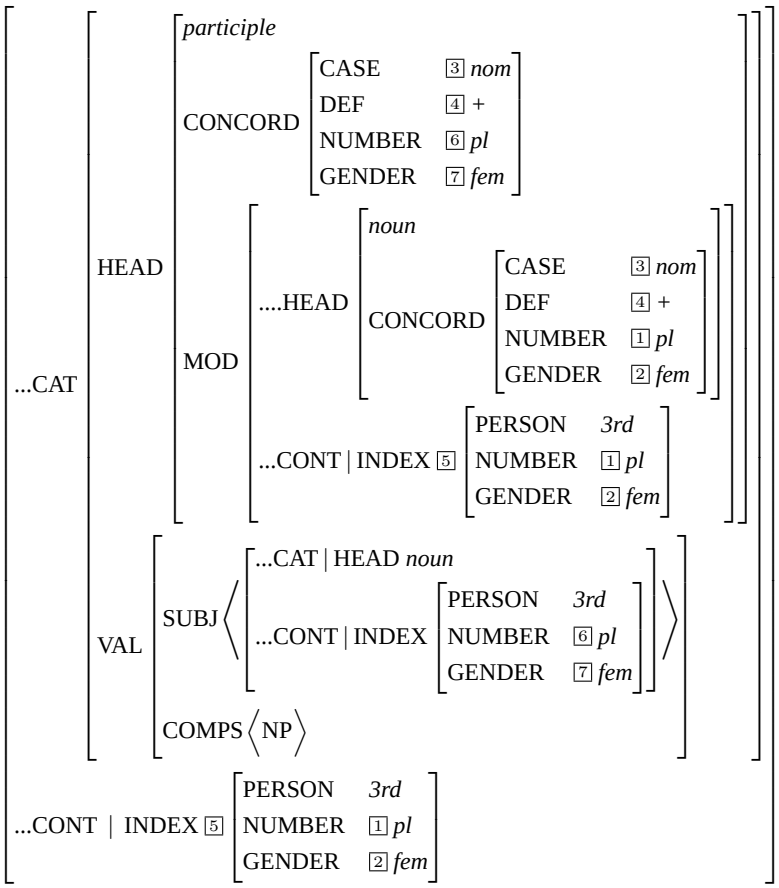


Figure 2: The head of a subject NF-RC

(31) *al-banaat-u l-waahib-u l-maal-a
the-girls.FP-NOM the-giving.PART.MS-NOM the-money.MS-ACC

"The girls who are giving the money"

This potential problem is prevented by the constraint on *subject-non-fin-rel-cl* phrase type, shown in (27), which states that the INDEX value of the modified noun is token-identical to the INDEX value of the unexpressed subject. Consequently, the NUMBER-GENDER properties, tagged 1 & 2, are token-identical to their respective properties, tagged 6 & 7. Thus, the combination of lexical and phrasal constraints achieves the expected result — full morphosyntactic agreement between the participle and the relative head.

The potential for hybrid agreement is exploited, on the other hand, in the licensing of non-subject NF-RCs. The NUMBER and GENDER properties in the CONCORD complex of the participle/adjective (1 & 2) are not token-identical to those in the INDEX complex (6 & 7). The constructional definition of the *non-subject-non-fin-rel-cl* phrase type ensures the full agreement between the re-

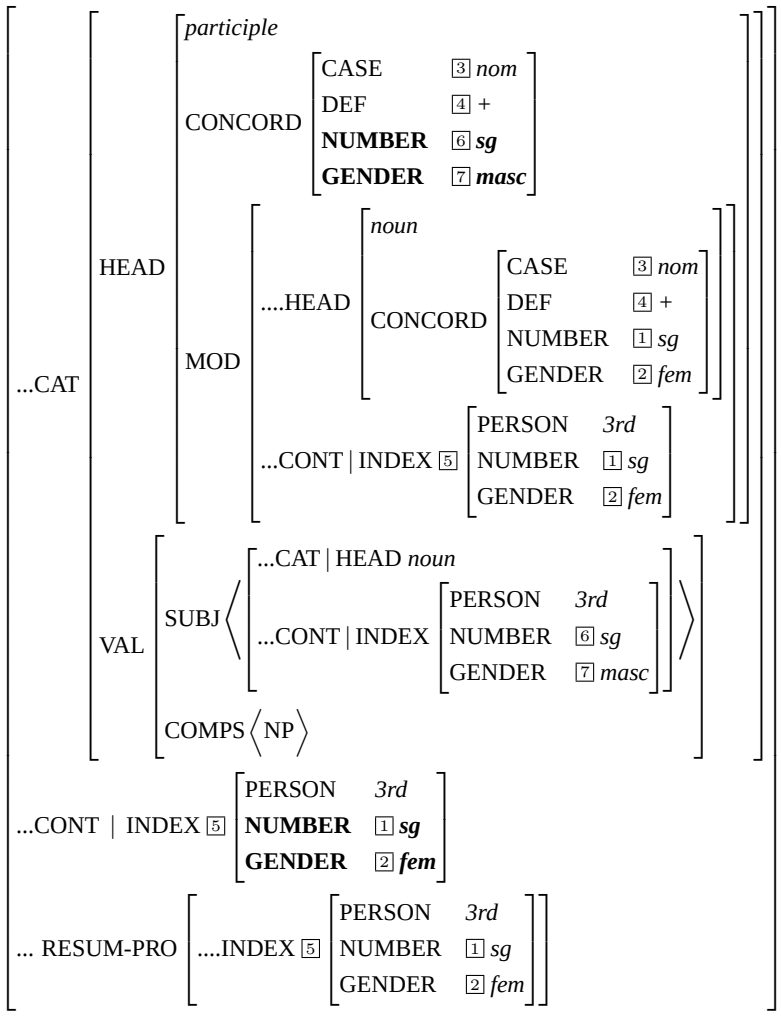


Figure 3: The head of a non-subject NF-RC

sumptive pronoun and the relative head.

To summarize, the proposed architecture provides a unified way of accounting for the split agreement strategy adopted by SA, without requiring major construction-specific stipulations. The morphosyntactic agreement properties of the head of the NF-RC are split into NUMBER-GENDER and DEFINITENESS-CASE, where the former are those properties which occur at the intersection of morphosyntactic and semantic agreement, while the latter are specific to morphosyntactic agreement.[3] The heads of non-subject NF-RCs exhibit hybrid agreement, in that their morphosyn-

[3]It could be speculated that the fact that SA has four morphologically marked agreement properties of which two occupy the intersection between the two types of agreement and two are specific to a particular type is what enables SA to adopt hybrid agreement. This is not the case with Modern Hebrew, for which all the morphologically marked agreement properties occur only at the intersection, hence its avoidance of the construction.

tactic PERSON-NUMBER properties do not match their semantic counterparts. In subject-non-finite-RCs full agreement is attained as a consequence of the constructional constraint which matches the INDEX properties of the unrealized SUBJ with those of the relative head.

6 Conclusion

The conflict resolution strategy adopted by SA, whereby the agreement properties of the head of the non-subject NF-RC are split between those which agree with the relative head and those which agree with the subject, provides a serious challenge to any formal linguistic theory. An adequate theory should unquestionably provide an account for such a construction, as well as for other existing strategies. Moreover, a bigger challenge for a linguistic theory is to incorporate the account into a larger context.

The theory of agreement presented here was originally proposed in order to account for similar, yet distinct cases of hybrid agreement in diverse languages. However, unlike the phenomenon which motivated this theory, where hybrid agreement is a reflex of an 'internal' conflict, hybrid agreement in the constructions discussed in this paper is used as a strategy to resolve 'external' conflicting constraints. Nevertheless, as was shown, the concept of two types of agreement and its implementation in the HPSG framework provided the appropriate background for accounting for the rare and 'exotic' construction in SA. Consequently, this provides original supporting evidence for a theory of agreement which distinguishes between morphosyntactic and index agreement, and consequently extends the implications of the theory. Moreover, by adopting the current constructional approach, whereby constraints can targets syntactic structure above the lexical level, better empirical coverage is achieved.

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A phrase structure approach to argument cluster coordination

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Abstract
It has often been argued that Non-Constituent Coordinations involve ellipsis. Focussing in this paper on so-called 'Argument Cluster Coordination', we provide empirical evidence drawn from French against such elliptical analyses and sketch an alternative approach within HPSG.

1. Introduction*

It has often been argued that Non-Constituent Coordinations such as Argument Cluster Coordination (1a), Right Node-Raising (1b) and Gapping (1c) involve ellipsis. Focussing in this paper on Argument Cluster Coordination (henceforth ACC), we provide theory-neutral arguments drawn from French against such elliptical analyses and propose an alternative approach within HPSG.

(1) a John gave a book to Mary and a record to Jane.
b John hates, but Mary loves, opera.
c John bought a book and Mary a record.

We begin by reviewing the main distributional properties of ACC (§2) and the possible syntactic analyses (§3). Building on previous work (Abeillé & Godard 1996, 2000), we then provide (§4) empirical evidence against elliptical approaches that rely on deletion (see a. o. van Oirsouw 1987, Wilder 1997, Crysmann 2003, Beavers & Sag 2004) or some substitution principle at the syntax-semantics interface (see Sag *et al*. 1985). We conclude that an adequate analysis should allow non-standard constituents to be conjoined in a non-elliptical structure (with the shared predicate outside the coordinate structure), as originally proposed by Dowty (1988) and Steedman (1989, 2000) within Categorial Grammar. Focussing on syntactic issues, we then show (§5) how this structure and its unusual properties can be represented within HPSG without relaxing phrase structure.

2. Basic data

The basic distribution of ACC has been well studied both in English (Dowty 1988) and French (Abeillé & Godard 2002). Let us briefly review the main generalizations.

(i) ACC may involve subcategorized complements (2a), scopal and non-scopal modifiers (2b,c), or some mix of the two (2d,e).

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(2) a Paul offrira un disque à Marie et un livre à Jean.
Paul will.offer a record to Mary and a book to Jean
b Paul viendra probablement lundi et certainement jeudi.
Paul will.come probably on Monday and certainly on Thursday.
c Paul a vu cette exposition à Rome en juillet et à Paris en septembre.
Paul has seen this exhibition in Rome in July and in Paris in September
d Paul a vu Jean à Rome et Marie à Paris.
Paul has seen Jean in Rome and Marie in Paris
e Paul invitera probablement Marie et certainement Jean.
Paul will.invite probably Marie and certainly Jean

Following among others van Noord & Bouma (1994), Abeillé & Godard (1997), Bouma *et al*. (2000), we take modifiers to the right of the predicate to be combined as complements in a flat VP structure. Hence, clusters in (2d,e) involve sister constituents.

(ii) ACC obeys 'Wasow's Generalization' (cf. Pullum & Zwicky 1986) in the same conditions as constituent coordinations, i. e. each conjunct must independently meet the constraints imposed by the shared material. As a consequence, extraction only applies 'across-the-board' (3a,b) and one may conjoin clusters of 'unlikes' in case the shared predicate allows alternative categories as complements (3c). Interestingly, the coordination of clusters of different lengths is also allowed (3d,e) provided the shared predicate may take one complement or more, as shown by the lack of implication from (3d) and (3e) to (4a) and (4b) respectively. Hence, ACC does not obey stronger parallelism constraints than ordinary coordinations, as is often claimed.

(3) a Voici la femme dont le juge a rencontré le mari _ hier et le fils _ ce matin.
Here.is the woman of.whom the judge has met the husband _ yersterday and the son _ this morning
b *Voici la femme$_i$ dont le juge a rencontré le mari _ hier et son$_i$ fils ce matin.
Here.is the woman$_i$ of.whom the judge has met the husband _ yersterday and her$_i$ son this morning.
c Les enseignants attendent des élèves qu'ils respectent le règlement et de leur proviseur un soutien sans faille. (PP-CP + PP-NP)
The teachers expect from.the students that they respect the rules and from their headmaster a strong support
d Paul joue du piano le lundi avec Marie et le vendredi. (PP-NP+NP)
Paul plays the piano on Monday with Marie and on Friday
e Paul a écrit une lettre à sa mère et un petit poème. (NP +NP-PP, from Abeillé & Godard 2002)
Paul has written a letter to his mother and a short poem

(4) a Paul plays the piano on Friday with Marie / with someone
b Paul wrote a short poem to his mother / to someone.

(iii) Long-distance ACC with clusters consisting of non-sister constituents is disallowed, be those constituents 'major constituents' in the sense of Hankamer (1971), that is dependents of the matrix verb or some embedded one (5a), or not (5b).[1] ACC differs from gapping constructions in this respect, where remnants must be major (6a) but not necessarily sister constituents (6b).

(5) a Jean dit de rester chez elle à Marie et ??(de rester) ici à Paul
(from Abeillé & Godard 2002)
Paul says to stay at home to Marie and (to stay) here to Paul
b Paul a donné les jouets de sa fille à Marie et *(les jouets) de son fils à Jean.
Paul has given the toys of his daughter to Mary and ??(the toys) of his son to Jean

(6) a Paul admire le courage de Marie, et Jean ??(le courage) de Pierre.
Paul admires the courage of Marie and Jean (the courage) of Pierre
b Paul a promis d'essayer d'apprendre le latin et Marie le grec.
Paul has promised to try to learn Latin and Mary Greek

(iv) ACC is compatible with all the conjunctions available in French (7), including coordinators such as *ainsi que* which we return to in §4.1.

(7) a Personne n'offrira de disques à Marie {ni / ou} de livres à Jean
No one NE will.offer any records to Marie nor / or any books to Jean
b Je serai absent demain mais au bureau toute la semaine prochaine.
I will be absent tomorrow but at my office next week
c Paul offrira un disque à Marie ainsi qu'un livre à Jean.

---

[1]At first sight, English seems more liberal in this respect (compare (i) and (ii), cf. Sag 1976, Dowty 1988). We hypothesize that long-distance ACC is excluded in both languages but that English verbs, unlike French verbs, may combine with a bare preposition and inherit its complement, hence allowing the coordination in (i) to be analyzed as an ordinary local ACC when the preposition is shared. Other examples of apparent long-distance ACC remain problematic (iii). While further research is needed, we suggest such examples might be best analyzed as unambiguous clausal gapping constructions rather than ACCs.
(i) John talked about Manet on Wednesday and (about) Renoir on Thursday. (from Dowty 1988)
(ii) Jean a parlé de Manet mercredi et *(de) Renoir jeudi.
(iii) ?We found a book that was about Civil War hero on Monday and a WWI hero on Thuesday (from Beavers & Sag 2004).

(v) ACC may occur within NP, AP or PP with the same restriction, i. e. long-distance ACC is excluded (8). This is a second difference with gapping constructions, which only occur in the sentential domain.

(8) a Paul désapprouve les propositions du ministre de l'économie en faveur de l'emploi et *(du ministre) de l'éducation en faveur de la recherche.
Paul dislikes the propositions of the minister of economy in favor of employment and (of the minister) of education in favor of research
b Les résultats sont inférieurs à la moyenne régionale de 15% et *(à la moyenne) nationale de 20%.
The results are inferior to the average regional by 15% and (to the average) national by 20%
c Avec la femme de Pierre comme directrice et *(la femme) de Jean comme secrétaire, l'entreprise court à la faillite.
With the wife of Pierre as manager and (the wife) of Jean as secretary, the company is going to collapse

3. Competing analyses

Turning to the syntactic analysis of ACC, three main competing structures have been proposed to account for a coordination such as (2a): an elliptical structure A (figure 1), an elliptical structure B (figure 2) or a non-elliptical structure C (figure 3).[2] Let us briefly make explicit the analytical content of each.

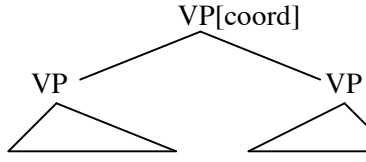

Figure 1- structure A

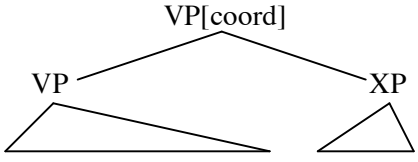

Figure 2- structure B

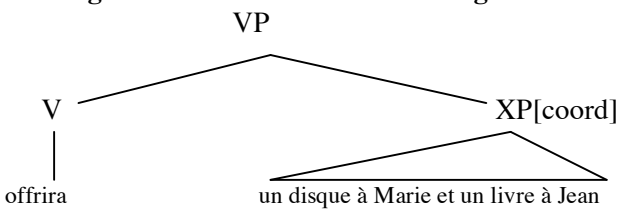

Figure 3- structure C

[2] A fourth possibility would be to assume a 'flatter' VP structure without any coordinate node. Supposing this solution can be formalized, it has the undesirable effect of setting ACC completely apart from constituent coordination, contrary to fact (see §2(ii)). We thus leave it aside in the discussion that follows.

Structure A illustrates a deletion approach to ellipsis. Accordingly, an ACC such as (2a) consists of two VPs the second of which is syntactically complete (so that no specific interpretation rule is needed) but phonologically reduced in that some left peripheral material has been deleted (i. e. ignored by phonology) under appropriate identity conditions with some left material in the first conjunct (see a. o. van Oirsouw 1987 and Wilder 1997 in a transformational perspective, and Crysmann 2003 and Beavers & Sag 2004 within HPSG). While this kind of analysis leaves room for some syntactic and semantic mismatches between antecedent and elided material (depending on exactly what identity conditions one puts on deletion), it crucially requires some grammatical form to be recoverable in the ellipsis site (cf. Chomsky 1964). Such an analysis thus leads one to expect that not only the second conjunct on its own but also the coordination as a whole behave as ordinary VPs.

Structure B makes the second prediction but not the first: while the coordination as a whole in (2a) is analyzed as a VP, its second conjunct constitutes a headless fragment whose syntactic and semantic well-formedness may be defined by a general substitution procedure (see Sag *et al*. 1985). Basically, the fragment is licensed if the substitution of its remnants with some parallel categories in the first VP conjunct gives rise to a syntactically and semantically well-formed structure.

Finally, structure C illustrates an approach to ACC that eschews ellipsis by allowing non-standard constituents to be conjoined in the scope of a shared predicate (see Dowty 1988 and Steedman 1989, 2000 within Categorial Grammar and Hudson 1988, Maxwell & Manning 1996 and Mela & Fouqueré 1996 within Word Grammar, LFG and HPSG respectively).[3] As we show now, only this last structure adequately captures the syntactic properties of ACC in French.

4. Syntactic arguments against ellipsis

We begin by reviewing and extending earlier arguments by Abeillé & Godard (1996, 2000) against both elliptical structures A and B. We then provide new data relying on the distribution of restrictive and additive adverbs and agreement phenomena in favor of non-elliptical structure C. We finally discuss Beavers & Sag (2004)'s positive argument in favor of ellipsis. As we show, the argument, which crucially relies on the putative non-existence of asyndetic coordination in English, is not supported by the data in French.

[3] Alternatively, it has been proposed that structure C involves across-the-board extraction of the verb out of each VP conjunct (see Mordechai & Schacher 1983, Larson 1988). Such an analysis does not account for cases such as (2c) where the shared material corresponds to some non-constituent string, nor does it easily account for the reconstruction problems discussed below. We refer to Dowty (1988: 184-187) for a detailled criticism.

4.1 Abeillé & Godard (1996, 2000)'s arguments

As pointed out by Abeillé & Godard (1996), syntactic reconstruction of the alleged deleted material in ACC is not always grammatical. As they observe, a conjunction such as *ainsi que* may combine with an argument cluster (9a) while it is excluded with finite VP or S elsewhere (9b,c).[4]

(9) a Paul offrira un disque à Marie ainsi qu'un livre à Jean.
Paul will.offer a record to Mary as well as a book to Jean
b *Paul écoute la radio ainsi que lit le journal.
Paul listens to the radio as well as reads the paper.
c *Paul lit le journal ainsi que Marie écoute la radio.
Paul reads the paper as well as Marie listens to the radio

A similar pattern arises with constituent negations in French and English (cf. Culicover & Jackendoff 2006). While adverbs such *(non) pas* / *not* may introduce an argument cluster (10a-11a), they are excluded with finite VP or S (10b,c-11b,c).

(10) a Paul offrira un disque à Marie et (non) pas un livre à Jean.
b *Paul lit le journal et (non) pas écoute la radio.
c *Il neige et (non) pas il pleut.

(11) a Paul gave a record to Mary and not a book to Bill.
b *Paul read the paper and not listened to the radio.
c *It's raining and not it's snowing.

If ACCs are to be represented by elliptical structure A, this means one has to enforce deletion of the finite verb in the second conjunct in (9a-10a-11a). While such a stipulation is no doubt amenable to formalization in existing treatments such as Beavers & Sag (2004)'s, it requires abandoning the recoverability condition on deletion, a rather unattractive move.

On the other hand, structure B correctly predicts those data (since the second conjunct does not contain any verb nor project a VP) but makes it difficult to explain the position of initial conjunctions in so-called 'correlative coordinations'. As Abeillé & Godard (2000) observe, those conjunctions obligatorily occur in French after the shared predicate, be it a verb (12a), or not (12b),

[4] French *ainsi que* differs in this respect from English *as well as* which is excluded as a coordinator in combination with finite S (i), but not with finite VP (see (ii-iii) from Huddleston, Payne & Peterson (2002: 1316):
(i) *[John read the paper] as well as [Mary listened to the radio].
(ii) She [means what she says] as well as [says what she means].
(iii) She [plays the piano] as well as [sings lieder].

rather than before (13), as expected if this predicate were included in the first conjunct. [5]

(12) a Paul compte offrir et un disque à Marie et un livre à Jean.
Paul is.planning.to offer and a record to M and a book to Jean
'Paul is planning to offer not only a record to Marie but also a book to Jean.'

b Les résultats sont inférieurs et à la moyenne régionale de 15% et à la moyenne nationale de 20 %
The results are inferior and to the regional average by 15% and to the national average by 20%
'The results are inferior not only to the regional average by 15% but also to the national average by 20%.'

(13) a *Paul compte et offrir un disque à Marie et un livre à Jean

b *Les résultats sont et inférieurs à la moyenne régionale de 15% et à la moyenne nationale de 20 %

As suggested by Beavers & Sag (2004), one could maintain an elliptical structure by considering that 'initial' conjunctions do not mark the left edge of the first conjunct in coordinate structures but rather the boundary between elided and non-elided material, hence occurring after the shared material. While at first sight attractive, this solution makes it difficult to account for the fact that finite V/VP/S correlative coordinations are rejected by many French speakers with initial conjunctions *et* and *ni* (14-15-16) while none of them rejects corresponding ACC in the scope of a finite verb (17) (cf. Mouret 2005).

(14) a %Paul [et lit et parle] l'anglais couramment.
Paul and reads and speaks English fluently

b %Paul [ni ne lit ni ne parle] l'anglais couramment.
Paul neither NE reads nor NE speaks English fluently

(15) a %Paul [et lit le journal et écoute la radio].
Paul and reads the paper and listens to the radio

b %Paul [ni ne lit le journal ni n'écoute la radio].
Paul neither NE reads the paper nor NE listens to the radio

[5] English data in (i) are similarly used by Hudson (1988) to dismiss a VP analysis of ACC. The argument is however less convincing since English correlatives may float (ii).
(i) John gave {both / either / neither} a book to Mary {and / or / nor} a record to Bill.
(ii) John {both / either/ neither} gave a book to Mary {and / or / nor} a record to Bill.

(16) a %Ce matin, et Paul a lu le journal et Marie a écouté la radio.
This morning, and Paul has read the paper and Marie has listened to the radio
b %Ce matin, ni Paul n'a lu le journal, ni Marie n'a écouté la radio
This morning, neither Paul NE has read the paper nor Marie NE has listened to the radio

(17) a Paul offrira et un disque à Marie et un livre à Jean
b Paul n'offrira ni un disque à Marie ni un livre à Jean

Assuming an elliptical structure would force us to condition the combination of initial *et* and *ni* with some finite VP in the first conjunct to the elision of the head verb in the second conjunct since it is the only case where such combination is allowed. Again, such a stipulation is at odd with the simple generalization that a non-elliptical structure makes available: if neither the first conjunct nor the second includes a predicate, then ACCs as a whole in (17) are non-finite and thus accepted by those speakers who reject (14-15-16).

4.2 Further arguments

We provide two additional arguments against elliptical structures based on the distribution of adverbs and agreement data with argument clusters containing postverbal subjects.

Let us first consider additive and restrictive adverbs. As shown in (18), such adverbs may introduce an ACC and take it as a whole as their semantic associate. How such a reading arises with elliptical structure A or B is unclear. One does not see how the adverb can take the ACC as a whole as its associate if it occurs inside the first VP conjunct. Indeed, no such association out of the first conjunct is allowed elsewhere (19).

(18) a Paul offrira seulement un disque à Marie et un livre à Jean alors qu'il aurait pu aussi offrir des fleurs à Léa.
Paul will offer only a record to Marie and a book to Jean while he could have also offered some flowers to Léa
b Paul offrira aussi un disque à Marie et un livre à Jean alors qu'il aurait pu offrir seulement une bouteille de vin à leurs parents.
Paul will offer also a record to Marie and a book to Jean while he could have offered only some bottle of wine to their parents.

(19) a Paul compte lire seulement le journal et écouter la radio.
Paul is.planning.to read only the paper and listen to the radio
≠'The only thing Paul is planning to do is to both read the paper and listen to the radio.'
b Paul compte lire aussi le journal et écouter la radio.
Paul is.planning.to read also the paper and listen to the radio
≠'Paul is planning to read the paper and listen to the radio and there is some other thing besides those two activities that Paul is planning to do.'

Alternatively, one could try to adjoin such adverbs to the VP or S coordination as a whole and let them be linearized inside the first conjunct by some 'domain union' operation. Leaving aside the fact that such an operation should be restricted to ACC given the absence of association out of the first conjunct in (19), this cannot be the right solution since both restrictive and additive adverbs fail to adjoin to finite VP or S elsewhere in French (20).

(20) a *Paul [seulement [lit le journal]] alors qu'il pourrait aussi écouter la radio.
Paul only reads the paper while he could also listen to the radio
b *Paul [aussi [lit le journal] alors qu'il pourrait se contenter d'écouter la radio.
Paul also reads the paper while he could only listen to the radio

On the other hand, those association phenomena do not raise more problems than usual if one assumes structure C. The restrictive/additive adverb may be adjoined to the coordination as a whole or, alternatively, combined at the same level with the verb and the coordination. In both cases, it has access locally to the coordinate structure.

A last argument against both elliptical structures A and B involves agreement phenomena. As shown by Marandin (1999), postverbal subjects in French 'unaccusative' constructions combine as sisters with complements though still agreeing in number with the head verb. As a consequence, one may conjoin argument clusters containing postverbal subjects. Interestingly, two agreement patterns arise. Either the verb agrees independently with each subject and the interpretation is that of a conjunction of two independent events, as enforced in (21a) by the adverbial *quelques secondes plus tard*, or the verb is plural and the interpretation is that of a complex event, as enforced in (21b) by the adverbial *simultanément*.

(21) [Paul is driving]

a Alors {surgit / *surgissent} d'un buisson une biche, et quelques secondes plus tard d'un champ un renard.
Then {comes / come} from a bush a doe and few seconds later from a field a fox

b Alors {surgissent / *surgit} simultanément d'un buisson une biche et du champ un renard.
Then {come / comes} simultaneously from a bush a doe and from a field a fox

While the first pattern is expected with structures A and B, the second one proves problematic: one does not see how a singular postverbal subject could combine with a plural verb. Alternatively, one could argue that (21b) is an ungrammatical sentence accommodated on pragmatic grounds, along the lines of Beavers & Sag (2004)'s account of some plural agreement phenomena in RNR contexts. This would be plausible if (21b) were of intermediate acceptability compared to (21a). Since it is not the case, this solution seems dubious.[6] On the other hand, nothing in principle precludes the second agreement strategy to occur if one assumes structure C. In such case, the plural predicate does not directly combine with the first singular subject, but rather with the coordination as whole, hence leaving room for some specific agreement constraints (see §5.3).

4.3 A note on asyndetic coordination

We finally show that Beavers & Sag's (2004: 51-53) positive argument in favor of ellipsis in ACC is amenable to discussion. As they argue, asyndetic structures in English are ungrammatical when they contain only two elements and might be best analyzed as resulting from some replanning process when they contain more than two elements. As a consequence, no appropriate structure is available for (22a) if one precludes a VP analysis with ellipsis, for it would imply embedding a binary asyndetic ACC that is excluded elsewhere. The same data obtain in French (22b) but we remain skeptical about the argument. Judgements in the area of asyndetic constructions seem in fact variable in both languages. Moreover, as far as French is concerned, such judgements do not agree with data found in corpora. Indeed, we do find natural binary and non-binary asyndetic structures (23), including cases such as (23b) where a coordination analysis seems inescapable given the general ban in French on non-coordinated bare N' in argument positions (23c).

[6] The argument can be strengthened: in the absence of some adverbial that enforces one of the readings, it is the plural agreement strategy that seems to be preferred.

(22) a Jan travels to Rome tomorrow, to Paris on Friday ??(and will fly to Tokyo on Sunday).
b Paul ira à Rome demain, à Paris vendredi ??(et se rendra à Tokyo dimanche).

(23) a On a eu peur des bombes: on a [des femmes, des enfants] avec nous. (France Inter, 19/07/06)
We were afraid by bombs: we have women, children with us.
b [Effets de glace, sols en verre] créaient des univers mouvants, lumineux, impalpables. (Le Monde, 11/04/06)
Mirror effects, glass floors created moving, luminous, impalpable universes
c *[Effets de glace] créaient des univers mouvant, lumineux, impalpables.

As a matter of fact, some asyndetic structures must be analyzed as a variety of coordination. It remains to be seen why their acceptability is often reduced when they are uttered out of the blue. Data in (22) do not therefore provide strong evidence in favor of an elliptical analysis of ACC.

4.4 Intermediate conclusion

As we have shown, neither a deletion-based approach nor a substitutional one is appropriate to account for the syntactic properties of ACC. We conclude that ACC does not involve ellipsis at all and that an adequate analysis should instead allow non-standard constituents to be conjoined and compositionally interpreted in the scope of some shared predicate, possibly followed by some shared complements (see (2c)).

5. An alternative approach in HPSG

Most existing accounts of ACC that eschew ellipsis achieve such a result by abandoning or partially relaxing fixed phrase structures, allowing syntactic constructs such as higher-order predicates (Dowty 1988, Steedman 1989, 2000), word strings (Hudson 1988), partial expansions of c-structure rules (Maxwell & Manning 1996) or tuples of categories (Mela & Fouqueré 1996) to be conjoined in the scope of some shared predicate. Leaving aside Categorial Grammar whose flexible phrase structures can be justified on independent grounds (see Steedman 2000), the main motivation for such moves is to account for the very fact that neither argument clusters nor ACCs as a whole behave as ordinary constituents regarding phenomena such as cliticization or extraction (24).

(24) a *C'est [un disque à Marie] que Paul offrira.
This is a record to Marie that Paul has offered
b *C'est [un disque à Marie et un livre à Jean] que Paul offrira.

Focussing on syntactic issues, we explore an alternative approach within HPSG, deriving 'non-constituency' neither from argument clusters nor from ACCs, but rather from the lexical requirements of the predicate with which such clusters combine. We sketch in §5.1 the syntax of coordination we assume for French. We then show in §5.2 how argument clusters can be represented as non-headed constituents (rather than 'non'-constituents) and how features get computed when such constructs are coordinated. We finally show in §5.3 how 'non-constituency' can be derived from the lexicon by allowing predicates to be partially saturated by some canonical (hence non-extractible / cliticizable) ACC rather than by an ordinary sequence of constituents.

5.1 A constructional syntax for coordination

Let us first briefly sketch the syntax of coordination we assume for French. As for conjunctions, we follow Abeillé (2003,2005) by analyzing them as 'weak' heads (rather than markers) making a subconstituent with the following phrase and inheriting from it most of their syntactic features. Assuming a lexical type such as (25) for conjunctions (with the CONJ feature from Sag *et al*. 1985) one thus allows head-complements structures such as those illustrated in figures 4 and 5.[7]

(25) *conj-wd* =>

$$\begin{bmatrix} \text{HEAD } \boxed{1} \\ \text{CONJ } \textit{conj} \\ \text{MARKING } \boxed{2} \\ \text{SUBJ } \boxed{3} \\ \text{SPR } \boxed{4} \\ \text{COMPS} < \begin{bmatrix} \text{HEAD } \boxed{1} \\ \text{MARKING } \boxed{2} \\ \text{SUBJ } \boxed{3} \\ \text{SPR } \boxed{4} \\ \text{COMPS } \boxed{L} \end{bmatrix} > + \boxed{L} \end{bmatrix}$$

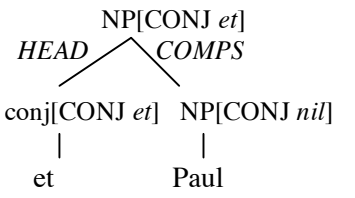

Figure 4

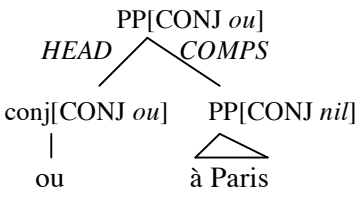

Figure 5

[7] Following Abeillé (2003,2005), we take *sign* to be specified [CONJ *nil*] by default and the argument structure of words to contain only [CONJ *nil*] synsems, hence excluding conjuncts of the form [conj XP] in argument positions.

Turning to the analysis of coordinate structures as a whole, we follow Pollard & Sag (1994) among others by treating coordination as a *sui-generis* non-headed construction, rather than a binary conjunction phrase or some multi-headed construction. Given that coordinate structures in French may be simplex ([X^+ [conj X]$^+$]), correlative ([[conj X] [conj X]$^+$]) or asyndetic ([X X^+]) we posit three subtypes of *coord-cx* (26a), differing on whether some conjuncts (26b), all the conjuncts (26c) or none of them (26c) is headed by a conjunction.[8] As in Sag *et al*. (1985), we make crucial use of the CONJ feature to enforce the identity of conjunctions in case more than one conjunction is realized, hence excluding correlative coordinations such as **Ni Paul ou Marie* (lit. *neither Paul or Mary*).[9]

(26) a *coord-cx* =>
[N-HD-DTRS *list*([CONJ *nil*])+*list*([CONJ [1]¬*nil*])]
a *simplex-coord-cx* =>
[N-HD-DTRS *1-to-n-list*([CONJ *nil*])+*1-to-n-list*([CONJ [1]*et/ou/ni/ainsi-que*])]
b *correl-coord-cx* =>
[N-HD-DTRS *2-to-n-list*([CONJ [1]*et/ou/ni/soit*])]
c *asyndetic-coord-cx* =>
[N-HD-DTRS *2-to-n-list*([CONJ *nil*])]

Feature resolution in coordinate structures has been subject to much debates. Leaving aside agreement phenomena, the problem is basically to determine how Wasow's generalization is to be captured. First, one must account for the fact that coordinations of unlike categories, differing in features such as part of speech or verbal mood can occur if (27a), and only if (27b), some shared predicate allows each category as alternative argument (cf. Sag *et al*. 1985). While analyses allowing left-peripheral ellipsis provide a straightforward account of those data, some specific operation on features is required if such elliptical processes are to be rejected, as we have argued they should be.

(27) a Il n'est pas certain [que Paul s'en aille] ni [que Marie {reviendra / revienne}].
It is not certain (+ _CP[subj]/CP[ind]) that Paul leave.SUBJ nor that Marie {come.back.IND/come.back.SUBJ}
b Il est certain [que Paul s'en ira]et [que Marie {reviendra/*revienne}].
It is certain (+_CP[ind]/*CP[subj]) that Paul leave.IND and that Marie {come.back.IND/come.back.SUBJ}

[8] Here we use a type hierarchy for lists that slightly differs from the one that is usually assumed since Pollard & Sag (1994). See §5.2 for a justification.
[9] Note that we do not posit an empty conjunction in asyndetic coordinations, hence leaving the task to the construction to provide the appropriate semantics, whatever such semantics is.

Second, one must account for the fact that coordination of predicates with different subcategorization requirements can occur if (and again only if) there exists some neutralized argument that can satisfy each of those requirements simultaneously, as shown by French data in (28), adapted from Kayne (1975).

(28) %Paul {nous/*lui/*l'} a écrit et appelé(s) maintes fois.
Paul {us.ACC&DAT/ him.DAT/him.ACC} has written(+_OBJ[*dat*]) and called (+_OBJ[*acc*]) several times.

We follow Sag (2003)'s recent account which appeals to underspecification. We illustrate how coordination data such as (27) may be dealt with while leaving aside the proper treatment of argument neutralization which would take us too far. Let us consider the description in (29). It requires the coordination head features to be either equal to the head features of its daughters, or else less specified, as represented by the ≤ relation (meaning 'equal to' or 'a supertype of') that holds for any embedded feature structure within [0].

(29) *coord-cx* =>

$$\left[\begin{array}{ll} \text{MOTHER} & \left[\begin{array}{l} \text{HEAD } \boxed{0} \mid \boxed{0} \leq \boxed{1},\ldots, \boxed{n} \\ \text{VALENCE } \boxed{A} \\ \text{SLASH } \boxed{B} \\ \text{COORD+} \end{array}\right] \\ \text{DTRS} & \left\langle \left[\begin{array}{l} \text{HEAD } \boxed{1} \\ \text{VALENCE } \boxed{A} \\ \text{SLASH } \boxed{B} \end{array}\right], \ldots, \left[\begin{array}{l} \text{HEAD } \boxed{n} \\ \text{VALENCE } \boxed{A} \\ \text{SLASH } \boxed{B} \end{array}\right] \right\rangle \end{array}\right]$$

As a consequence, coordinations of identical categories may be either fully specified for their head features or else underspecified, while coordinations of unlikes necessarily remain underspecified for the relevant conflicting properties of their conjuncts, such as VFORM in (27a). Assuming on the other hand that selectors impose a lower bound on the type of their arguments, i.e. requires them to be at least as specified as stated (hence possibly underspecified) or else more specified, the data in (27) follow, as we briefly show. Let us assume *finite* to be the immediate supertype of *indicative* and *subjunctive* in the hierarchy of possible values for the VFORM attribute. Let us moreover assume that the instance of the adjectival predicate in (27a) is specified as in (30a) while the instance of the adjectival predicate in (27b) is specified as in (30b). Only an indicative CP or a coordination of such CPs will be allowed as complement in the latter case, hence accounting for the contrast in (26b). On the other hand, three resolutions of the VFORM feature will be allowed in the former case (thanks to the ≤ relation), licensing as al-

ternative complements an indicative CP (or a coordination of such categories), a subjunctive CP (or a coordination of such categories), or else some underspecified finite CP arising from the coordination of an indicative and a subjunctive CP, as in (27a).

(30) a *certain* in (26a): [COMPS <CP[VFORM [1], *finite* ≤ [1]]>]
b *certain* in (26b); [COMPS <CP[VFORM *indicative*]>]

Now, returning to the *coord-cx* in (29), we constrain VALENCE features of the daughters to be equated on the mother in order to prevent predicates with different subcategorization requirements from combining outside neutralization contexts such as (28). We also constrain SLASH features to unify in order to exclude asymmetric extraction patterns, since those are rejected in French even when some asymmetric discourse relation holds between conjuncts (compare French (31a) with English (31b)). Finally note that the *coord-cx* is specified for a boolean feature [COORD+], an ancillary feature which we return to in §5.3.

(31) a *Voici le livre que Paul est allé à la librairie et a acheté _.
b Here is the book that Paul went to the bookshop and bought _.

5.2 Licensing argument clusters

Argument clusters may occur not only in ACC (as symmetric conjuncts), but also in (clausal) gapping constructions (32a,b) as well as in short answers in dialogue (32c) with the same basic property, i. e. the cluster is non-finite (32d). This suggests that argument clusters should be defined independently of coordination.

(32) a Paul a mangé une pomme et [Marie une orange].
Paul has eaten an apple and Marie an orange
b Paul apprécie son café le midi autant que sa tisane le soir.
Paul enjoys his coffee at noon as much as his herbal tea the evening
c [I wonder what kind of goods Paul can sell and to whom in his seedy bookshop]
- Des livres d'occasion à quelques collectionneurs aventureux, je suppose.
Some old books to adventurous collectors, I guess.
d Paul a mangé une pomme {?et non pas / ainsi que} Marie une orange
Paul has eaten an apple {and not / as well as} Marie an orange

Postponing the issue of 'non-constituency' to §5.3, we propose analyzing such clusters as instances of some underspecified non-headed construction *ac-cx* with one daughter or more (33). The construction is valence saturated and specified for a new head feature CLUSTER that takes as its value the list of

synsem description of the construction daughters.[10] Since other head features remain underspecified, the combination of argument clusters with items such as *ainsi que* or *non pas* that select for a non-finite category will hence be allowed. Finally note that the construction amalgamates the SLASH value of its daughters: this is needed to enforce ATB-extraction out of ACCs (see (3a,b)).

(33) *ac-cx* =>

$$\left[\begin{array}{l}\text{MOTHER}\ \left[\begin{array}{l}\text{HEAD}\ \left[\begin{array}{l}head\\ \text{CLUSTER}\ \langle \boxed{1},\ldots,\boxed{n}\rangle\end{array}\right]\\ \text{SUBJ}\ \langle\rangle\\ \text{SPR}\ \langle\rangle\\ \text{COMPS}\ \langle\rangle\\ \text{SLASH}\ \Sigma 1\ \cup\ \ldots\ \cup\ \Sigma n\end{array}\right]\\ \text{N-HD-DTRS}\ \boxed{L}\textit{1-to-n-list}\left\langle\left[\text{SYNSEM}\ \boxed{1}\left[\text{SLASH}\ \Sigma 1\right]\right],\ldots,\left[\text{SYNSEM}\ \boxed{n}\left[\text{SLASH}\ \Sigma n\right]\right]\right\rangle\end{array}\right]$$

Now turning to the feature computation that arises when such constituents get coordinated, nothing more needs to be said to allow the variety of ACCs mentioned in §2(ii). ACCs of unlike categories such as (3c) repeated in (34a) will be dealt with just like ordinary coordinations of unlikes, i.e. by underspecifying within the CLUSTER head feature of the coordination as a whole the conflicting properties of the categories appearing on each conjunct's own CLUSTER feature. Assuming the first and the second conjunct in (34a) to be specified as in (34b) and (34c) respectively, one thus allows (among other resolutions) the coordination as a whole to be specified as in (34d) for its CLUSTER feature, with *cpltzer_ noun* as an appropriate supertype that subsumes *cpltizer* and *noun* in the hierarchy of HEAD values.

(34) a Les enseignants attendent des élèves qu'ils respectent le règlement et de leur proviseur un soutien sans faille. (PP-CP + PP-NP)
b [CLUSTER <[HEAD *prep*], [HEAD *cpltzer*]>]
c [CLUSTER <[HEAD *prep*], [HEAD *noun*]>]
d [CLUSTER <[HEAD *prep*], [HEAD *cpltzer_ noun*]>]

More interestingly, coordinations of clusters of different lengths such as (3d) repeated here in (35a) can also be accommodated by positing a *list* hierarchy as in figure 6. Let the first and the second conjunct in (35a) be partially specified as in (35b) and (35c) respectively, one allows (again among others resolutions) the ACC as whole to be specified as in (35d) for its CLUSTER feature, hence providing the amount of underspecification needed.

[10] A default constraint should be stated in order to prevent signs in general from having a non-empty list value for their CLUSTER feature. We leave this aside here.

(35) a Paul écrira un petit poème et une lettre à sa mère (NP+NP-PP)
b [CLUSTER <NP>+*elist*]
c [CLUSTER <NP>+*1-list*(PP)]
d [CLUSTER <NP>+*0-to-1-list*(PP)]

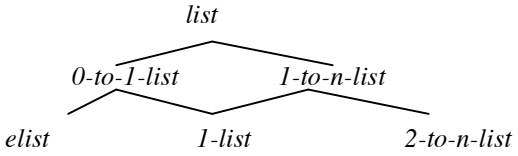

Figure 6

5.3 Argument cluster coordinations as complements

Turning to the final step of our syntactic analysis, we posit a valence-changing lexical rule (mapping words to words) that allows a given predicate to be partially saturated by an ACC. We formulate it in (36) as a post-inflectional lexical construction replacing some non-empty sublist of complements in the COMPS of the input word by an ACC (i.e. a description that is specified as [COORD+] and has a non-empty list value for its CLUSTER feature) in the COMPS of the output word. Note that the sublist to be replaced cannot correspond itself to a single ACC, hence preventing infinite recursion.

(36)
$$\left[\begin{array}{l} \textit{acc-post-inflec-lex-cx} \\ \text{INPUT}\left[\begin{array}{l}\textit{word}\\ \text{COMPS } \boxed{\text{L1}} + \boxed{\text{L2}}\ \textit{1-to-n-list}\langle[\text{CAT } \boxed{1}],\ldots,[\text{CAT } \boxed{n}]\rangle\end{array}\right] \\ \text{OUTPUT}\left[\begin{array}{l}\textit{word}\\ \text{COMPS } \boxed{\text{L1}} + \langle\left[\begin{array}{l}\text{COORD+}\\ \text{CLUSTER}\langle[\text{CAT } \boxed{1}],\ldots,[\text{CAT } \boxed{n}]\rangle\end{array}\right]\rangle\end{array}\right] \end{array}\right]$$
$$\wedge \boxed{\text{L2}} \neq \langle\left[\begin{array}{l}\text{COORD +}\\ \text{CLUSTER } \textit{1 - to - n - list(synsem)}\end{array}\right]\rangle$$

This lexical construction achieves three main results. First note that it crucially introduces the ACC in the COMPS list. Assuming, as is standard within HPSG, that the COMPS list only contains *canonical-synsem* elements as opposed to the ARG-ST of words which may also contain gaps and pronominal affixes (i. e. *non-canonical synsem* elements), rule (36) correctly predicts that ACC cannot be extracted or cliticized (see (24)). This is how we propose to capture the 'non-constituent' properties of ACC.

Second, since only local elements appear in the COMPS sublist that is replaced in (36), long-distance ACC is also correctly prevented (see §2(iii)) without locating any constraint in argument clusters themselves (recall that clusters of non-sister constituents may arise in gapping constructions, see (6b)).

Finally, note that the ACC replacing the sublist [L2] in (36) preserves the syntactic CAT properties of the original complements in its CLUSTER feature. This is how Wasow's generalization is captured. Let the syntactic properties of the original complements be maximally specified and argument cluster conjuncts will be required to be parallel. Let on the other hand those properties remain partially underspecified and the variety of non-parallel ACCs will be allowed to occur. Consider for example a verb like *écrira* and suppose it is specified for a simplified COMPS list as in (37a). The rule in (36) allows for an alternative entry with a COMPS list of the form (37b), hence providing the appropriate environment for an ACC with conjuncts of different length as in (35a/d) to occur (see figure 7).

(37) a écrira$_1$: [COMPS <NP> + [1], *0-to-1-list*(PP) ≤ [1]]

b écrira$_2$: [COMPS < [COORD+ ; CLUSTER < NP > +[1] | *0 - to - 1 - list*(PP) ≤ [1]] >]

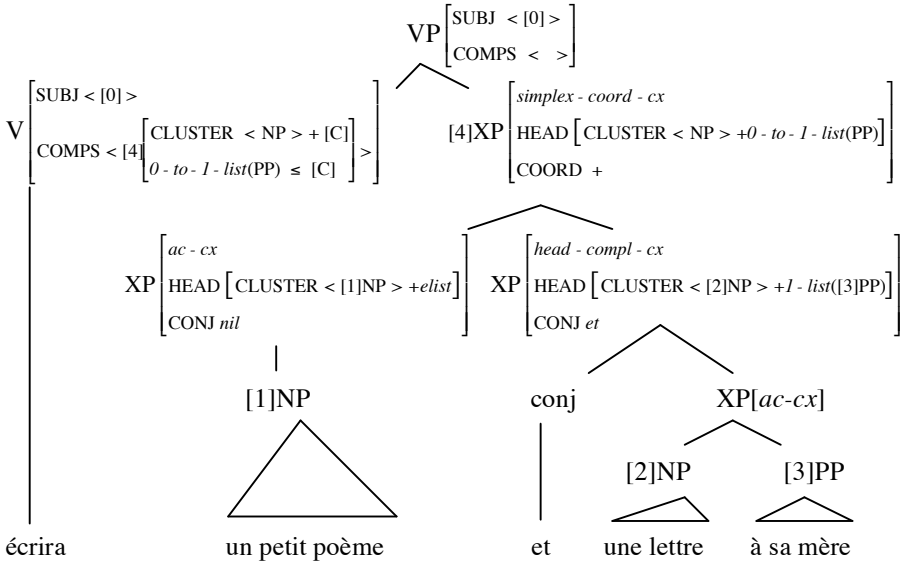

figure 7

We conclude this section by noting that the agreement phenomena discussed in §4.3 can be accounted for by the additional constraint in (38).

(38) ([INPUT [CONCORD | NUM [N] ; COMPS [L1] + [L2] <..., [INDEX | NUM [N]], ...>]]) →

([OUTPUT [COMPS [L1] + < [CLUSTER <..., [INDEX | NUM [N]], ...>] >]]

∨ [N] = *plural*)

Read in conjunction with (36), such a constraint states that if the input entry agrees with one of its complements (i. e with some postverbal 'subject'), then either the output entry preserves this constraint in its CLUSTER list (hence enforcing the first agreement strategy) or the verb is plural whatever the index number value of each cluster's corresponding complement (hence allowing the second agreement strategy).

6. Conclusion

Taking French as our object language in this paper, we have provided theory-neutral arguments against analyses that appeal to ellipsis to account for ACC. As we have shown, neither a deletion-based approach (which might be the right solution for Right-Node-Raising constructions), nor a substitutional one (which might be the right solution for Gapping) is empirically appropriate. Focussing on syntactic issues, we have then explored an alternative approach within HPSG that eschews ellipsis by allowing non-standard constituents to be conjoined in the scope of some shared predicate. While such non-standard constituents are generally obtained by relaxing phrase structure, we propose analyzing them as non-headed constituents, deriving their unusual properties from the interplay of two different sets of constraints: those imposed by coordination and those imposed by predicates that select such clusters as arguments. It remains to be seen how our analysis can be paired with a proper syntax-semantics interface.

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A unified approach to questions, quantifiers, and coordination in Japanese

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Abstract

The Japanese language is one of the languages where universal and existential quantification are expressed using *wh*-words with the conjunctive and disjunctive particles, respectively. In this paper, inspired by the syntactic and semantic parallelism found in Japanese between quantification, coordination, and question, we seek to analyze these constructions in a unified fashion. We investigate various phenomena of these constructions and show how these three constructions can be uniformly analyzed as cases where abstracted arguments are questioned or quantified for verbs. We then present an HPSG formalization of the analysis.

1 Introduction

Universal/existential quantifiers can be seen as generalization of logical conjunction/disjunction. The universal (existential) quantification of an open proposition is the conjunction (disjunction) of all its possible instantiations. In other words, conjunction (disjunction) is a special kind of universal (existential) quantification where the domain of the variable is restricted to the set of the conjuncts (disjuncts). The Japanese language seems to reflect this well-known logical relationship. A common way in Japanese to express universal or existential quantification is to use a *wh*-pronoun in combination with *mo* or *ka*, particles otherwise used to denote conjunction or disjunction (Let's call this quantification *wh-mo/ka*).[1] Actually, there is a strong parallelism between these two uses of the particles:

(1) a. Kare-wa ie-de-mo gakkou-de-mo asonda.
he-TOP home-LOC-*mo* school-LOC-*mo* played
'He played at home and at school.'

b. Kare-wa doko-de-mo asonda.
he-TOP where-LOC-*mo* played
'He played everywhere.'

c. Kare-wa ie-ka gakkou-(ka)-de asonda.
he-TOP home-*ka* school-*ka*-LOC played
'He played at home or at school.'

d. Kare-wa doko-ka-de asonda.
he-TOP where-*ka*-LOC played
'He played somewhere.'

Examples (1b) and (1d) are examples of universal and existential quantification, respectively. In (1b), the *wh*-word *doko* 'where' is marked by *mo*, and it means

[1]There are other languages where universal/existential quantification is expressed by a *wh*-word and a conjunctive/disjunctive particle (see, for example, Gill et al. (2004)). This suggests that the use of conjunctive and disjunctive particles in universal and existential quantification in Japanese is not just a coincidence but a typological tendency.

'everywhere'. In (1d), *doko* is marked by *ka*, and it means 'somewhere'. Examples (1a) and (1c) are examples of conjunctive and disjunctive coordination. As you can see, syntactically, (1a) and (1c) are the same as (1b) and (1d), respectively, except that the *mo/ka*-marked argument are repeated several times (2 times in this case) and in each case, the *wh*-word is replaced by a different individual. This syntactic correspondence between (1a, c) and (1b, d) is parallel with the semantic correspondence between these examples because, as the above-mentioned logical relationship between universal/existential quantification and conjunctive/disjunctive coordination suggests, the denotations of (1a) and (1c) are the same as those of (1b) and (1d), respectively, except that the domain of the variable is restricted to the set of conjuncts.

But what are the *wh*-words doing in the quantified sentences (1b, d)? According to Ginzburg and Sag (2001) (henceforth GS)'s semantic ontology, on which they base their HPSG account of English interrogatives, questions are propositional abstracts where *wh*-words correspond to abstracted arguments. If, in (1b, d), the *wh*-words are not *mo/ka*-marked and the verb is in the interrogative form, we have an ordinary *wh*-question:

(2) Kare-wa doko-de asonda-ka?
he-TOP where-LOC played-Q
'Where did he play?'

and its denotation, in GS's view, is

(3) $\lambda\{x\}[\![\text{he played at } x]\!]$

Note here that (3) is the very open proposition which is quantified in (1b, d).

The relationship between the three constructions in question, namely question, quantification, and coordination in Japanese, is informally summarized in Figure 1, which shows the semantic relationship, what syntactic elements each construction consists of, and how these syntactic elements are shared between these constructions.

This relationship leads us to think that the semantics of questions, quantifiers and coordination in Japanese should be consistently accounted for by the semantic contributions of the particles *mo/ka* and of *wh*-words. In the following, we show how such an analysis can be implemented in HPSG.[2]

2 Framework

Before proceeding with the analysis, let us first outline our general framework for representing the semantics of question and quantification and for identifying

[2]Hagstrom (1998) further identified the disjunctive particle *ka* with the question marker *ka* and tried to analyze them uniformly as existential quantification over choice functions. We do not take this view, however, because the disjunctive particle *ka* and the question marker *ka* are a nominal suffix and a suffix to finite verbs, respectively, and thus we consider that they are different lexical entries belonging to different syntactic categories that happen to have the same form.

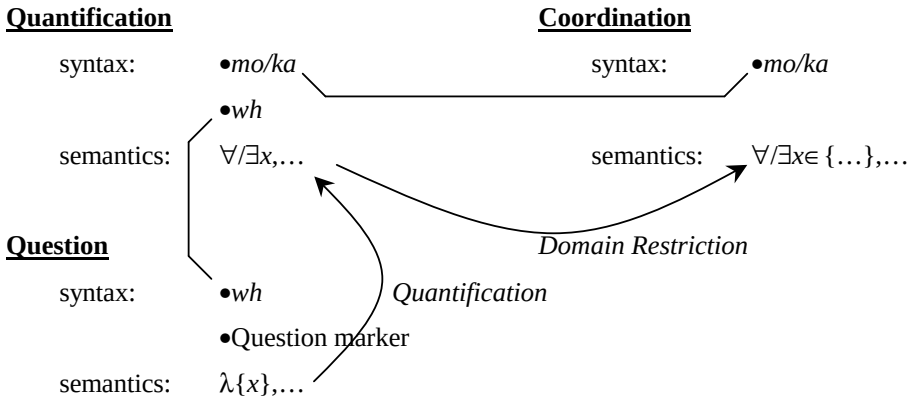


Figure 1: Syntactic/semantic relationship between the three constructions

mo/ka-marked words in HPSG. Our general semantic framework follows that of GS's, but with some modifications. In this section, we first explain our adaptation of GS's framework, and then we introduce a feature to identify *mo/ka*-marked words.

2.1 Ginzburg and Sag (2001)'s semantic framework

GS introduced a separate semantic type, *question*, for the contents of interrogative clauses. The type *question* has the feature PARAMS, "the *wh*-phrase analogue of QUANTS" (Ginzburg and Sag 2001:121), whose value is a set of *params*, "restriction-bearing indices" (Ginzburg and Sag 2001:121), which correspond to the abstracted arguments of the propositional abstract – the *wh*-words in the clause. In their framework, questions are semantically distinguished from other clauses by their contents being of type *question*. Thus, even polar questions, questions with no arguments abstracted, can be distinguished as questions, only with empty PARAMS.

This treatment of polar questions, however, is not without problems. GS define the conjunction of two propositional abstracts as follows (Ginzburg and Sag 2001:110):

> *Given a question* q_1 *(*$= \lambda A.\sigma$*) and a question* q_2 *(*$= \lambda B.\tau$*), where* $A \cap B = \emptyset$*:*
>
> $$\wedge(\lambda A.\sigma, \lambda B.\tau) =_{def} \lambda A \cup B. \wedge \{\sigma, \tau\}$$

($\lambda A.\sigma$ denotes the propositional abstract whose set of abstracted argument is A and whose corresponding proposition is σ) That is, as the conjunction of the corresponding propositions with the set of abstracted arguments being the union of the sets of abstracted arguments of the conjuncts. But in this way, since a polar question is a propositional abstract whose set of abstracted parameters is the empty set and the union of a set with the empty set is the original set itself, if you conjoin

a polar question with another question, the information that the truth value of the corresponding proposition of the polar question is asked is lost. For example, the denotation of (4a) and (4b) will be the same, that is, (4c).

(4) a. whether it is good and whether it is cheap

b. whether it is good and cheap

c. $\lambda\{\}(\text{Good}(i) \wedge \text{Cheap}(i))$

d. $\lambda\{p_1, p_2\}(\text{Good}(i, p_1) \wedge \text{Cheap}(i, p_2))$

e. $\lambda\{p\}(\text{Good}(i, p) \wedge \text{Cheap}(i, p))$

One way to solve this problem is to regard the polarity as an argument and to abstract it in polar questions, instead of identifying polar questions as propositional abstracts with empty PARAMS.[3] For example, if 'Good' and 'Cheap' in (4) have the polarity argument as their second arguments, the denotation of (4a) and (4b) are distinguished as (4d) and (4e), respectively.

To implement this solution, in our framework, the type *rel(ation)* has the feature POL(ARITY), whose value is of type *index*. The POL of a relation indicates whether the relation holds or not. For example, a negative declarative sentence's matrix verb[4] whose CONT|NUCL|POL is i has $negative(i)$ in its BACKGROUND[5] to indicate that the verb's polarity is negative. The POL value is of type *index* so that it can be abstracted. In polar questions, this index is converted to a parameter with the restriction of being a polarity and put in the PARAMS set.

As a byproduct of this solution, we do no longer need a separate semantic type for questions, for questions can now be distinguished simply by their PARAMS being non-empty: in our framework, we do not have the type *question*, and instead PARAMS is made a feature appropriate for *soa*. In this way, PARAMS is more "analogue of QUANTS", as PARAMS and QUANTS are both features of *soa*, and questions and quantified clauses are distinguished from other clauses by their PARAMS and QUANTS being non-empty, respectively.

2.2 *mo/ka*-marked words

In order to be able to identify whether a word is marked by *mo*, *ka*, or neither, we introduce a feature called MOKA. MOKA is a feature appropriate for the type *part-of-speech*, and its value is of type *moka*. The type *moka* has three subtypes: *mo*,

[3]There are other reasons to prefer this solution. First, the PARAMS set can be thought of as the set of inquired information and in a polar question, something is surely asked – the truth-value of the clause. Second, in English, there is a *wh*-word, *whether*, for this argument, as can be seen in (4a, b). Third, and most important for this paper, this polarity argument can be quantified: 'no matter wh...' construction is the English counterpart of Japanese *wh-mo*, and *whether* can be quantified as in 'no matter whether ...'

[4]Throughout this paper, I use the term 'verb' to refer to verbs and adjectives.

[5]We will see the constraint to achieve this in section 4.1.

ka, and -. A word's HEAD|MOKA is *mo* and *ka* when the word is marked (suffixed) by the conjunctive particle *mo* and by the disjunctive particle *ka*, respectively, and otherwise it is -.

Parts of the type hierarchy of our framework are shown in Figure 2

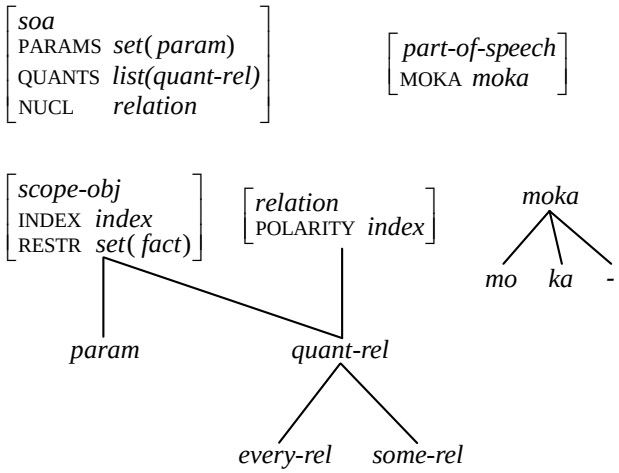


Figure 2: Parts of the type hierarchy

3 Data and Analysis

3.1 Quantification

In *wh-mo/ka*, the particles *mo/ka* do not always mark the *wh*-word directly. Especially, *mo* can mark any verbal dependent[6] containing the *wh*-word.[7] Thus, there are sentences that differ only in the position of *mo* and in such cases, different positions of *mo* can lead to different meanings:

(5) a. Kujyo-ga kare-kara kuru-to komaru.
complaint-NOM he-from come-COND I hate it
'I hate it if he complains.'

b. Kujyo-ga dare-kara-mo kuru-to komaru.
complaint-NOM who-from-*mo* come-COND I hate it
'I hate it if everyone complains.'

[6] By a verbal dependent, I mean a dependent of a verb, and by saying that a dependent is marked by *mo/ka*, I mean that the head word of the dependent is marked (suffixed) by *mo/ka*.

[7] On the other hand, *ka* usually marks *wh*-words directly and there are cases where such *ka*-marked *wh*-words are not verbal dependents. In this paper, however, we restrict ourselves to cases where *ka*-marked *wh*-words make verbal dependents.

c. Kujyo-ga dare-kara kite-mo komaru.
complaint-NOM who-from come-COND-*mo* I hate it
'I hate it if someone complains.'

d. Kujyo-ga dare-ka-kara kuru-to komaru.
complaint-NOM who-*ka*-from come-COND I hate it
'I hate it if someone complains.'

Examples (5b-d) are the same as (5a), except that the argument *kare* is abstracted and quantified by *wh-mo/ka*. Examples (5b) and (5d) differ in whether the *wh*-word is marked by *mo* or by *ka*, and accordingly their meanings differ in whether the antecedent is quantified universally or existentially. Examples (5b) and (5c) differ only in the position of *mo* but their meanings are so different that (5c)'s meaning is the same as (5d)'s.

It has been noted in the literature (e.g., Yatsushiro (2001)) that *mo* marks the scope of the universal quantifier. Considering that *mo* always marks a verbal dependent, we propose the following principle of quantification to explain the semantics of *wh-mo*/*ka*: for each *mo/ka*-marked dependent of a verb, *wh*-words contained in it can be universally/existentially quantified for the verb.[8] It follows from this principle that the quantified clause is the antecedent in (5b, d) and the matrix sentence in (5c). Thus, we get the following denotations for (5b-d):

(6) a. $(\forall x, x$ complains$) \rightarrow$I hate it

b. $\forall x, (x$ complains$\rightarrow$I hate it$)$

c. $(\exists x$ s.t. x complains$) \rightarrow$I hate it

As (6b) and (6c) are logically equivalent, these denotations match the actual interpretations of (5b-d).

3.2 Question

Now consider questions. It has been noted in the literature (e.g., Hagstrom (1998)) that the interrogative scope is marked by the question marker, as can be seen in the following example:

(7) a. Kujyo-ga dare-kara kita-ka tazuneta.
complaint-NOM who-from came-Q I asked
'I asked who complained.'

b. Kujyo-ga dare-kara kita-to omou-ka.
complaint-NOM who-from came-that think-Q
'Who do you think complained?'

[8]By saying that a *wh*-word w is quantified for a verb v, I mean that w is quantified as a variable of the open proposition which the maximal projection of v denotes. In our HPSG framework, it means that the *quant-rel* made from the parameter which w denotes goes into the QUANTS of the *soa* which v denotes.

So the principle of question is as follows: for each verb in the interrogative form (VFORM being *interrogative*), *wh*-words contained in its maximal projection can be questioned for it.[9]

3.3 Interaction of constraints

Note that the principle of quantification does not say that all, or even some, of the *wh*-words in a *mo/ka*-marked dependent of a verb are quantified for the verb. While *ka* usually marks the *wh*-words directly and such *ka*-marked *wh*-words can only be quantified for the word of which the *wh*-word is a dependent, *mo* can mark any verbal dependent, which may contain two or more *wh*-words, and not all *wh*-words there are necessarily quantified for the verb. The following example illustrates this point.

(8) a. Dare-mo nani-mo iwanai.
who-*mo* what-*mo* say-NEG
'Nobody says anything.'

b. Dare-ga nani-o itte-mo kinisi-nai.
who-NOM what-ACC say-COND-*mo* care-NEG
'No matter who says what, I don't care.'

c. Dare-ga nani-o itte-mo kinisi-nai-no?
who-NOM what-ACC say-COND-*mo* care-NEG-Q

d. John-ga nani-o itte-mo kinisi-nai.
John-NOM what-ACC say-COND-*mo* care-NEG
'No matter what John says, I don't care.'

Although both (8a) and (8b) have two *wh*-words universally quantified by *wh-mo*, *mo* appears only once in (8b) and twice in (8a). This is because, while, in (8a), the two *wh*-words are two separate dependents of the verb for which they are quantified, (8b) is an example where the two *wh*-words are contained in one dependent of the verb for which they are quantified.

Example (8c) is the same as (8b) except that the matrix verb is marked by a question marker. Unlike (8b), however, (8c) has an interesting grammatical ambiguity. There are four interpretations of (8c) as each of the two *wh*-words can either be quantified by *wh-mo* or be questioned by the question-marker. Although, out of context and with default prosody, the default interpretation of (8c) would be as a polar question, where the two *wh*-words are both quantified ('Don't you care no matter who says what?'), other interpretations are possible. For example, the interpretation that the first *wh*-word *dare* is questioned and the second *wh*-word *nani*

[9] By saying that a *wh*-word w is quantified for an interrogative verb v, I mean that the interrogative scope is the maximal projection of v. In our HPSG framework, it means that the *param* which w denotes goes into the PARAMS of the *soa* which v denotes.

is quantified ('No matter what WHO says, you don't care?') is natural as a reprise question to (8d) or when the first *wh*-word *dare* is stressed.[10, 11]

Such an ambiguity can be explained as the result of interaction between the principle of quantification and the principle of question. Of course, all *wh*-words must be either quantified or questioned once, and only once, somewhere. But when *mo/ka* and question-markers co-occur, as in (8c), or when a verb phrase is embedded in another, there will be choices as to whether the *wh*-words are questioned or quantified and for which verb. In our HPSG framework, these different choices are represented by whether the parameters go into PARAMS or QUANTS and which *soa*'s PARAMS/QUANTS they go into.[12]

3.4 Coordination

As we noted in the introduction, conjunction (disjunction) is a special kind of quantification, where the domain of the variable is restricted to the set of conjuncts (disjuncts). Marked by *mo*, (1a) and (1b) are both examples of universal quantification that differ only in the domain of the variable. In (1b), the *wh*-word *doko* implies that the domain is the set of places. In (1a), the conjunction implies that the domain is the set of its conjuncts, that is, $\{home, school\}$. So, we analyze a coordinated phrase in the same way as a *mo/ka*-marked *wh*-word, that is, as a parameter, except that the domain is restricted to the set of the conjuncts and that it can only be quantified for the verb of which it is a dependent, not questioned.

In a coordinated phrase, conjuncts (disjuncts) must have compatible syntactic categories whose MOKA values are not -. When they are marked by *ka*, the coordinated phrase must have at least two disjuncts. A *mo*-marked coordinated phrase, on the other hand, may consist of one conjunct (or more).

[10]The correspondence between prosody and scope of *wh*-question has been discussed in previous works (e.g., Deguchi and Kitagawa (2002); Ishihara (2002)).

[11] Out of context and with default prosody, however, interpretations other than as a polar question would be unnatural. We leave it to future work to discuss exactly in what context or with what prosody such interpretations can be natural, that is, what pragmatic/prosodic constraints are to be imposed when not all free *wh*-words in a *mo*-marked verbal dependent are quantified for the verb. Cf. footnote 12.

[12] Previous works such as Shimoyama (to appear) claim the existence of what she calls the island puzzle in Japanese to the effect that all, not some, free *wh*-words in a *mo*-marked verbal dependent are quantified for the verb and all, not some, of the remaining *wh*-words in an interrogative verb's maximal projection are questioned for the verb, thus accepting only the interpretation as a polar question for (8c). Let us call those interpretations that obey the island condition X and those that don't Y. Our attitude is that, although X and Y may impose different pragmatic/prosodic constraints, both are grammatical. Note that, although our implementation in this paper accepts both X and Y, it is easy to distinguish X and Y in our framework. Our implementation can easily be modified to accept only X, and it should also be easy to modify it to impose certain pragmatic/prosodic constrains only for Y, while Shimoyama's analysis can essentially only accept X. Cf. footnote 11.

3.5 Scope ambiguity

When two or more parameters are quantified for a verb, their relative scope must be considered. Basically, any scope order is possible. For example, in (9a), either of *dare* and *nani* can take wide scope over the other.

(9) a. Dare-mo-ga nani-ka-o sitteiru.
who-*mo*-NOM what-*ka*-ACC know
'Everyone knows something.'

b. Dare$_1$-ga nani-o itte-mo dare$_2$-ka-ga sakarau.
who-NOM what-ACC say-COND-*mo* who-*ka*-NOM oppose
'No matter who says what, someone opposes it.'

But for any three parameters p_1, p_2 and p_3 that are quantified for the same verb, if p_1 and p_2 are contained in the same dependent of the verb and p_3 is contained in a different dependent of the verb, p_3 can only either take wide scope over both p_1 and p_2 or take narrow scope under both p_1 and p_2. For example, in (9b), as *dare*$_1$ and *nani* are contained in the same dependent *dare*$_1$*-ga nani-o itte-mo* and *dare*$_2$ is contained in a different dependent *dare*$_2$*-ka-ga*, the scope orders *dare*$_1$ $>$ *dare*$_2$ $>$ *nani* and *nani* $>$ *dare*$_2$ $>$ *dare*$_1$ are not possible.

4 Formalization

In this section, we formalize our analysis in our framework. Here is a rough idea of how our system works: *wh*-words and coordinated phrases contribute as parameters, restriction-bearing indices. Such a parameter can go to the PARAMS of any interrogative verb whose maximal projection contains it (the case of a *wh*-question), or it can go to the QUANTS of any verb in a *mo*- or *ka*-marked dependent of which it is contained (the case of *wh-mo/ka*). When the parameter goes to the QUANTS of a verb, it is converted to an *every-rel* or a *some-rel* depending on whether the dependent is marked by *mo* or by *ka*. If no parameter goes into the PARAMS of an interrogative verb, the polarity of the verb goes into the PARAMS of the verb instead. It is the case of a polar question.

4.1 Parameter Amalgamation

Parameters are propagated via the STORE feature, a head feature whose value is a set of *params*. The STORE of a word designates the parameters in the word's maximal projection that are yet to be quantified/questioned. Parameters originate in the STORE values of *wh*-words[13] and of coordinated phrases[14], and each word amalgamates its arguments' STORE values (we ignore adjuncts in this paper), putting those

[13] *Wh*-words are specified in the lexicon as having *params* in their STORES.

[14] Coordination rule, a grammar rule which licenses coordinated phrases, stipulates that coordinated phrases have *params* in their STORES, as we will see in section 4.2.

parameters that are quantified/questioned for the word into its PARAMS/QUANTS and others into its STORE, which is then inherited up the tree as a head feature. In this way, each parameter is guaranteed to be either quantified or questioned, at most once. To implement this amalgamation, we introduce two new features appropriate for the type *synsem*, namely TO-QUANTIFY and TO-QUESTION, whose values are sets of *params*. The TO-QUANTIFY and TO-QUESTION of a word w_1 are disjoint subsets of w_1's STORE and designate, when w_1 becomes a dependent of another word w_2, what parameters in w_1's STORE will be quantified and questioned for w_2. In the amalgamation, each word uses its arguments' TO-QUANTIFY and TO-QUESTION values to decide its own QUANTS, PARAMS and STORE. The conditions under which parameters are quantified/questioned for verbs are expressed as constraints on these features. The constraints in Figure 3 implement the propagation and retrieval of parameters.

The lexical amalgamation of STORE is stated in constraint (e). The STORE of a word whose content is not of type *soa* is simply the union of its arguments' STORE values. When the content of a word is of type *soa* (that is, when the word is a verb), the parameters in the arguments' TO-QUANTIFY and TO-QUESTION values go to the word's QUANTS and PARAMS, respectively, and the rest of the parameters in the arguments' STORE values go to the word's STORE. Note that the contained difference[15] operation, $s_i \dot{-} q_i \dot{-} p_i$, in constraint (e) constrains each argument's TO-QUANTIFY and TO-QUESTION (q_i and p_i) to be disjoint subsets of the argument's STORE (s_i).

When the parameters in the arguments' TO-QUANTIFY values go to the word's QUANTS, they are converted, by the function f, to sets of *quant-rels* depending on the arguments' MOKA values, and these sets are ordered and then concatenated, by function h, into a list to specify the scope order. In this way, it is ensured that no two parameters from the same dependent have a parameter from another between them in the scope order, as we discussed in section 3.5. Constraint (a) requires that only parameters from *mo/ka*-marked arguments can be quantified.

When the word is not in the interrogative form, constraint (b) restricts the word's PARAMS to be empty, thus restricting, in combination with constraint (e), every argument's TO-QUESTION to be empty. It is the case of a declarative clause. When the word is in the interrogative form and the arguments' TO-QUESTION values are all empty, constraint (b) requires the word's PARAMS to be non-empty and then constraint (e) requires, since the arguments' TO-QUESTION values are all empty, the word's PARAMS to be its parameterized polarity (in this paper, we ignore possible semantic differences between positive and negative polar questions). It is the case of a polar question. Otherwise, as some of the arguments' TO-QUESTION values are non-empty, it follows from constraint (f) that the word's PARAMS is not its parameterized polarity and then constraint (e) requires the word's PARAMS to be the union of the arguments' TO-QUESTION values. It is the case of a *wh*-question.

[15] The contained difference $R \dot{-} S$ is the same as the ordinary set difference $R - S$, but it is defined only for R and S such that $R \subset S$.

(a) $\left[\begin{array}{l} word \\ \text{MOKA} \ \ \text{-} \end{array}\right] \Rightarrow \left[\text{TO–QUANTIFY} \ \{\}\right]$

(b) $\left[\begin{array}{l} word \\ \text{VFORM} \ \ \neg interrogative \end{array}\right] \Leftrightarrow \left[\text{PARAMS} \ \{\}\right]$

(c) $root \Rightarrow \left[\text{STORE} \ \{\}\right]$

(d) $\left(\left[\begin{array}{l} word \\ \text{MOKA} \ \ ka \end{array}\right] \vee \left[\text{STORE} \ \{\left[\text{RESTR} \ \in\right]\}\right]\right) \Rightarrow \left[\begin{array}{l} \text{STORE} \ \ \boxed{1} \\ \text{TO–QUANTIFY} \ \ \boxed{1} \end{array}\right]$

(e) $word \Rightarrow /\left(\left[\begin{array}{ll} \text{STORE} & \bigcup_{i=1}^{n} s_i \\ \text{CONT} & \neg soa \\ \text{ARG–ST} & \left\langle\left[\text{STORE} \ \ s_1\right], \cdots, \left[\text{STORE} \ \ s_n\right]\right\rangle \end{array}\right] \vee \left[\begin{array}{ll} \text{STORE} & \bigcup_{i=1}^{n}(s_i \doteq q_i \doteq p_i) \\ \text{CONT} & \left[\begin{array}{ll} soa & \\ \text{QUANTS} & h(\texttt{order}(\{f(m_1,q_1),\cdots,f(m_n,q_n)\})) \\ \text{PARAMS} & \left(\bigcup_{i=1}^{n} p_i\right) \vee \{\left[\begin{array}{ll} param & \\ \text{INDEX} & \boxed{1} \\ \text{RESTR} & polarity(\boxed{1}) \end{array}\right]\} \\ \text{NUCL} & \left[\text{POLARITY} \ \ \boxed{1}\right] \end{array}\right] \\ \text{ARG–ST} & \left\langle\left[\begin{array}{ll} \text{STORE} & s_1 \\ \text{TO–QUANTIFY} & q_1 \\ \text{TO–QUESTION} & p_1 \\ \text{MOKA} & m_1 \end{array}\right], \cdots, \left[\begin{array}{ll} \text{STORE} & s_n \\ \text{TO–QUANTIFY} & q_n \\ \text{TO–QUESTION} & p_n \\ \text{MOKA} & m_n \end{array}\right]\right\rangle \end{array}\right]\right)$

$f(\boxed{1}, \{x_1, \cdots, x_n\}) = \{g(\boxed{1}, x_1), \cdots, g(\boxed{1}, x_n)\},$

$g(mo, \left[\begin{array}{ll} param & \\ \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2} \end{array}\right]) = \left[\begin{array}{ll} every\text{-}rel & \\ \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2} \end{array}\right], g(ka, \left[\begin{array}{ll} param & \\ \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2} \end{array}\right]) = \left[\begin{array}{ll} some\text{-}rel & \\ \text{INDEX} & \boxed{1} \\ \text{RESTR} & \boxed{2} \end{array}\right],$

$h(\langle x_1, \cdots, x_n \rangle) = \texttt{order}(x_1) \oplus \cdots \oplus \texttt{order}(x_n)$

(f) $\left[\begin{array}{l} word \\ \text{POL} \ \ i \end{array}\right] \Rightarrow \left(\left[\begin{array}{ll} \text{PARAMS} & \{[\text{RESTR} \ polarity]\} \\ \text{ARG-STR} & \langle[\text{TO-QUESTION} \ \{\}], \cdots, [\text{TO-QUESTION} \ \{\}]\rangle \end{array}\right] \vee \left[\begin{array}{ll} \text{PARAMS} & \neg\{[\text{RESTR} \ polarity]\} \\ \text{VFORM} & negative \\ \text{BCKGRD} & \{negative(i)\} \end{array}\right] \vee \left[\begin{array}{ll} \text{PARAMS} & \neg\{[\text{RESTR} \ polarity]\} \\ \text{VFORM} & \neg negative \\ \text{BCKGRD} & \{positive(i)\} \end{array}\right]\right)$

(The $\dot{-}$ operator denotes contained difference[15], and $\oplus$ denotes list concatenation.)

Figure 3: Constraints for parameter amalgamation

Constraint (f) also requires that, when it is not the case of a polar question, the polarity of the word be specified in its BACKGROUND according to its VFORM.

As we have seen in section 3, coordinated phrases and *ka*-marked parameters can only be quantified immediately. It is stated in (d). Note that, as we will see below in section 4.2, the RESTR value of the parameter that a coordinated phrase represents is a singleton set whose only member is of type $\in$.

Lastly, constraint (c) requires every parameter to be questioned or quantified somewhere.

Figure 4 provides a brief illustration of how (8c)'s interpretation as a reprise question to (8d), the interpretation that *dare* is questioned and *nani* is quantified, can be accepted in our system. First, *dare-ga* and *nani-o* have *params*, $\boxed{1}$ and $\boxed{2}$,

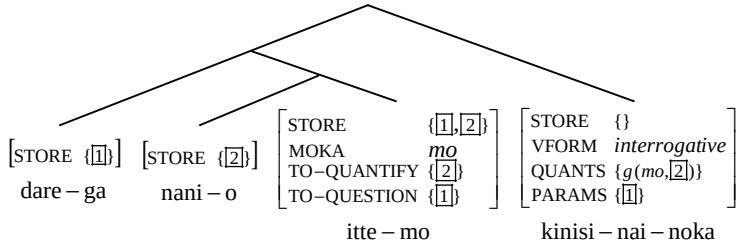


Figure 4: Example

in their STORES, as specified in the lexicon. Then, the verb *itte-mo* amalgamates these *params* into its own STORE. Now, the TO-QUANTIFY and TO-QUESTION values of the verb *itte-mo* can be non-empty, because *itte-mo* is marked by *mo*[16] and because it heads a dependent of an interrogative verb *kinisi-nai-noka*.[17] So, the TO-QUANTIFY and TO-QUESTION of *itte-mo* can be any partition of its STORE.[18] There are four ways of partitioning it into two sets, and one of them is that the TO-QUANTIFY and TO-QUESTION contains $\boxed{2}$ and $\boxed{1}$, respectively. In this case, it follows from constraint (e) that the matrix verb's QUANTS contains $\boxed{2}$, converted to an *every-rel*, and that the matrix verb's PARAMS contains $\boxed{1}$. This is the case shown in Figure 4, and it gives the interpretation that *dare* is questioned and *nani* is universally quantified.

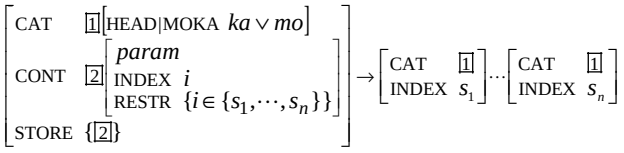
4.2 Coordination rule

Coordinated phrases are licensed by the grammar rule in Figure 5.

[16]Cf. constraint (a).

[17]Cf. constraints (b) and (e).

[18]They must be a partition of the STORE because constraint (c) requires the STORE value of the matrix verb *kinisi-nai-noka* to be empty and thus requires, in combination with constraint (e), the (disjoint) union of the TO-QUANTIFY and TO-QUESTION values of *itte-mo* to be equal to its STORE value.



($n \geq 2$ when MOKA is *ka*, and $n \geq 1$ when MOKA is *mo*.)

Figure 5: Coordination rule

The mother has a parameter in its STORE and the parameter has only one relation, of type $\in$, in its RESTR. The type $\in$ is a relation that takes two arguments, an index and a set of indices, and it specifies that the index is a member of the set of indices. Here, we represent a $\in$ relation briefly as $x \in y$ where x is the index and y is the set of indices.

Figure 6 is an illustration of how (1a)'s coordinated phrase is realized in our system. In this example, the two conjuncts have indices i and j respectively, and

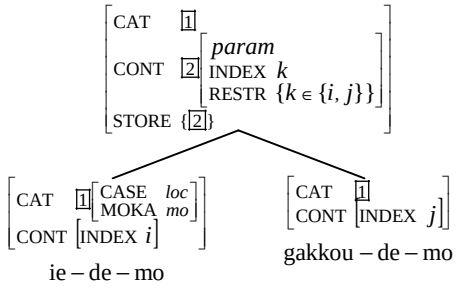


Figure 6: Example

thus the mother's CONT value is a *param* whose domain is the set of i and j.

5 Conclusion

In this paper, we have shown that question, quantification, and coordination in Japanese can be analyzed uniformly as cases where each parameter, denoted either by a *wh*-word or by a coordinated phrase, is quantified or questioned for an appropriate verb. We investigated various phenomena of these constructions to determine the conditions under which a parameter is questioned or quantified for a verb, and we gave an HPSG formalization of the analysis. Our analysis can account for, among other things, the quantifier scope as marked by the position of the conjunctive particle *mo* and the ambiguity of sentences like (8c), which arises from the interaction between the principle of question and the principle of quantification. Note especially that the last-mentioned ambiguity phenomenon is naturally derived in our unified, constraint-based analysis.

We have left two important issues for future work. First, we have ignored the syntactic difference between the conjunctive and disjunctive particles, *mo* and *ka*, and assumed that *ka* behaves the same way as *mo* syntactically. Actually, while *mo* can mark any verbal dependent, *ka* can only mark noun phrases, and, while *mo* can only mark verbal dependents, *ka* can mark any noun phrase regardless of whether or not it makes a verbal dependent.[19] Also, unlike in conjunctive coordination, only the last disjunct is case-marked, and the last disjunct may or may not be marked by *ka*, in disjunctive coordination, as you can see in examples (1a, c). In future work, we will revise the implementation so that *ka* is processed rightly.[20]

Second, the question of exactly what pragmatic/prosodic constraints are to be imposed on certain interpretations has been left unanswered. For example, out of the four interpretations of (8c), only the interpretation as a polar question is natural out of context and with default prosody.[21] Although the implementation given in this paper just accepts all the interpretations as grammatical, it is easy, in our framework, to identify those interpretations that would impose further pragmatic/prosodic constraints, and therefore it should be easy, when the study of the pragmatic/prosodic constraints in question is done, to revise the implementation so that it imposes certain pragmatic/prosodic constraints for certain interpretations.[22]

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[19] Cf. footnote 7.

[20] The syntactic difference between *mo* and *ka* has been discussed in previous works (e.g., Yatsushiro (2001)).

[21] Cf. footnote 11.

[22] Cf. footnote 12.

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Motion event and deictic motion verbs as path-conflating verbs

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Abstract

This paper attempts to decompose the Motion event into such elements as Figure, Path, Vector, and Ground based upon Talmy's framework, which makes it possible to formally analyze and compare the lexical semantics of the deictic motion verbs within and across languages. It is shown that the difference in interpretations of the Path is attributable to the lexical specifications of both deictic motion verbs and locative phrases. It is argued that deictic motion verbs can be lexically specified for the entailment of arrival only if they express the Path eventually directed to the deictic center. A formal analysis is given based upon the HPSG framework in order to identify the elements of a Motion event contributed by each element of a verb phrase, and to determine the compositional fashion in which they are combined to give the interpretation of the verb phrase as a whole.

1 Introduction

This paper examines typical deictic motion verbs *come* and *go* in different languages, Chinese, English, Japanese, and Korean, as well as other languages in the literature, using Talmy's framework for analyzing motion verbs (Talmy 1975, 1985, 2000). It is an attempt to determine the cross-linguistic patterns of spatio-temporal semantic properties of those deictic motion verbs, which are represented as the Ground and the Path of motion in Talmy's analysis.

Talmy (1975, 1985, 2000) formalizes a situation containing motion as a Motion event. The basic Motion event is analyzed to consist of an object (the Figure) and its movement through a path (the Path) with respect to another reference object (the Ground). These components can be identified in the following sentence:

(1) The bottle moved into the cove.
[Figure] [Motion] [Path] [Ground]

Some motion verbs, e.g. *enter* and *exit*, express not only the fact of Motion as is the case of *moved* in (1), but also (part of) the Path information such as 'into/out of an enclosure.' These motion verbs, which include the Path of motion in their lexical meaning, are called Path-conflating motion verbs. According to Talmy, deictic motion verbs are a kind of Path-conflating verb with a special choice of the Path and the Ground, and 'the Deictic component of Path typically has only the two member notions "toward the speaker" and "in a direction other than toward the speaker."' (Talmy 2000:56) Thus, the lexical meaning of *come* can be seen as conflated with the speaker

as the Ground as represented in (2).

(2) *come*

MOVE	TOWARD	a point which is the location of	the speaker
[Motion]	[Vector [Path]	[Conformation]	[Ground]

In (2), MOVE is an abstract verb which represents motion in a Motion event, and TOWARD is a component of the Path called Vector. The Vector expresses 'the basic types of arrival, traversal, and departure that a Figural schema can execute with respect to a Ground schema' (Talmy 2000:53), and is represented in terms of abstract prepositions, called 'deep prepositions,' such as TOWARD and TO. It expresses the meaning of a preposition as well as the Path information conflated within the semantics of motion verbs. The Conformation is another component of the Path and specifies the spatial relation of the Path to the Ground.

Talmy's analytical framework makes it possible to schematize the meanings of deictic motion verbs viewed as path-conflating verbs, and to compare the elements of meanings of the deictic motion verbs across different languages. More specifically, this paper takes Talmy's claim as the starting point that the choice of Path and Ground in the lexical meanings of *come* is 'TOWARD a point which is the location of the speaker,' and *go* expresses the motion with the Ground which is complementary to that of *come*, i.e. 'TOWARD a point which is not the location of the speaker.' It will then show, beyond typical examples, that this characterization of the lexical semantics of the deictic motion verbs is too simplistic: the Vector TOWARD does not always describe the Path involved in the meanings of all deictic motion verbs even within a single language. It is argued that the distinction of the Vectors TOWARD and TO in the semantics of *come* and *go* provide a natural account for the asymmetry in the interpretation of time expressions that modify the motion verbs, a long-standing problem since Fillmore (1975). The distribution of the Vectors within and across languages is analyzed to demonstrate that only the Path directed toward the deictic center can give rise to the Vector TO.

In the following sections, data from Chinese, English, Japanese, and Korean are collected and analyzed by the present author. Other examples and analyses borrowed from other sources are indicated by the accompanying references. The term '*coming* verbs' is used as a cover term to refer to the deictic motion verbs (or verb affixes) in various languages which require the Ground of the described motion to be the location of the speaker, as well as other locations that are analyzed to constitute the deictic center. The term does not presuppose the same denotational range as the English verb *come*, nor the uniqueness of such a verb within a language (cf. Wilkins and Hill (1994) and Lucy (1994) for a criticism of such assumptions).

2 The Vector TO and the Entailment of Arrival

The Vector is typically represented by the preposition of locative or directional prepositional phrases. In Path-conflating motion verbs including deictic motion verbs, the Vector also appears as part of the lexical semantics of the verbs. The Vector, in effect, specifies the boundedness of the Path: e.g. TOWARD indicates a path unbounded at the end while TO indicates a bounded path with an end point. The examples in (3) show that the motion does not have exactly the same Vector when it is described as *coming* and *going* in English, Japanese, and Korean. Although the use of the *coming* and the *going* verbs, if acceptable at all, naturally requires different utterance situations, the examples are intended to show the different acceptability of the *coming* and *going* verbs when they are followed by the second clause 'he has not arrived yet,' which forces the unbounded reading of the Path.[1]

(3) E: He *came/ went to school at eight, but he hasn't arrived yet.

J: Kare-wa hatizi-ni gakkou-ni *ki-/ iki-masita-ga mada
he-TOP eight o'clock-at school-to come-/ go-PAST-but yet

tuite-ima-sen.
arrive-NONPST-NEG
'He went to school at eight, but he hasn't arrived yet.'

K: Ku-nun yeodelsi-ey hakyo-ey *wa-/ ka-ss-nunte ku-nun acik
he-TOP eight-at school-to come-/ go-PAST-but he-TOP yet

tochakhaci-anh-assta.
arrive-NEG-PAST
'He went to school at eight, but he hasn't arrived yet.'

Given the second sentence which states that the Figure has not arrived, the use of the *coming* verbs in past tense or perfective aspect in the first clause is unacceptable. In other words, only the *going* verbs, but not the *coming*

[1]In the following examples, the uppercase letters which precede sentences, C, E, J and K indicate the examples are in Chinese, English, Japanese, and Korean, respectively. In the gloss, abbreviations are used as: CMPL for completive; INF(initive); NEG(ative); NOM(inative); NONPAST for non-past; PAST; PROG(ressive); Q(uestion); and TOP(ic).

verbs, allow the unbounded interpretation of the Path which is compatible with non-arrival. The same discrepancy in the interpretation of the Path expressed by the *coming* and *going* verbs is reported in *kommen* 'come' and *gehen* 'go' in German (Rauh 1981; Watanabe 1994), and *la mai* 'come (move hither)' and *la hou* 'go (move thither)' in Longgu, an Austronesian language (Wilkins and Hill 1995). In these languages, the Vector of the Path conflated in the lexical semantics of the *coming* verbs is TO as in 'MOVE TO a point,' indicating the expressed path is necessarily bounded, while the *going* verbs express the motion 'MOVE TOWARD a point.'

The difference of the Vectors conflated in the lexical semantics of the *coming* and *going* verbs manifests itself in the choice of motion verbs in the situation where the arrival of the Figure is at issue. In the Korean example in (4), where the arrival of the Figure, i.e. the typhoon, rather than its motion is questioned, the unanimous choice of the *coming* verb indicates the inappropriateness of the *going* verb, which does not entail the arrival of the Figure at the end of the Path. The example (4) assumes a telephone conversation with a distant friend.

(4) K: Tayphwung-i nenuy tongnay-ey o-/ *ka-ass-e?
typhoon-NOM your town-to come-/ go-PAST-Q
'Has the typhoon come to your town?'

The location of the addressee can play the role of the Ground of the *coming* verb in Korean when the speaker empathized with the Ground more than with the Figure. Since it is unlikely that the speaker empathizes more with the typhoon than with the addressee, the choice of *coming* verb in (4) is predictable in Korean. At the same time, the contrast with the following example (5), in which the arrival of the Figure is not the direct issue, shows that there is more to the choice of deictic motion verbs in Korean. The example in (5) assumes a telephone conversation, and the indefinite noun phrase as the sentence subject is intended to solicit the interpretation of the situation where the speaker empathizes more with the addressee, located at the Ground, than with the Figure, i.e. someone from the power company, triggering the use of the *coming* verb as is the case in (4). The first choice of the motion verb of all six Korean speakers tested, however, is *kata* 'go,' while four speakers additionally accept *ota* 'come.'

(5) K: Cenkihoysa-ey cenhwa-hamyen, nwukwunka ol-/ kal-kepnita.
power company-to telephone-do if, someone come/ go-will
'If you call the power company, someone will come.'

Both examples (4) and (5) assume the situation where the choice of the *coming* verb is possible in terms of the empathy hierarchy between the

Figure and the Ground in Korean. The difference of the preference of motion verbs, however, is only attributable to the different Vectors conflated in the lexical semantics of the motion verbs: when the arrival of the Figure is questioned as in (4), the bounded Path expressed by *ota* 'come,' and hence the entailment of arrival, play the critical role in describing the motion, leaving the use of *kata* 'go' unacceptable, while in (5), where the entailment of arrival is not an issue, *kata* 'go' is equally acceptable or preferred to express the motion toward the location of the addressee as the Ground.

The choice of the *coming* verbs illustrated in (3) and (4) above should not be taken as indicating that the *coming* verbs never cooccur with a prepositional phrase that expresses an unbounded path. Together with the preposition *toward*, e.g. *came toward the goal*, the verb phrase as a whole expresses the motion with the Path not bounded at the end, i.e. 'MOVE TOWARD a point.' Rather, the examples in (3) illustrate that, combined with the same locative phrase *to school*, which presumably introduces the Vector TO,[2] the verb phrases headed by the *coming* verbs necessarily express a bounded path while the verb phrases headed by the *going* verbs do not. Since the Vector expressed by the locative phrase *to school* is identical regardless of whether the motion is described as *coming* or *going*, the different acceptability of the motion verbs in (3) must be attributed to the Vector expressed as part of the lexical semantics of the motion verbs themselves. In a formal analysis, it is necessary to capture the compositional fashion in which the Vector expressed by the verb phrase as a whole is calculated from both Vectors contributed by the deictic motion verbs, which are taken to be path-conflating verbs and thus to contain a Vector, and by the cooccurring locative phrases.

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[2]As shown in (3), locative phrases are indicated by the suffixes *-ni* 'to' (or *-e* 'to') in Japanese, *-ey* 'to' (or *-lo* 'to') in Korean. In addition to these suffixes, each language has a way to explicitly express an unbounded path, i.e. the Vector TOWARD:

(i) J: gakko-ni mukat-te ki-/ it-ta
school-to head-INF come-/ go-PAST
'(lit.) went/ came heading for school'

K: hakyo-ey hyangha-ye wa-/ ka-ssta
school-to head-INF come/ go-PAST
'(lit.) went/ came heading for school'

The verbs *mukat-te* in Japanese and *hyangha-ye* in Korean are non-finite forms of path-conflating verbs *muka-u* 'head (for)' and *hyangha-ta* 'head (for)' respectively, which are not deictic and may occur independently of the deictic motion verbs.

3 The Vector TOWARD and the Lack of Entailment of Arrival

Unlike the languages discussed in Section 2, the deictic motion verbs in Chinese, do not entail arrival as (6) shows.

(6) Chinese

Ta	ba	dian	lai/ qu	xuexiao	danshi	ta	hai	mei	dao.
he	eight	o'clock	come/ go	school	but	he	yet	not	arrive

'(lit.) He came/went to school at eight, but he has not arrived.'

In Chinese, a locative phrase directly follows the verb without a preposition as shown in (6), and the use of neither *lai* 'come' nor *qu* 'go' together with the locative phrase entails the arrival of the Figure as indicated by the acceptability of both motion verbs. The same lack of entailment of arrival is reported for the *coming* verb in Mparntwe Arrernte, an Australian language (Wilkins and Hill 1995).[3] In these languages, both motion verbs can equally express an unbounded path: i.e. 'MOVE TOWARD a point.'

Although not reflected in the English translation, example (6) has an inchoative reading. That is, the time expression 'at eight' expresses the departure time, rather than the arrival time, regardless of whether the motion is described by the *coming* or the *going* verb. Viewing the interpretation of point-of-time expressions as the indication of the boundedness of the Path, the *coming* and *going* verbs in (6) can be taken to express the Path bounded at the start, rather than at the end.

In his seminal work on deictic motion verbs in English, Fillmore (1975) claims, without a further explanation, that the reference time of *come* is the arrival time and the reference time of *go* is the departure time. As claimed, the point-of-time expression in *He came to school at eight* can be interpreted only as the arrival time in English as well as in Japanese and Korean in (3). The invariable arrival time interpretation of the time expression with the *coming* verbs in the languages in Section 2 is associated with their invariable bounded interpretation of the Path, i.e. 'TO a point.' Despite Fillmore's claim, however, time expressions with the *going* verbs do not always indicate the departure time, as pointed out by Cinque (1972). This is true not only in English, Japanese, and Korean, but also in Chinese as demonstrated in (7): the context, which strongly suggests the arrival of the Figure at the end point

[3]Willkins and Hill (1995) claim that, though *peyte-* 'come' and *ihe-* 'go' in Mparntwe Arrente are pragmatically oppositional, the motion verb *ihe-* 'go' is not semantically deictic. The deictic interpretation of *ihe-* arises only pragmatically since the use of it implies that the described motion cannot be described by, and hence must be the opposite of, *peyte-* 'come,' which is claimed to be semantically deictic.

of the Path, gives rise to the interpretation of the time expression as the arrival time even when the motion is described by the *going* verbs.

(7) C: Yinyuehui yinggai shi yi dian kaishi,
concert be supposed to be one o'clock start

suoyi wo yi dian hui qu yinyueting.
so I one o'clock will go concert hall
'The concert is supposed to start at one. So I will go to the concert hall at one.'

E: The concert was supposed to start at one. So I went to the concert hall at one.

J: Konsaato-wa itizi-ni hazimaru-kotoninatte-imasita.
concert-TOP one o'clock-at begin-be supposed to-PAST

Dakara watasi-wa itizi-ni kaizyo-ni iki-masita.
so I-TOP one o'clock-at concert hall-to go-PAST
'The concert was supposed to start at one. So I went to the concert hall at one.'

K: Khonsethu-nun hansi-ey yellilo toyeissee-ssta.
concert-TOP one o'clock-at start be supposed to-PAST

Kureseo, na-nun hansi-ey khonsethu-ey ka-ssta.
so I-TOP one o'clock-at concert-to go-PAST
'The concert was supposed to start at one. So I went to the concert at one.'

In (7), the natural reading of 'one o'clock' is the time when the Figure arrives at the concert hall. That is, while expressed by the *going* verbs, the Figure is described to have reached the concert hall at the end point of the motion, rather than merely heading for the direction of the concert hall. Thus, though the lexical semantics of the *going* verbs in all the languages above is schematized with the Path 'TOWARD the point,' the Vector is defeasible in the sense that the meaning of the entire verb phrase including the locative phrase may be calculated to be 'MOVE TO a point.' The Vector TOWARD conflated in the lexical semantics of the *going* verbs does not preclude the possibility that the Path is bounded at the end as a special case of the

unbounded path if provided with the right context. The examples in (7) demonstrate that, when the arrival of the Figure is implied at the end of the motion described by the *going* verbs, the cooccurring time expression is interpreted as the arrival time, as is the case of the *coming* verbs with the lexically specified Path 'TO a point.'

The asymmetry of the Vector conflated in the lexical semantics of the *coming* verbs and the *going* verbs in languages like English, Japanese, and Korean, is further evidenced by utterances where no additional Vector is introduced by an explicit locative phrase. Example (8) assumes a telephone conversation with a friend, inquiring what time the addressee plans to arrive at the party to which the speaker plans to go as well.

(8) What time will you be coming/ going?

When the arrival time is inquired, and thus the bounded end of the Path is the concern, the motion can be described either as *coming* or *going*, regardless of the absence of a locative phrase. On the other hand, when the departure time is inquired due to concern about a traffic jam, for example, the motion can be described only as *going*, e.g. *What time will you be *coming/going?*, again indicating that the Vector associated with *come* is lexically determined to be TO, which precludes the possibility of interpreting the time expression as the departure time.

Dowty (1979:60) points out that 'an activity verb describing movement behaves like an accomplishment verb if it occurs with either a locative-of-destination or with an adverb of extent,' as in *John walked to the park/ a mile*. It is well known that the boundedness in time, i.e. telicity, is not a property of lexical verbs alone: (3) through (7) are all examples of the telic (accomplishment) use of the motion verbs, and are telic by virtue of the cooccurring locative phrases. The relevant distinction here, however, is the point along the Path where the telic Motion event is interpreted as reaching the 'climax' or 'terminus' point (Vendler 1957) in time.

Those motion verbs which entail the arrival of the Figure, such as the *coming* verbs in English, Japanese, and Korean, are lexically determined to express the Path as bounded at the end, and the terminus point in time is necessarily associated with the bounded end of the Path, i.e. point-of-time expressions are interpreted as the arrival time. On the other hand, the motion verbs that do not entail the arrival of the Figure, such as the *coming* verb in Chinese, and the *going* verbs in all the languages discussed in Sections 2 and 3, are not lexically determined to express a bounded path. Their lexical semantics, however, does not preclude the possibility that, if provided with the right context, the Path expressed by the entire VP is bounded either at the start or the end as a special case of an unbounded path, allowing point-of-time expressions to be interpreted as the departure time or the arrival

time, respectively.[4]

4 Other Vectors

In Sections 2 and 3, it is shown that only *coming* verbs in some languages exhibit the bounded end of the Path, entailing the arrival of the Figure of the motion at the Ground. This section explores the deictic motion verbs in other languages which express a rather different kind of Path, to determine if any generalization in the distribution of the boundedness of the Path emerges.

Otomanguean languages exhibit a very different kind of Vectors of the Path as documented in Texmelucan Zapotec (Speck and Pickett 1976), Isthmus Zapotec (Pickett 1976), and Diuxi Mixtec (Kuiper and Merrifield 1975).[5] In these languages, (some) deictic motion verbs express a 'round trip' (Kuiper and Merrifield 1975:32) or 'two-way motion' (Pickett 1976:163). Following the authors' analyses, the *coming* verbs refer to the verbs whose initial motion is directed toward the location of the speaker and/or the addressee, i.e. verbs expressing the motion which might be expressed in English as 'come and then return.' The motion expressed by the *going* verbs, on the other hand, might be translated as 'go and then return.'

According to Speck and Pickett (1976), Texmelucan Zapotec has two *coming* verbs and two *going* verbs as shown in (9). These *coming* and *going* verbs are cross-classified according to the notion of 'Base,' which is defined as 'the place where the person in motion normally or expectedly returns' (Speck and Pickett 1976:61).

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[4]Aske (1989), analyzing the Path-conflating verbs in Spanish in Talmy's framework, distinguishes the notions of boundedness and telicity of the Path. The 'telic path phrase' is claimed to be a bounded path which predicates 'an end-of-path location [...] of the Figure' (Ask 1989:6). Although the distinction between the boundedness and the telicity of the Path is not clear to the present author, both appear to be a spatial notion. Slobin and Hoiting (1994) interpret Aske's telic path as a characterization of movement across some kind of boundary, again a spatial notion.

[5]Wilkins and Hill (1995) report a non-deictic two-way motion verb root *alpe-* in Mparntwe Arrernte, an Australian language. When it is suffixed to a deictic one-way motion verb *petye-* 'come,' *pety-alpe-* expresses a motion event in which 'the figure moves back along a return path towards the place thought of as the place where speaker is' (Wilkins and Hill 1995:223). In Tila Chol, a Mayan language, the two-way motion verb *tsajni* expresses a two-way motion 'go from and come back to the base of the addressee' (Hoopert and Warkentin 1977:15). However, it is not clear whether or not the Path expressed by these verbs are bounded, and they are not included in the following discussion.

(9) Deictic motion verbs in Texmelucan Zapotec (Speck and Pickett 1976)

-yeed 'come$_1$ (come toward a Base and return)'

-iid 'come$_2$ (come toward a non-Base and return)'

-ya 'go$_1$ (go toward a Base and return)'

-a 'go$_2$ (go toward a non-Base and return)'

Thus, for example, the motion expressed by the first *going* verb *-ya* 'go$_1$' is more accurately described as 'go toward a Base of the Figure and then return. 'The example in (10) with *-ya* describes the motion to San Lorenzo and then from San Lorenzo back to the start point.

(10) Texmelucan Zapotec (Speck and Pickett 1976: 61)

Karp	bi	b-ya-y	škeey
Policarpo	already	CMPL-go$_1$-he	San Lorenzo

'Policarpo already went to San Lorenzo.'

Furthermore, the *going* verbs in Texmelucan Zapotec entail the arrival of the Figure: they indicate not merely a two-way motion but also the completion of the return trip back to the start point. Thus in (10), the description of the motion by *b-ya-y*, in completive aspect, entails that Policarpo is actually back at the start point.

The *coming* verbs, on the other hand, lack the entailment of arrival. In (11), the second *coming* verb *-iid* 'come$_2$' or 'come toward a non-Base of the Figure and then return' in completive aspect indicates that the return motion from Oaxaca has been initiated while it does not necessarily imply that Policarpo has actually reached the place where he started from, as suggested by the second sentence. (Although the *going* verbs entail the arrival, the use of the first *going* verb *ya-* in progressive aspect in the second sentence only indicates Policarpo headed back to his Base.)

(11) Texmelucan Zapotec (Speck and Pickett 1976: 61)

Karp	b-iid	yu	lolaʔ.	sa	ya-y.
Policarpo	CMPL-come$_2$	he	Oaxaca	recently	PROG go$_1$-he

'Policarpo came to Oaxaca. He just left (for home).'

The arrival, traversal, and departure represented by the small set of Vectors which Talmy (1975, 2000) proposes do not remotely describe the motion exemplified above. Given the lack of appropriate Vectors, the Path expressed by the two-way motion deictic motion verbs can be represented in terms of a sequence of abstract prepositions TO/TOWARD and VIA as 'BACK TO/TOWARD a start point VIA a point,' where TO and TOWARD

indicate the paths bounded and unbounded at the end of the return motion, respectively. The term *coming* verbs in those languages with the two-way motion verbs refer to those deictic motion verbs that express the motion initially directed to the deictic center, i.e. 'VIA a point which is the location of the speaker or the addressee,' while the *going* verbs refer to those which express the motion initially directed to the non-deictic center, i.e. 'VIA a point which is neither the location of the speaker nor the addressee.'

The second *coming* verb *-iid* in (11) expresses a motion of the Figure initially to Oaxaca, which is the deictic center and is a non-Base of the Figure, and then back toward the start point without entailing arrival at the start point. Thus, the lexical meaning of the *coming* verb *-iid* may be, more accurately though somewhat clumsily, schematized as: 'MOVE BACK TOWARD a start point VIA a point which is the location of the speaker or the addressee AND which is not a Base of the Figure.' On the other hand, the lexical semantics of the first *going* verb *-ya-* in (10), which entails the arrival of the Figure back at the start point, is schematized as: 'MOVE BACK TO a start point VIA a point which is neither the location of the speaker nor the addressee AND which is a Base of the Figure.'

The Vector BACK TO employed in the schematization of the two-way Path makes it clear that, in Texmelucan Zapotec, it is the *going* verbs that entail the arrival of the Figure at the end of the Path while in the languages discussed in Section 2, i.e. English, Japanese, and Korean, it is the *coming* verbs that entail the arrival of the Figure. Thus, the Path is bounded either at the end point of the one-way motion described as *coming*, or at the start point of the two-way motion described as *going*. In the rest of this section, various one-way or two-way deictic motion verbs with the entailment of arrival are shown to follow the same pattern.

In Isthmus Zapotec, unlike in any other languages that have been discussed, both *coming* and *going* verbs entail the arrival of the Figure at the end of the Path (Pickett 1976). However, not both deictic motion verbs express a two-way motion in Isthmus Zapotec. The *coming* verb *-eeda-* expresses only a one-way motion, while the *going* verb *-e-* expresses a two-way motion. Thus, both with the bounded Path, the lexical semantics of the *coming* verb is schematized with the Path 'TO a point which is the location of the speaker,' and the *going* verb is schematized with the Path 'BACK TO a start point VIA a point which is not the location of the speaker.'[6] Note that the bounded end of the Path is either the end point of the motion described by the one-way *coming* verb, as is the case of the *coming* verbs in English, Japanese, and Korean, or the end point of the return motion, i.e. the start point of the motion described by the two-way *going* verb, as is the case of the two-way *going* verbs in Texmelucan Zapotec.

The system of the deictic motion verbs in Diuxi Mixtec is somehow

[6]It is not clear from Pickett (1976) whether the location of the addressee plays the role of the Ground of the *coming* verb.

more complicated as analyzed by Kuiper and Merrifield (1975). As shown in (12), it includes two one-way *coming* verbs, *ndisi* and *vásî,* and two one-way *going* verbs, *nú?ú* and *hį́?į́*, and they are cross-classified according to a Base of the Figure as the Ground as is the case with Texmelucan Zapotec. In addition to these one-way deictic motion verbs, Diuxi Mixtec has a two-way *coming* verb *kiši* and a two-way *going* verb *šę?ę́.*

(12) Motion verbs in Diuxi Mixtec (Kuiper and Merrifield 1975)

ndisi	'come$_1$ (come toward a Base)'
vásî	'come$_2$ (come toward a non-Base)'
kiši	'come and return'
nú?ú	'go$_1$ (go toward a Base)'
hį́?į́	'go$_2$ (go toward a non-Base)'
šę?ę́	'go and return'

All six motion verbs express the unbounded path and do not entail the arrival of the Figure at the end of the motion as: 'they view the movement of an Agent [Figure] as not yet initiated and, therefore, potential, or as initiated and, therefore, completive. The focus is on the initiation of the motion.' (Kuiper and Merrifield 1975:33)[7] The following example (13) shows the use of the one-way *going* verb *nú?u* 'go$_1$' or 'go toward a Base of the Figure.'

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[7]In spite of such a claim that all deictic motion verbs express the Motion with the unbounded Path, every example which illustrates the point contains one of the two one-way *going* verbs *nú?ú* 'go toward a Base' and *hį́?į́* 'go toward a non-Base' in Kuiper and Merrifield (1975). Furthermore, in spite of the claim for the unbounded Path, *vásî*, a one-way *coming* verb (toward a non-Base) is said to be translatable as perfective in English 'because of the implication that the Agent [Figure] remains at Goal [Ground]' at the utterance time as in:

(i) Diuxi Mixtec (Kuiper and Merrifield 1975:37; the gloss is given by the present author)

vásî-te	núndúa
CMPL come-he	Oaxaca

'He has come to Oaxaca.'

The implication that the Figure is located at the Ground at the utterance time seems to indicate, contrary to the authors' claim, that the one-way *coming* verb *vásî* entails the arrival of the Figure. Even if that is the case, however, the claim of this paper still holds that the bounded end of the Path is the end point of the one-way motion described as *coming* (or the start point of the two-way motion described as *going*).

(13) Diuxi Mixtec (Kuiper and Merrifield 1975:35; the gloss is given by the present author)

hwą́-núʔú-te dyuší

CMPL-go$_1$-he Diuxi

'He went (home there) to Diuxi.'

The motion verb *hwą́-núʔu* in completive aspect indicates the motion has been initiated but 'does not necessarily imply that the Agent [Figure] of the verb actually reaches the expected destination [Ground] even when the destination is explicitly stated in the sentence' (Kuiper and Merrifield 1975:35). Thus, the deictic motion verbs in Diuxi Mixtec are similar to Chinese in that they do not entail the arrival of the Figure regardless of whether they express *coming* or *going* motion.

The distribution of Vectors, (BACK) TO and (BACK) TOWARD, surveyed throughout this paper reveals that the choice of Vector employed by various deictic motion verbs is not always uniform even within a single language. At the same time, the distribution of the Vector is not totally random, and a pattern of distribution across languages emerges: if deictic motion verbs entail the arrival of the Figure, i.e. are schematized with the Vector (BACK) TO, the bounded end of the Path is expressed either as the end point of the one-way *coming* motion or as the start point of the two-way *going* motion. The *coming* verbs which express the one-way motion 'TO a point' are represented by English, Japanese, Korean, German, Longgu, and Isthmus Zapotec. The *going* verbs which express two-way motion 'BACK TO a start point' are represented by Texmelucan Zapotec and Isthmus Zapotec. Since Isthmus Zapotec has only a one-way *coming* verb and a two-way *going* verb, both deictic motion verbs entail the arrival of the Figure. On the other hand, no deictic motion verbs entail arrival in Chinese, Mparntwe Arrernte, and Diuxi Mixtec.

A moment of reflection clarifies that the uniform characterization of the deictic motion verbs which entail arrival is that they all express the motion with the Path ultimately directed to the deictic center, typically the location of the speaker. That is, a language can include the entailment of arrival as part of the lexical semantics of the deictic motion verbs only if the verbs describe the motion ending where the speaker can perceive the Figure's arrival. On the other hand, the verbs which express the motion away from the deictic center, i.e. the one-way *going* verbs and the two-way *coming* verbs, necessarily lack the entailment of arrival.

5 A Unified Analysis of the Vector

It has been shown that the *coming* verbs with a locative phrase, e.g. *come to school*, entail the arrival of the Figure in English, Japanese, and Korea, and

the Path expressed by the VPs is bounded at the end. The same locative phrase does not necessarily indicate the arrival location when combined with the *coming* verb in Chinese and the *going* verbs in all of the languages. It is clear that the Vector expressed by the VP as a whole is contributed both by locative phrases and the deictic motion verbs, which are taken to be Path-conflating verbs and thus to contain a Vector as part of their lexical semantics. The following lexical entries for *come* in (14) (as well as the *coming* verbs in Japanese and Korean) and *to* in (15) attempt to capture the way the Vector of the VP is calculated in some compositional fashion. The feature configuration is loosely based on Pollard and Sag (1994) and Sag et al. (2003).

(14) *come*

$$\begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD } \textit{verb} \\ \text{VAL} \begin{bmatrix} \text{SPR } \langle \text{NP}_i \rangle \\ \text{COMPS } \langle (\text{PP} \begin{bmatrix} \text{INDX } j \\ \text{RSTR} < \ldots \boxed{1} \begin{bmatrix} \text{RELN } \textit{dir} \\ \text{INST } j \end{bmatrix} \ldots > \end{bmatrix}) > \end{bmatrix} \end{bmatrix} \\ \text{CNT} \begin{bmatrix} \text{INDX } s_1 \\ \text{RSTR} < \begin{bmatrix} \text{RELN } \textit{move} \\ \text{SIT } s_1 \\ \text{FGR } i \\ \text{PATH } j \end{bmatrix}, \boxed{1} \begin{bmatrix} \text{RELN } \textit{dir} \\ \text{INST } j \\ \text{D–GRND } k \\ \text{BOUND} \begin{bmatrix} \text{STRT } - \\ \text{END } \backslash + \end{bmatrix} \end{bmatrix} > \end{bmatrix} \\ \text{CNTXT|RSTR} < \begin{bmatrix} \text{RELN } \textit{speaker–loc} \\ \text{INST } k \end{bmatrix} > \end{bmatrix}$$

In (14), the index *i* of the subject NP provides the index of FGR (Figure) of the Motion event expressed as the *move* RELN (relation). The PATH index *j* is shared with the INDX (index) value of the (optional) locative complement, which makes it possible for both the verb and the complement PP to contribute to the RSTR (restriction) on the Path. The fact that the verb is deictic is captured by the D-GRND (deictic-Ground) value *k*, which, in effect, indicates the index of the speaker's location as the INST(ance) value of the *speaker-loc*(ation) RELN in the contextual restriction, CNTXT|RSTR. That is, the deictic verb expresses a Motion with the Path directed toward the location of the speaker.

The restriction [1] on the PATH index *j* is specified as the directional relation [RELN *dir*], which represents both kinds of paths with Vectors TO and TOWARD. The positive value + of BOUND|STRT (start) and BOUND|END will indicate Paths bounded at the start and at the end, respectively. As shown in (14), *come* is lexically specified to express a path which is unbounded at the start, i.e. [BOUND|STRT –], while the default

positive value \+ of BOUND|END allows the verb to occur either in an expression of a bounded path, e.g. *come to school*, or an unbounded path, e.g. *come toward school*. The boundedness specification in (14) means that, if the Path expressed by the entire VP is bounded at all, it must be bounded at the end. It is assumed that the interpretation of point-of-time expressions is sensitive to the BOUND values, and that the terminus point in time indicated by the time expression is necessarily associated with the bounded point of the Path, i.e. either a bounded end point, [END +], or a bounded start point, [STRT +]. Since *come* is lexically specified to be [BOUND|STRT –], a cooccurring point-of-time expression, e.g. *come at eight o'clock*, is taken to induce [BOUND|END +] and to be interpreted as the arrival time.

The boundedness specification of the Path is also induced by the locative phrases headed by the preposition *to* in (15).

(15) *to*

$$\begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} & \textit{prep} \\ \text{VAL} \begin{bmatrix} \text{SPR} & \langle\,\rangle \\ \text{COMPS} & \langle \text{NP}_l \rangle \end{bmatrix} \end{bmatrix} \\ \text{CNT} \begin{bmatrix} \text{INDX} & j \\ \text{RSTR} & \langle \boxed{1} \begin{bmatrix} \text{RELN} & \textit{dir} \\ \text{INST} & j \\ \text{GRND} & l \\ \text{BOUND|END} & +\vee- \end{bmatrix} \rangle \end{bmatrix} \end{bmatrix}$$

The unspecified value, i.e. + ∨ –, of BOUND|END of the preposition is intended to allow for both a bounded path, e.g. *come to school*, and an unbounded path, i.e. *go to school* in a sentence like (3). The prepositions which necessarily indicate an unbounded path, e.g. *toward*, will be lexically specified as [BOUND|END –]. The index of the Path [INDX *j*] is projected onto the PP via the Semantic Inheritance Principle. The index *l* of the prepositional object NP provides the index of the GRND of the Path. When the deictic motion verb *come* combines with the locative complement *to school*, the restriction on the Path index *j* is instantiated as in (16).

(16) *come to school*

$$\boxed{1} \begin{bmatrix} \text{RELN} & \textit{dir} \\ \text{INST} & j \\ \text{D–GRND} & k \\ \text{GRND} & l \\ \text{BOUND} \begin{bmatrix} \text{STRT} & - \\ \text{END} & + \end{bmatrix} \end{bmatrix}$$

The resolved feature structure (16) states that the Path *j* is directed toward

the speaker (the index *k*), with the school as its Ground (the index *l*), and bounded at the end, which signifies the arrival of the Figure. The cooccurrence of the location of the speaker as the deictic ground, i.e. [D-GRND *k*], and the bounded end, i.e. [BOUND|END +], of the Path represents the generalization discussed in Section 4: if an expression of a Motion event entails the arrival of the Figure, then the deictic motion verb involved must be the one that expresses the Path directed toward the location of the speaker.

The lexical entry for *go* (as well as the *going* verbs in Chinese, Japanese, and Korean) is identical to that of *come* in (14) except for the restriction on the Path, shown in (17).

(17) *go*

$$\begin{bmatrix} \text{RELN} & \textit{dir} \\ \text{INST} & \textit{j} \\ \boxed{1}\ \text{D–GRND} & \neg \textit{k} \\ \text{GRND} & \textit{l} \\ \text{BOUND} & \begin{bmatrix} \text{STRT} & +\text{v}- \\ \text{END} & +\text{v}- \end{bmatrix} \end{bmatrix}$$

The restriction on the Path represents the Path whose deictic ground is NOT the location of the speaker, i.e. [D-GRND ¬*k*], and is totally unspecified for the boundedness. When combined with a locative phrase headed by *to* in (15), the interpretation of the VP is still ambiguous between a bounded and an unbounded path. The ambiguity is resolved to be [BOUND|STRT +, END –] in a context such as (3), where the time expression indicates the departure time, or to be [BOUND|STRT –, END +] in a context such as (7) with the time expression indicating the arrival time.

The lexical entry for *lai* 'come' in Chinese, which, unlike English, Japanese, and Korean, does not entail the arrival of the Figure, shares the unspecificity of the boundedness of the Path with *go* in (17), while its D-GRND value is the speaker's location in the same way as the *coming* verbs in the other languages.

An example of two-way motion verbs which entail the arrival of the Figure is given in (18), which illustrates the lexical entry for *-ya* 'go$_1$' or 'go toward a Base of the Figure and then return' in Texmelucan Zapotec.

(18) *-ya* 'go toward a base of the Figure and then return'

$$\begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD } \textit{verb} \\ \text{VAL} \begin{bmatrix} \text{SPR } \langle \text{NP}_i \rangle \\ \text{COMPS } \langle \text{NP}_l \rangle \end{bmatrix} \end{bmatrix} \\ \text{CNT} \begin{bmatrix} \text{INDX } s_1 \\ \text{RSTR} \left\langle \begin{bmatrix} \text{RELN } \textit{move} \\ \text{SIT } s_1 \\ \text{FGR } i \\ \text{PATH } j \end{bmatrix}, \begin{bmatrix} \text{RELN } \textit{bidir} \\ \text{INST } j \\ \text{GRND } l \\ \text{D–GRND } \neg k \\ \text{BOUND} \begin{bmatrix} \text{STRT } - \\ \text{END } + \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix} \\ \text{CNTXT|RSTR} \left\langle \begin{bmatrix} \text{RELN } \textit{speaker–loc} \\ \text{INST } k \end{bmatrix}, \begin{bmatrix} \text{RELN } \textit{base} \\ \text{INST } l \\ \text{FGR } i \end{bmatrix} \right\rangle \end{bmatrix}$$

The bidirectional relation [RELN *bidir*] in the RSTR value specifies the restriction on the PATH index *j* and represents the 'round trip' expressed by the two-way motion verb. In this relation, the values of D-GRND and GRND specify the properties of the mid point of the Path where the return trip starts, rather than the end point of the Path. The mid point corresponds to the Ground of the Vector VIA. In (18), the D-GRND value ¬*k* indicates that the deictic Ground is not the location of the speaker *k*, which is the INST value of the *speaker-loc* RELN in the context restriction, CNTXT|REST. The GRND index *l* is contributed by the index of the locative complement. In addition, the GRND index *l* is shared with the INST value of the *base* RELN in CNTXT|REST, which indicates that the Ground is a Base of the Figure *i*. The Path represented by these indices is 'VIA a point which is not the location of the speaker AND which is a Base of the Figure.'

In Texmelucan Zapotec (as well as in other Otomanguean languages), the locative NP which indicates the Ground of the motion directly follows the verb without a preposition. In (18), the index *l* of the locative complement NP provides the index of the Ground: i.e. it is shared with the GRND value of the *bidir* RELN. Unlike English, Korean, and Japanese, the semantic content of a locative phrase does not contribute to the determination of the boundedness of the Path. Consequently, the bounded end [BOUND|END +] of the Path is solely determined by the lexical entry of the verb.

In the *dir* RELN such as for *come* in (14), which represents the direction of a one-way motion, [BOUND|END +] indicates the bounded end of the Path and corresponds to the Vector TO, while in the *bidir* RELN in (18), [BOUND|END +] indicates the bounded end of a return path and corresponds to the Vector BACK TO. As generalized in Section 4, deictic motion verbs that entail arrival express the motion with the Path ultimately directed to the deictic center. If two-way motion verbs entail arrival, i.e. [BOUND|END +], it implies that the initial motion is necessarily directed not toward the

location of the speaker, i.e. [D-GRND ¬*k*].

6 Conclusion

This paper has examined the deictic motion verbs in different languages, Chinese, English, Japanese, and Korean as well as other languages in the literature, using Talmy's framework as an attempt to determine the cross-linguistic patterns of spatio-temporal semantic properties of those deictic motion verbs. It has been shown that the lexical semantics of the *coming* verbs in English, Japanese, and Korean are conflated with a bounded Path, which gives rise to the entailment of arrival of the Figure. On the other hand, the *coming* verb in Chinese, as well as the *going* verbs in all of the languages are conflated with an unbounded Path and consequently, do not entail the arrival of the Figure. The difference in the Path is reflected in the interpretation of the cooccurring point-of-time expression: with the bounded Path schematized by the Vector TO, the time expression marks the arrival time, while it is either the arrival time or the departure time with the unbounded Path schematized by the Vector TOWARD, depending on the context of utterance.

In addition to these languages, Diuxi Mixtec, Isthmus Zapotec, and Texmelucan Zapotec, languages with two-way motion verbs, were analyzed to characterize the distribution of the entailment of arrival. As the unified pattern of the distribution of the Vectors TO and BACK TO, which represent the arrival of the Figure, the bounded end is shown to be either at the end point of the one-way *coming* motion, or at the start point of the two-way *going* motion. It is concluded that deictic motion verbs, whether expressing a one-way motion or a two-way motion, can be lexically specified for the entailment of arrival only if they express the Path eventually directed to the deictic center, typically the location of the speaker.

A formal analysis is given to represent the bounded end of the Path as the feature-value specification [BOUND|END +] in a (bi)directional relation restricting the Path. The boundedness value for an entire VP is determined by the lexical specifications of verbs as well as by locative phrases. The generalization that only an expression of a Motion directed toward the deictic center can entail arrival is captured as the cooccurrence of [BOUND|END +] with the location of the speaker as the deictic ground, i.e. [D–GRND *k*] for a one-way motion, and with [D–GRND ¬*k*] for a two-way motion.

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Modeling typological markedness in semantics: The case of negative concord

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Abstract

We will provide an analysis of negative concord in sentential negation in three languages, French, Polish and German. The focus of the paper is (1) the typological variation with respect to the realization of negative concord in the three languages under investigation and (2) the treatment of lexical exceptions within the different typological classes. We will propose a unified theory of negative concord which identifies a common core system and adds language-specific constraints which can handle typological variation between languages and lexical exceptions within a given language.

1 Introduction

Negative concord (NC) can be explored from two perspectives: Either the general pattern of negation is investigated from a typological perspective or the negation system of a particular language is presented in considerable detail. In this study we attempt to combine these two approaches and propose a fine-grained analysis including idiosyncratic exceptions embedded in a typological perspective. A key insight for our analysis is the observation that languages which are predominantly NC languages often contain lexical exceptions to this tendency, i.e. words which do not enter into a concord relationship. Similarly, languages in which multiple negative expressions are obligatorily interpreted as separate negative quantifiers ($\neg\exists$) may contain words which prefer a negative concord interpretation. We consider it an important feature or our theory that it is formulated in a surface-oriented framework without abstract syntactic nodes or invisible categories which drive the semantic interpretation.

We will present a grammar architecture for expressing the difference between optional, obligatory and impossible NC as a consequence of different realizations of cross-linguistic properties of language. Our typological approach, illustrated here with data from French, Polish and German, aims at modeling NC across languages as a consequence of different basic principles of the semantic combinatorics, of language-specific constraints, and of idiosyncratic lexical properties. This lexicalist view will be supported with lexical items in languages with predominantly obligatory concord or predominantly impossible concord which break the general pattern and can only be described as lexicalized exceptions. This will lead to a theory which is prepared to accommodate exceptions without imposing mutually inconsistent constraints. We will argue that the basic principles should be expressed in terms of agreement requirements and the lexical idiosyncrasies as collocational restrictions.

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2 French, Polish and German

In this section we give a brief overview of the distribution of n-words and sentential negation markers as well as their interaction in producing sentential negation in finite sentences in French, Polish and German. Although sentential negation in French and German will (in accordance with the literature) be identified as belonging to different typological systems, we will then proceed to show that there are exceptional expressions in both languages with apparently identical syntactic distribution and semantic behavior.

2.1 Core Data

Negation in French, which is a standard example of an NC language, has been studied thoroughly (Gaatone, 1971; Cristea, 1971; Muller, 1991; Grevisse and Goosse, 1993). It is famous for the peculiar behavior of the lexical elements that are associated with negation. The most prominent ones are the pre-verbal negation particle *ne*, the negative adverb *pas*, and so-called n-words such as *personne* (*nobody*) and *rien* (*nothing*). We will follow the syntactic analysis of French negation as proposed in Kim (1996). As in Rowlett (1998) we suppose that the pre-verbal negation particle *ne* does not carry semantic negation in any register of modern European French, but the negative adverb *pas* always does.[1] On the basis of these two assumptions, we investigate the distributional properties of n-words. N-words can express sentential negation (1-a). In combination with other n-words a single negation reading (SN) is possible (1-b). With a clause-mate negative marker (NM) *pas*, n-words trigger a DN reading (1-c).[2]

(1) a. Jean n'a parlé à **personne**. [SN]
Jean NE has talked to nobody
'Jean hasn't talked to anyone.'

b. **Personne** n'a **rien** dit. [SN,DN]
nobody NE has nothing said
'Nobody said anything.' [SN] or: 'Nobody said nothing.' [DN]

c. **Personne** n'est pas venu. [DN]
nobody NE is not come
'Nobody did not come.'

[1]The negative adverb *pas* occurs in comparatives as in (i). Wilmet (1997) uses this observation to argue that comparatives are, to a certain extent, negative.

(i) a. Il faut avoir l'esprit plus libre que je ne l'ai **pas**.
it needs have the spirit more free than I NE it have NM
'One must have a freer spirit than I do.' (Racine, after Wilmet 1997, p. 513)

b. Il est plus instruit que je suis **pas**.
he is more instructed than I am NM
'He is better instructed than I am.' (Sturm, 1981, p. 24)

[2]Non-European varieties of French show single negation readings for sentences such as (1-c). See Sections 5.2.1 and 6 for a more detailed discussion.

To summarize the basic facts of French, n-words display optional NC, but the negative marker *pas* does not participate in NC.

Negation in Polish represents a second typological class.[3] The examples in (2) show that sentential negation in Polish typically requires a pre-verbal negative marker *nie* (Kupść, 2000, ta; Kupść and Przepiórkowski, 2002). N-words must co-occur with the negative marker, and only a single negation reading is possible (2-b).

(2) a. Janek *(nie) pomaga **nikomu**. [SN]
Janek (NM) helps nobody
'Janek doesn't help anybody.'

b. **Nikt** *(nie) pomaga ojcu. [SN]
nobody (NM) helps father
'Nobody helps his father.'

More than one n-word can occur in the same clause (3). In these cases, again, only a single negation reading is available.

(3) a. **Nic** **nikomu** *(nie) powiedziałem. [SN]
nothing.GEN nobody.DAT (NM) I-told
'I didn't tell anybody anything.'

b. **Nikt** **nigdy** **nikogo** **niczym** *(nie) uszczęśliwił. [SN]
nobody never nobody.GEN with nothing (NM) made happy
'Nobody has ever made anybody happy with anything.'

The obligatoriness of the NM in Polish makes it difficult to distinguish n-words from *negative polarity items* (NPI). NPIs are expressions that cannot occur in affirmative statements. Many languages have a group of indefinite NPIs, such as English *anything* or *a word*. Błaszczak (1999) argues for an analysis of Polish n-words as NPIs. Richter and Sailer (2004a) provide counter-arguments in favor of the inherent negativity of Polish n-words. In particular, in non-verbal projections, n-words can express negation, whereas uncontroversial corresponding NPIs cannot. The examples in (4) show that the NPI *słowo* (*a word*) is ungrammatical if there is no (potentially elided) licensing negation in short answers, whereas the n-word *żaden* (*no*) can occur without such licensing, (5). The genitive of negation in (4) may provide evidence for the presence of an elided verbal negation; accusative case excludes this as a straightforward option.

(4) Powiedział coś? *Słowo./ Słowa./ Słowa nie powiedział.
he said something Word.ACC/ Word.GEN/ Word.GEN NM he said
'Did he say something/anything? Not even a word./ He did not say even a word.'

(5) Ile przeczytałeś książek? **Żadną**./ **Żadnej**.
How many you read books? None.ACC./ None.GEN.
'How many books have you read? None'

[3] See Richter and Sailer (2004a,b) for an in-depth discussion of the Polish data and a review of the relevant literature.

In German the negation particle *nicht* and n-words (*niemand* (*no one*)) always express negation and never enter an NC relation. The data in (6) are syntactically parallel to those in (1).

(6) a. Hans sprach mit **niemandem**. [SN]
Hans talked with no one

b. **Niemand** sprach mit **niemandem**. [DN]
no one talked with no one

c. **Niemand** kam nicht. [DN]
no one came not
'No one didn't come.'

These data show that n-words in German do not enter NC. The negative marker *nicht* need not be present and does not enter into NC.

So far we have considered the negation systems of three types of languages. In all three languages, n-words must be considered as inherently negative. Nonetheless the interpretation of sentences with n-words and the possibility of their co-occurrence with other n-words and with the negative marker differ. On the basis of the interpretation of clauses with more than one n-word, we call French an *optional NC language*, Polish an *obligatory NC language*, and German a *no-NC language*. Giannakidou (2005) gives a typologically oriented overview over NC. According to her, optional NC is attested in Romance languages (Italian, Catalan), obligatory NC is found in the Slavic languages, but also in Greek, Hungarian, Rumanian and Japanese. English and Dutch are no-NC languages — at least in their standard variety.

2.2 Exceptions in French and German

In addition to the core data of the previous section, both French and German have a number of exceptional n-words.[4] French *mot* expresses negation (7-a). In contrast to *personne* a DN reading is not possible in combination with n-words (7-b) and the combination with *pas* is ungrammatical (7-c).[5] Surprisingly the German n-word *Dreck* behaves in exactly the same way in (8-a) and (8-b).[6]

(7) a. Jean n'a dit **mot**. [SN]
Jean NE has said word
'Jean said nothing.'

b. **Personne** n'a dit **mot**. [SN]
nobody NE has said word
'Nobody said anything.'

[4] We have not been able to find exceptional n-words in Polish so far.

[5] As pointed out to us by Olivier Bonami and Gilles Boyé, for many speakers (7-a) is not grammatical, whereas the other two sentences in (7) are. For these speakers *mot* is an NPI, similar to English *a word* or Polish *słowo* (*a word*) in (4).

[6] Some German speakers reject (8-c), which we find fully grammatical.

c. *Il ne dit pas **mot**.
he NE says not word

(8) a. Das geht dich **einen Dreck** an. [SN]
this concerns you a dirt PART
'This is none of your business.'

b. Das geht **niemanden einen Dreck** an. [SN]
this concerns no one a dirt PART
'This is no one's business.'

c. Das geht dich k**einen Dreck** an. [SN]
this concerns you no dirt PART
'This is none of your business.'

Notice that while *mot* and *Dreck* behave like n-words with respect to the truth conditions of the respective sentences, they are severely constrained with respect to the verbs they can combine with. In French the original lexical meaning of specialized n-words such as *mot* is an important factor: *mot* (literally: *word*) can only combine with verbs of saying.

(9) a. Jean n'a dit **rien** du tout/ **mot**.
Jean NE has said nothing at all/ word

b. Jean n'a acheté **rien** du tout/ ***mot**.
Jean NE has bought nothing at all/ word

Similarly, German *Dreck* only combines with a restricted number of verbs, verbs of intellectual concern such as *kümmern*, *scheren* (both meaning *care* or *concern*), or *interessieren* (*interest*).

(10) a. Das schert/ interessiert mich **einen Dreck**/ gar nicht.
this concerns/ interests me a dirt/ not at all
'I don't care about this at all.'

b. Das gefällt mir ***einen Dreck**/ gar nicht.
this pleases me a dirt/ not at all
'I don't like this at all.'

3 Precursors and Theoretical Prerequisites

3.1 NC with Truth Conditional Semantics in HPSG

There are a number of previous studies on NC in HPSG which link syntax to a truth conditional semantic analysis. De Swart and Sag (2002) provide an HPSG analysis of NC in terms of the lexical retrieval of quantifiers. Lexical retrieval is combined with the option of forming a polyadic quantifier, i.e. merging a sequence of expressions of the form $\neg\exists x_i$ into a single quantifier $\neg\exists x_1 \ldots x_n$. A language-specific parameter will determine whether such an absorption is possible. DeSwart (2006) uses this syntactic framework to provide an optimality theoretic account of the characteristic interpretation strategies in a number of languages. This theory

captures the general patterns (NC/non-NC) of the languages, but it remains unclear how to incorporate lexical idiosyncrasies which contradict the general pattern of a language in this analysis.

Richter and Sailer (1999) discuss a set of data similar to those we investigate here. Their analysis, formulated in terms of a traditional Ty2 semantics using the lambda calculus and type shifting rules for the semantic combinatorics, focuses on the idiosyncrasies of the French data and models all of French negation in terms of a lexical ambiguity of n-words and idiosyncratic collocational restrictions for each reading of the n-words. While this approach describes both the general pattern and the idiosyncratic data, it fails to capture typological generalizations and a distinction between the general case and exceptions. This distinction is, however, clearly present in the data.

Richter and Sailer (2004a) present an analysis of Polish as a strict NC language. The analysis uses Lexical Resource Semantics (LRS) and exploits the possibility that two items may contribute the same negation to the logical form of a clause. They enforce strict NC by a language-specific principle saying that, in Polish, every verbal projection may have at most one negation in its logical form. This analysis accounts for one particular general pattern of NC in a fairly elegant way. However, it has not been shown how different NC patterns ranging from obligatory to impossible concord can be accommodated.

3.2 Lexical Resource Semantics

Following Richter and Sailer 2004a, our semantic interpretations will be couched in terms of LRS. LRS crucially allows us to use (1) a semantic combinatorics different from the lambda calculus, (2) techniques of scope underspecification, (3) identity constraints for (pieces of) semantic representations, and (4) expressions of Ty2 as logical representations.

In LRS the semantic information of a sign is encoded in its L(OGICAL-)F(ORM) value. The value of this attribute contains the following two attributes:[7] PARTS lists all subexpressions that are contributed by a sign. The EX(TERNAL-)C(ONTENT) is the logical form of a phrase. The combinatoric principles determine that the PARTS list of a phrase is the concatenation of the daughters' PARTS lists. Furthermore, the EXC value of an utterance consists exactly of the expressions on the utterance's PARTS list.

3.3 A Collocation Module

Richter and Sailer (1999) use a collocation module to account for n-words in general. Soehn (2006) modifies this module in a theory of idiomatic expressions and integrates it with an LRS semantics. A sign has a list-valued attribute COLL. Collocationally restricted items have a non-empty COLL value, which may contain

[7] LRS uses some more attributes, which, however, do not play a role in this paper.

various *barrier* objects indicating the syntactic domain in which their context requirements must be satisfied. For our data, this will always be the smallest complete clause containing a given lexical item. Barrier objects have several attributes which are used to specify (local) syntactic or semantic properties that the relevant barrier must have, such as LOC-LIC for its *local* value and LF-LIC for properties of its logical form.

4 Analysis I: The Typological Patterns

4.1 NC Universals

It has been argued in the literature that the conceptually most attractive analysis of the data is one which assumes a single lexical entry for any given n-word and characterizes their occurrence restrictions in terms of entailment properties of the admissible contexts of the n-word (see for example Giannakidou (1997)). The data above permit a treatment with a single lexical entry for each n-word only under the assumption of negation agreement. Consider sentences with the n-word *mot* but without another n-word. Then the only potential overt source of a negation in the clause is the n-word *mot*. Negation must, thus, be part of its semantic contribution, which in turn must be licensed by the lexical entry of the word. When *mot* occurs together with *personne*, we would erroneously predict the absence of an SN reading unless we assume negation agreement. The same observation holds for the other n-words. Clearly negative instances like the examples (1), (5) and (6-a) above force us to assume that negation is part of the semantic contribution of n-words in all three languages under consideration. In (11) we state the common properties of all n-words considered in the present paper.

(11) Schematic lexical description of an n-word:[8]

$$\begin{bmatrix} \text{PHON } \langle \textit{personne/nikt/niemand} \rangle \\ \text{SYNSEM NP} \\ \text{LF} \begin{bmatrix} \text{EXC} & \boxed{1}\, \exists x(\alpha \wedge \beta) \\ \text{PARTS} & \langle x, \boxed{1}, \mathsf{human}'(x), \neg\gamma \rangle \end{bmatrix} \end{bmatrix} \textbf{and } \mathsf{human}'(x) \lhd \text{(is a component of) } \alpha \textbf{ and } \boxed{1} \text{ is a component of } \gamma$$

Given the characteristics of LRS mentioned in Section 3.2, optional negation agreement is available as a basic option of the semantic combinatorics: Each n-word contributes negation ($\neg$), but n-words can agree, i.e. they may contribute the same semantic negation to an utterance.

Our discussion of the core data has revealed that the negative marker also contributes negation in all three languages. In (12) the relevant semantic contribution of the NM is sketched. Note that syntactically the NMs differ considerably: German *nicht* is a simple adverb, Polish *nie* is a verbal prefix and French *pas* is an

[8] Greek letters in the descriptions refer to subterms which are not specified in more detail. Occasionally we write $\alpha \lhd \beta$ to indicate that the Ty2 expression described by α is a subterm (component) of the Ty2 expression described by β. PARTS lists are somewhat simplified throughout this paper.

adverb to VP or a complement of the verb (Kim and Sag, 2002).

(12) Schematic lexical description of a negative marker:[9]

$$\begin{bmatrix} \text{PHON } \langle \textit{pas/nie/nicht} \rangle \\ \text{SYNSEM} \left[\text{LOC CAT HEAD MOD LOC CAT HEAD } \textit{verb} \right] \\ \text{LF} \left[\text{PARTS } \langle \neg \delta \rangle \right] \end{bmatrix}$$

Based on these sketches of lexical entries we can now look at the three configurations discussed in Section 2.1: a sentence with only an n-word, a sentence with an n-word and an NM, and a sentence with two n-words. In all cases, we will show what the possible interpretations are if we do not impose any language-specific constraints. In Section 4.2 we will introduce the principles which will restrict the range of readings to those which are actually attested in each language.

In (13-a) a sentence with one n-word and no NM is given in the three languages under discussion. In (13-b) the semantic contributions of the words in the sentence, i.e. their PARTS lists are stated.

(13) a. (i) Jean n'a parlé à **personne**. (French)
J. talked with nobody
(ii) *Janek rozmawiał z **nikim**. (Polish)
(iii) Hans sprach mit **niemandem**. (German)

b. Semantic contributions of the words:

n-word:	$\left[\text{PARTS } \langle x, \exists x(\alpha \wedge \beta), \mathsf{human}'(x), \neg\gamma \rangle\right]$
proper name:	$\left[\text{PARTS } \langle \mathsf{j} \rangle\right]$
verb:	$\left[\text{PARTS } \langle \mathsf{talk}'(\mathsf{j}, x) \rangle\right]$

Due to the combinatoric principles of LRS, the PARTS list of the sentences in (13) contains exactly the elements of all the PARTS lists of the words in the sentence. The resulting list is indicated in (14).

(14) PARTS list of the sentences in (13):
$\left[\text{PARTS } \langle x, \exists x(\alpha \wedge \beta), \mathsf{human}'(x), \neg\gamma, \mathsf{j}, \mathsf{talk}'(\mathsf{j}, x) \rangle\right]$

We know that the logical form of the sentences must be composed of exactly the expressions in (14). However, the list does not explicitly encode the relative embedding of these expressions. For example, we do not know from looking at (14) whether $\mathsf{human}'(x)$ occurs in the restrictor or in the scope of the existential quantifier, i.e., whether it is a component of α or β. This information is partially specified in the lexical entries as well as in the combinatorial principles of LRS. In (15) the relevant restrictions are indicated, together with their source.

[9] Since Polish *nie* is a verbal prefix, (12) has to be re-interpreted in this case as describing the semantic contribution of *nie* to Polish negated verb forms. The MOD feature does not play a role in Polish, except for indicating that *nie* modifies the semantics of verbs in morphology.

(15) Subterm constraints on the semantic contributions:

$\mathsf{human}'(x) \lhd \alpha$	(lexical entry of the n-word)
$\exists x(\ldots) \lhd \neg\gamma$	(lexical entry of the n-word)
$\mathsf{talk}'(\mathsf{j}, x) \lhd \beta$	(syntactic combination of verb + n-word)

Only the logical form in (16) consists exactly of the expressions on the PARTS list and at the same time satisfies these constraints.

(16) Potential reading: $\neg\exists x(\mathsf{human}'(x) \wedge \mathsf{talk}'(\mathsf{j}, x))$

The second type of sentences that we want to discuss contains one n-word and an NM. The examples for our three languages are given in (17-a). In (17-b) the lexical contribution of the NM is given. The contribution of the other words is identical to that in (13-b) above.

(17) a. (i) Jean n'a pas parlé à **personne**. (French)
J. NE has NM talked with nobody
(ii) Janek nie rozmawiał z **nikim**. (Polish)
(iii) Hans sprach mit **niemandem** nicht. (German)

b. Semantic contributions of the words:
see (13-b)
n-marker: $\left[\textsc{parts}\ \langle\neg\delta\rangle\right]$

Collecting these expressions, we arrive at the PARTS list in (18).

(18) PARTS list of the sentences in (17):
$\left[\textsc{parts}\ \langle x, \exists x(\alpha \wedge \beta), \mathsf{human}'(x), \neg\gamma, \neg\delta, \mathsf{j}, \mathsf{talk}'(\mathsf{j}, x)\rangle\right]$

In order to deduce the logical forms of the sentences, we have to consider the subterm constraints contributed by the lexical entries and imposed by their syntactic combination. The relevant restrictions are collected in (19).

(19) Constraints on the semantic embedding:

$\mathsf{human}'(x) \lhd \alpha$	(lexical entry of the n-word)
$\exists x(\ldots) \lhd \neg\gamma$	(lexical entry of the n-word)
$\mathsf{talk}'(\mathsf{j}, x) \lhd \delta$	(combination NM + verb)
$\mathsf{talk}'(\mathsf{j}, x) \lhd \beta$	(syntactic combination verb + n-word)

In (20) we indicate the logical forms which are compatible with these conditions.

(20) Potential readings:[10]
a. $\neg\neg\exists x(\mathsf{human}'(x) \wedge \mathsf{talk}'(\mathsf{j}, x))$
b. $\neg\exists x(\mathsf{human}'(x) \wedge \neg\mathsf{talk}'(\mathsf{j}, x))$ [DN]
$(= \forall x(\mathsf{human}'(x) \rightarrow \mathsf{talk}'(\mathsf{j}, x)))$

[10]Note that $\neg\exists x\neg(\mathsf{human}'(x) \wedge \mathsf{talk}'(\mathsf{j}, x))$ is excluded due to background assumptions about representing quantifiers syntactically as generalized quantifiers, i.e $\exists x(\alpha \wedge \beta)$ as $\exists(x, \alpha, \beta)$.

c. $\neg\exists x(\mathsf{human}'(x) \wedge \mathsf{talk}'(\mathsf{j}, x))$ [SN]

Out of the three potential readings, (20-c) is the single negation reading which is attested for the French and the Polish sentence in (17). It may arise since nothing enforces that $\neg\gamma$ (contributed by the n-word) and $\neg\delta$ (contributed by the NM) be distinct expressions.

The logical form in (20-b) is the double negation reading that we reported for German and French in Section 2.1. The logical form contains two negations. It arises if $\neg\gamma$ and $\neg\delta$ are extensionally distinct logical forms ($\gamma = \exists x(\ldots)$, $\delta = \mathsf{talk}'(j, x)$). The reading in (20-a) has not yet been mentioned in our discussion. It is available in German and French. However, it requires special stress patterns and comes with restrictions on word order in German. As a denial form it is used to reject a previous claim that John had talked to nobody (i.e. that $\neg\exists x(\mathsf{human}'(x) \wedge \mathsf{talk}'(j, x))$ is true).[11]

Finally, we consider the sentence type with two n-words and no NM (21-a). In (21-b) we state the semantic contribution of the second n-word, which is analogous to that of the first n-word in(13-b).

(21) a. (i) **Personne** n'a parlé à **personne**. (French)
Nobody NE has talked to nobody
(ii) ***Nikt** rozmawiał z **nikim**. (Polish)
(iii) **Niemand** sprach mit **niemandem**. (German)
b. Semantic contributions of the words:
2nd n-word: $\left[\textsc{parts}\ \langle y, \exists y(\alpha' \wedge \beta'), \mathsf{human}'(y), \neg\gamma'\rangle\right]$

The lexical semantic contributions add up to the PARTS list in (22).

(22) PARTS list of the sentences in (21):
$$\left[\textsc{parts}\ \left\langle \begin{array}{l} x, \exists x(\alpha \wedge \beta), \mathsf{human}'(x), \neg\gamma, y, \exists y(\alpha' \wedge \beta'), \\ \mathsf{human}'(y), \neg\gamma', \neg\delta, y, \mathsf{talk}'(y, x) \end{array} \right\rangle\right]$$

In addition to the embedding constraints in (15) we also know that $\mathsf{human}'(y)$ must be in the restrictor of the second existential quantifier, i.e., it must be a component of α', and we know that the scope of the quantifier must contain $\mathsf{talk}(x, y)$, i.e. $\mathsf{talk}'(x, y)$ must be a component of β'.

If, in addition, we assume that the subject takes scope over the direct object, we can derive three possible readings, given in (23).

(23) Potential readings (assuming subject $>$ object)
a. $\neg\neg\exists y(\mathsf{human}'(y) \wedge \exists x(\mathsf{human}'(x) \wedge \mathsf{talk}'(y, x)))$
b. $\neg\exists y(\mathsf{human}'(y) \wedge \neg\exists x(\mathsf{human}'(x) \wedge \mathsf{talk}'(y, x)))$ [DN]
c. $\neg\exists y(\mathsf{human}'(y) \wedge \exists x(\mathsf{human}'(x) \wedge \mathsf{talk}'(y, x)))$ [SN]

The double negation reading in (23-b) is attested for the French and the German sentence in (21). The single negation reading, (23-c), is found for French.

[11] We are grateful to Danièle Godard for discussion of the French data.

The reading in (23-a) seems to be absent in all three languages. The problem is that there is a negation intervening between the negation and the existential quantifier contributed by the same n-word: If the first "$\neg$" is contributed by the subject, then the "$\neg$" of the direct object intervenes between the subject's negation and its quantifier ($\exists x \ldots$). If the first "$\neg$" stems from the direct object, then the subject's "$\neg$" intervenes between the object's negation and its quantifier ($\exists y \ldots$). We can exclude this kind of linear intervention by adding the following line to the lexical specification of n-words in(11).[12]

(24) Intervention condition, to be added to the specification in(11):

$$\textbf{and not E } \epsilon \left(\ \neg\epsilon \lhd \gamma \ \textbf{ and } \exists x(\alpha \wedge \beta) \lhd \epsilon \ \right)$$

The condition in (24) says that there may not be an expression ϵ such that $\neg\epsilon$ is in the scope of the negation contributed by the n-word ($\neg\gamma$), and at the same time, the existential quantifier contributed by the n-word ($\exists x \ldots$)) is in ϵ.

In this section we showed that we can derive all and only the attested readings if we assume the lexical specifications for the n-words in (11) (augmented with (24)) and for the negative marker in (12), and apply the combinatorial principles of LRS without any further restrictions. We saw that not all of the resulting readings are available in all languages. In the next section we will present language-specific principles that will allow us to impose the correct restrictions for each language.

4.2 Typological Constraints

In this section we will present the general principles which determine the typological type of the negation system of each language. We will first look at Polish, then at German, and finally at French.

4.2.1 Polish

To enforce obligatory negative concord for Polish, Richter and Sailer (2004a) proposes the NEGATION COMPLEXITY CONSTRAINT, given in (25). Remember that in LRS, the EXCONT value is the logical form of a sign, the MAIN value is the main semantic constant contributed by the sign's lexical head.

(25) The NEGATION COMPLEXITY CONSTRAINT:
For each sign, there may be at most one negation that is a component of the EXCONT value and has the MAIN value as its component.

With this principle we can rule out the double negation reading and the denial reading given in (20) for the Polish sentence in (17). In this sentence, the MAIN

[12] To distinguish clearly between the HPSG description language and the semantic representation language we use **not** , **and** and **E** for negation, conjunction and existential quantification in the former.

value is the constant talk′. In the hypothetical EXCONT values in (20-a) and (20-b) this constant is in the scope of two negations.

To guarantee the presence of the NM in negated verbal projections, we must invoke a second language-specific principle for Polish. We called this principle the NEG CRITERION, due to its similarity in effect to the Neg Criterion of Haegeman and Zanuttini (1996).

(26) The NEG CRITERION:
For every verb, if there is a negation in the EXCONT value of the verb that has scope over the verb's MAIN value, then that negation must be an element of the verb's PARTS list.

Since the Polish NM *nie* is a verbal prefix, its semantic contribution is part of the semantic contribution of a negated verb. If a sentence contains an n-word and a negated verb, as the Polish sentence in (17), the NEG CRITERION is met. In (13) and in (21), however, there is no negation in the semantic contribution of the verb. Despite its absence in the verb, in all the potential logical forms of the complete sentence the verb's MAIN value (talk′) is in the scope of a negation. Thus, the NEG CRITERION correctly excludes these sentences. Note that if we add a pre-verbal negation in sentence (21), the sentence becomes grammatical. Due to the NEGATION COMPLEXITY CONSTRAINT it has only a single negation reading.

4.2.2 German

For Polish the constraint in (25) prevents double negation readings. For German, a non-NC language, we need a constraint that prohibits negation agreement. This constraint is given in (27).

(27) NEGATION FAITHFULNESS CONSTRAINT (German, Dutch, English):

a. In every phrase: there is no element of the form $\neg\alpha$ which is on the PARTS list of both the head-daughter and the nonhead-daughter.

b. *phrase* $\Rightarrow$
$$\left(\begin{bmatrix}\text{H-DTR LF PARTS } \boxed{A}\\ \text{N-DTR LF PARTS } \boxed{B}\end{bmatrix}\right.$$
$$\left.\begin{array}{l}\\ \textbf{and not } \mathbf{E}\boxed{1}\,\mathbf{E}\alpha \end{array}\right.$$
$$\left.\begin{array}{l}\boxed{1} = \neg\alpha\\ \textbf{and } \texttt{member}(\boxed{1},\boxed{A})\\ \textbf{and } \texttt{member}(\boxed{1},\boxed{B})\end{array}\right)$$

Let us reconsider the sentences with two words which contribute a negation, i.e. sentences (17) and (21). Their single negation readings in (20-c) and (23-c) arise by the identification of the negation contributed within the VP (either by the negative marker or by the n-word in object position) and the negation contributed by the subject. As an immediate consequence, when the subject combines with the VP, both constituents have a negation in their PARTS list. To derive a single negation reading, these negations must be identical, i.e. there must be an expression $\neg\alpha$

which is on the head-daughter's and on the nonhead-daughter's PARTS list. This is, however, what the constraint in (27) excludes.

4.2.3 French

For French n-words of the *personne*-type nothing needs to be said, as LRS allows for negation agreement but does not enforce it. This means that the ambiguity of a sentence with two n-words such as (21) is correctly predicted. At the moment we cannot yet exclude the single negation reading of a sentence with an n-word and the NM (i.e. of the type in (17)). This has to be postponed until the next section, where we will derive it from lexical properties of *pas* in European French.

Olivier Bonami and Gilles Boyé (p.c.) brought to our attention a number of interesting n-words in French slang, such as *que dalle*, *que tchi* and *oualou* (all meaning *nothing*), which are beyond the well-known core of French n-words.[13] According to a preliminary google search and introspective judgements of a small number of native speakers, these n-words pattern exactly like other n-words in French: They license negative polarity items (28-b), they show negative concord with other n-words (29), and they express a double negation when combined with *pas* (30). We did not find an instance of a double negation reading with *quedalle* and another n-word, though.

(28) a. *Je fous toute sorte de chose pendant les vacances.
I made all sorts of things during the holidays

b. On foutait rien/ que dalle/ que tchi/ oualou
One made nothing
'We did nothing.'

(29) (internet data)

a. mais si on va dans ce sens là, plus **personne** fait
but if one goes in this direction there no more nobody does
quedalle
nothing
'but if one goes in this direction, nobody does anything anymore.'
(found by O. Bonami)

b. en réalité ces initiatives n'apportent absolument **que dalle** à
in reality these initiatives NE bring absolutely nothing to
personne . . .
nobody
'In reality, these initiatives don't serve anything at all to anybody.'

(30) C'est pas quedalle
that's NM nothing
'That's not nothing.'

[13] Their non-standard status is also documented by (i) their high frequency of occurrence without *ne* and (ii) the considerable amount of orthographic variants (which include for *que dalle*: *quedalle, kedal, que le dail*, for *que tchi*: *ketchi, keutchi*, for *oualou*: *waloo, walloo, walou*).

While these n-words deserve a more systematic investigation, our preliminary survey suggests that they follow the pattern of the well-studied n-words in French.

4.3 Summary

In this section we demonstrated that we can assume the same semantic specifications for n-words and negative markers in French, Polish, and German. The typological differences in the negation systems are derived from language-specific restrictions on the mutual compatibility of negative items in a sentence.

In our theory optional NC is the simplest case, which is typologically correct. Strict NC can be enforced and might even be preferred because it leads to less complex logical forms. For the rare cases of non-NC languages a principle like (27) can account for the general pattern. Thus, these languages have more complex grammars than NC languages, which may explain their typological markedness.

5 Analysis II: Exceptional N-Words

While the negation agreement behavior of *personne*/*nikt*/*niemand*-type n-words follows from the architecture of LRS and general typological principles, our account of the n-words *mot* and *Dreck* in (7) and (8), and of the negative adverb *pas* is lexicalized and treats them as idiosyncratic items. Their lexical entries contain collocational restrictions which exclude some of the readings we expect to find according to the general principles.

5.1 Collocationally Restricted N-Words

In Section 2.2 we showed that French *mot* (*word*) and German *einen Dreck* (*a dirt*) are inherently negative, exhibit obligatory NC with other negative items in the sentence, and are restricted to co-occur only with a small number of verbs. French has a number of n-words similar to *mot*: The n-word *goutte* (*drop*) co-occurs with verbs of drinking, but also with verbs of perception (*voir, entendre* (*see, hear*)), or comprehension (*comprendre, connaître* (*understand, know*)). The n-word *mie* (*crumb*), the most archaic of the three, is attested with *écouter* (*listen*) and *attendre* (*wait/expect*). Our brief overview shows that the verbs with which each of these n-words co-occurs are not fully predictable from the literal meaning of the n-words.

It is worth noting that the negation marker *pas* was historically just one more of these specialized n-words. Motivated by its literal meaning (*step*), it used to combine preferably with verbs of movement. In Section 4.2.3 we observed that the interaction of *pas* with n-words does not follow completely from the general principles of the negation system of European French. For other varieties such as Canadian French (Acadian), reported in Richter and Sailer (1999), *pas* is fully integrated in the optional concord system. There we find both single and double negation readings for sentences which contain an n-word and *pas* ((1-c), (17)). We

conclude that in European French, *pas* has a regular grammatical meaning but, nonetheless, is (still) not free from idiosyncratic collocational restrictions.

In Section 2.2 we showed that the exceptional German n-word *einen Dreck* is similar to French *mot*: It is inherently negative, it does not lead to double negation readings and it is collocationally restricted to a small class of verbs. German has a number of other such specialized n-words (Sailer ta), including *den/ einen Teufel* (*the/ a devil*) or *einen feuchten Kehrricht* (*a damp dust*), which collocate with roughly the same class of verbs attested for *einen Dreck*.

The phrase *einen Dreck* violates the general typological pattern of German, which excludes NC. Interestingly, we also find French n-words that go against the otherwise stable ban on single negation readings with *pas*. There is a third group of n-words in French, also mentioned in Richter and Sailer 1999, which includes *âme que vive* (*soul that lives*). This n-word behaves analogously to *mot*, but it can form a single negation reading with *pas*, excluding a double negation reading.

(31) a. Il n'y a (pas) **âme qui vive** dans cet endroit désert. [SN]
It NE there has NM a living soul in this place deserted
'There isn't a living soul in this deserted place'

b. **Personne** n'a **jamais** rencontré **âme qui vive** dans cet endroit désert. [SN]
nobody NE has never met a living soul in this place deserted
'Nobody has ever met anyone in this deserted place.'

5.2 Analysis

We are now ready to show that the behavior of the exceptional words can be captured using the collocation theory of Soehn (2006) outlined in Section 3.3. The necessary collocational restrictions will directly express the distributional idiosyncrasy we find: For *pas* it will refer to abstract items in the logical form, for *mot* it will mention the verb class. The lexical entries of *einen Dreck* and *âme qui vive* will be the most elaborate, reflecting their unusual behavior relative to the negation systems of French and German.

5.2.1 The Lexical Entry of *pas*

Since *pas* is a negative marker its semantic contribution is as described for negative markers in general in (12). However, we have to add a collocational restriction within its COLL value in which we specify that no other item may agree with it within the same clause. This enforces the DN reading in (1-c) and in (17).

(32) Sketch of the relevant part of the lexical entry of *pas*:

$$\begin{bmatrix} \text{PHON } \langle \textit{pas} \rangle \\ \text{SYNSEM ADV} \\ \text{LF} \left[\text{PARTS } \langle \neg\delta \rangle \right] \\ \text{COLL} \left\langle \begin{bmatrix} \textit{complete-clause} \\ \text{LF-LIC } \left[\text{PARTS } \boxed{\text{A}} \right] \end{bmatrix} \right\rangle \end{bmatrix}$$ **and** $\neg\delta$ occurs exactly once in $\boxed{\text{A}}$.

5.2.2 The Lexical Entry of *mot*-type N-Words

The lexical entry of *mot* in (33) is consistent with (11). In addition, it contains a non-empty COLL value expressing that: (i) its collocational restrictions must be satisfied in the smallest complete clause containing *mot*; (ii) in this clause, *mot* must combine with a verb of saying (we use the attribute LISTEME from Soehn 2006 to express this); (iii) while *mot* contributes a negation, this negation may not be distinct from other negations in the same clause. Under this analysis, the incompatibility of *pas* and *mot* in (7-c) is an immediate consequence of the contradictory collocational requirements of the two items.

(33) Sketch of the lexical entry of the exceptional n-word *mot*:

$$\begin{bmatrix} \text{PHON } \langle \textit{mot} \rangle \\ \text{SYNSEM NP} \\ \text{LF} \begin{bmatrix} \text{EXC} & \boxed{1}\, \exists x(\alpha \wedge \beta) \\ \text{PARTS} & \langle x, \boxed{1}, \mathsf{thing}'(x), \neg\gamma \rangle \end{bmatrix} \\ \text{COLL} \left\langle \begin{bmatrix} \textit{complete-clause} \\ \text{LOC-LIC } \left[\text{CAT HEAD LISTEME } \textit{saying} \right] \\ \text{LF-LIC } \left[\text{PARTS } \boxed{\text{A}} \right] \end{bmatrix} \right\rangle \end{bmatrix}$$

and $\mathsf{thing}'(x)$ is a component of α **and** $\boxed{1}$ is a component of γ
and if there is an element in $\boxed{\text{A}}$ of the form $\neg\delta$, then $\delta = \gamma$

5.2.3 The Lexical Entry of *einen Dreck*-type N-Words

At the surface the pattern of German *Dreck* in (8) is analogous to that of *mot*. However, we have to take into account that the negation systems of French and German are fundamentally different. French has optional NC, in German NC is impossible. We assume that *Dreck* is lexically specified as optionally introducing a negation. Collocationally it is just like *mot*. A clause-mate negation may not be distinct from the negation contributed by *Dreck*. This leads to the effect that *Dreck* does not contribute a negation in the context of a negative marker or an n-word.

This analysis also makes the right predictions for (34), in which there are two words, an n-word and a negative determiner, which contribute negation.

(34) Das schert **niemanden keinen Dreck**. [DN]
this concerns no one no dirt
'No one does not care about this.'

In this case, the typological pattern of German is responsible for the double negation reading, and *Dreck* does not contribute a negative component.

(35) Sketch of the lexical entry of the exceptional n-word *Dreck*:

$$\left[\begin{array}{l}\textsc{phon}\ \langle \textit{Dreck} \rangle \\ \textsc{synsem}\ \mathrm{NP} \\ \textsc{lf}\ \left[\begin{array}{ll}\textsc{exc} & \boxed{1}\ \exists x(\alpha \wedge \beta) \\ \textsc{parts} & \langle x, \boxed{1}, \mathsf{thing}'(x) \rangle \big(\oplus\ \langle \neg\gamma \rangle\big)\end{array}\right] \\ \textsc{coll}\ \left\langle \left[\begin{array}{ll}\multicolumn{2}{l}{\textit{complete-clause}} \\ \textsc{loc-lic} & \left[\textsc{cat head listeme}\ \textit{intell-concern}\right] \\ \textsc{lf-lic} & \left[\textsc{parts}\ \boxed{A}\right]\end{array}\right] \right\rangle\end{array}\right]$$

and $\mathsf{thing}'(x)$ is a component of α

and $\boxed{1}$ is a component of an expression $\neg\delta$ in $\boxed{A}$

and if there is an element in $\boxed{A}$ of the form $\neg\delta$, then $\delta = \gamma$

To model n-words such as *âme qui vive* (*a living soul*) in (31), we assume a lexical entry which is like the one for *einen Dreck* in (35) with different local collocation requirements (i.e. a different LOC-LIC specification), but with identical logical form collocations: The PARTS list contains an optional negation operator ("$(\oplus\neg\gamma)$"), and the logical form of the smallest clause containing the n-word must have a negation ($\neg\delta$), but this negation may not be distinct from $\neg\gamma$. It follows that whereas the version of *einen Dreck* without negation is required in German whenever another negative item occurs in the same clause, *âme que vive* only needs to be non-negative if it co-occurs with *pas*.

6 Summary

The theory of NC which we have developed in this paper has three layers. The universal core system is determined by the semantic combinatorics of LRS and the structure of the collocation theory. At the same time common lexical semantic specifications of the important words of the sentential negation system (n-words and negative markers) have been identified. Without additional assumptions, the core system delineates the same potential readings for French, Polish and German. In the second layer, the typological principles distinguish among the three language-specific typological classes of NC we saw. In the third layer, language internal idiosyncrasies, i.e. exceptions to the general typological class, are handled by exceptional collocation requirements of small classes of lexical items. As a result, we distinguish clearly between (i) the overall type of the language and (ii) lexical items with principle-governed versus idiosyncratic behavior. Previous approaches have not been able to combine these two aspects.

Our analysis distinguishes three typological classes of NC. French is the simplest case, since the core of n-words exhibits an unmarked behavior. Double negation readings and single negation readings with two n-words are optional. The system is unstable due to a collocationally restricted function word, the negative

marker *pas*. Polish is a pure NC language. Two language-specific principles ((25) and (26)) enforce obligatory NC and the presence of the verbal negative marker, *nie*, in negative sentences. The obligatory presence of the NM in Polish makes it non-trivial to distinguish n-words from NPIs in this system. German marks the other end of the scale. German forbids NC with a third language-specific principle, which we called NEGATION FAITHFULNESS CONSTRAINT (27).

The analysis makes the following predictions: (1) We expect that functional items in a language show fewer or no collocational properties. This is attested for French *pas*. Historically, *pas* was collocationally as restricted as *mot*. Its collocational restrictions today are more general than those of the *mot* type. However, the incompatibility of *mot* and *pas* still follows from their respective collocational requirements alone. In non-European variants of French, *pas* does not have a collocational restriction, i.e. it behaves according to the general principle and permits optional NC. (2) For non-NC languages, items which enforce "NC-like" interpretations have complex semantic contributions and collocational requirements. Thus, they are highly marked. In fact, we only find very few of them in German. They have not been noticed in the literature, and we conjecture that their overall frequency in languages is very low.[14]

At the heart of our analysis is the technique of enforcing, forbidding or permitting structural identity between (components of) signs in complex structures. In HPSG this is *the* single most important device of linguistic description. It is used to model agreement in the nominal domain, coindexation in Binding Theory and subject-verb agreement in the sentential domain. In LRS analyses of semantic phenomena, structural identity of semantic representations has been used before to model tense agreement in Afrikaans (Sailer 2004) and interrogative agreement in multiple wh-questions in German (Richter and Sailer 2001). In the present contribution we argued that a typologically oriented analysis of NC can exploit negation agreement to account simultaneously for (1) the dominance of NC or multiple negation in a given language and (2) the occurrence of lexically marked exceptions to each pattern. We integrated lexical exceptions in such a way that they are distinguished as special cases which need to be learned individually.

[14] Postal (2004) presents intriguing data on idiosyncratic English slang n-words/minimizers such as *squat*. They seem to mean *nothing* in isolation (i-a), and they don't allow for a DN reading if a negative marker or an n-word is present ((i-b), (i-c)). However, in contrast to French *mot* and German *Dreck*, *squat* does not license NPIs (such as *in years* in (i-d)). Postal, thus, treats *squat* as being ambiguous between a zero-quantifier in (i-a) and an NPI in (i-b) and (i-c). We do not attempt to analyze *squat* in this paper, but the data supports the point that NC-like items in non-NC languages show clearly marked behavior.

(i) a. Claudia saw squat. (= Claudia saw nothing.)
b. Claudia didn't see squat. (= Claudia didn't see anything.)
c. Nobody knows squat about your topic. (= Nobody knows anything ....) (internet data)
d. Helga has said nothing/ *squat to me in years.

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A proposed lexicalised linearisation grammar: A monostratal alternative

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Abstract

This paper presents an overview of a proposed linearisation grammar, which relies solely upon information residing in lexical heads to constrain word order. Word order information, which encompasses discontinuity as well as linear precedence conditions, is explicitly encoded as part of the feature structure of lexical heads, thus dispensing with a separate LP specification or linearisation-specific feature like DOM for phrases. Instead, such lexicon-originated word order constraints are enforced in projections, propagated upwards and accumulated in the compound PHON feature, which represents phonological yields in an underspecified manner. Though limited somewhat in generative capacity, this approach covers the key phenomena that motivated linearisation grammars with a simpler grammar architecture without phrase structure rules.

1 Introduction

In this paper I would like to show there can be a serious *monostratal* alternative to the standard linearisation grammar in HPSG (Reape, 1994; Kathol, 2000) which posits a separate, 'phenogrammatical' representation, in particular Word Order Domain initiated by Reape, in order to account for, inter alia, scrambled discontinuity phenomena frequently observed in freer word order languages like German, Japanese and Korean. My central proposal consists in representing word-order related constraints that encompass discontinuity as well as linear precedence explicitly *inside* the feature structure, as values of the Word Order Constraints (WOCs) feature. In what follows I present a rather radical version of implementing this idea, wherein all the WOCs originate from *lexical heads* and are applied to local sisters. By way of compensation, we render PHON a compound feature enriched with word order information, through which WOCs propagate upwards, to ensure that the LP conditions in discontinuous phrases are enforced. Admittedly, this setup would require somewhat extensive modifications to other components of the grammar, at times dictating particular phrase structure construals. Also, the fully lexicalised system presented here does not quite achieve the same constraining power as the versatile DOM-oriented system. However, I will argue that our conservative extension to the classical HPSG can handle most of the phenomena claimed to require a separate linearisation-specific domain.

It would be worth noting, before getting into the details, that the main motivation behind my proposal is of a rather technical nature, namely the search for a simpler and reusable grammar architecture rather than a linguistically plausible account. The standard ID/LP style framework, which is largely inherited by the existent linearisation grammars (cf. Daniels (2005)), may well be a more intuitive and plausible route. However, given the usual advantages of a lexicalist framework, I believe it is worthwhile to push its boundary. For if word order information – a source of great many language-specific idiosyncrasies – was incorporated into the lexicon in its entirety, not only could we dispense with phrase structure rules

but also reuse many of the general schemata – such as Head Complement Schema – cross-linguistically. This in turn would bring immense benefits to computational grammar building too, as all the parsing work could then be borne by a single, universal word order free algorithm for any language (Sato, 2006).

2 Standard Linearisation Account

Below is an example of scrambled discontinuity from German of the kind that motivated linearisation grammars, where (1) is in canonical word order while (1') shows its scrambled variants.

(1) Ich glaube, dass der Vater dem Jungen das Buch zu lesen erlaubt.
I believe Comp the father(nom) the boy(dat) the book(acc) to read allow

'I think that the father allows the boy to read the book'

(1') Ich glaube, dass der Vater [das Buch] dem Jungen [zu lesen] erlaubt
Ich glaube, dass dem Jungen [das Buch] der Vater [zu lesen] erlaubt
Ich glaube, dass [das Buch] dem Jungen der Vater [zu lesen] erlaubt
...

Notice that the lower VP is realised discontinuously in (1') (in square brackets).[1] Such instances are not adequately covered by context free phrase structure rules (Suhre, 2000) and call for some non-CFG machinery for constituent ordering, such that (1) discontinuity/interleaving can be allowed and (2) appropriate LP constraints are enforced. Reape's account invokes some separate mechanisms to handle such ordering, in addition to the introduction of DOM (Reape, 1994). Firstly, Reape's 'default' combinatorial operation for a phrasal projection is *domain union* (rather than *append* as in context free rules), which is essentially discontinuity-allowing but order-preserving merging of lists. Secondly, in order to distinguish between the potentially discontinuous and obligatorily contiguous cases, the UNIONED feature is introduced into phrases, which indicates whether the phrase is intervenable at upper nodes. For example the lower zu-infinitival VP in the above example is UNIONED + and hence is domain-unioned into its mother, allowing for discontinuous realisation. Thirdly, LP constraints are stated in the LP component of the grammar. For example, the constraint COMPS$\prec$ZU-INF-V in German blocks the ungrammatical *zu lesen das Buch* sequence. The fact that the domain union operation preserves the relative order of constituents ensures that the LP compliance is preserved non-locally at upper nodes. In sum, the interaction of domain union, the UNIONED feature and LP statements controls the way that

[1] Under the 'biclausal' construal, which is generally accepted to be more appropriate for the 'incoherent' object control constructions in question (Gunji, 1999) than the 'monoclausal' alternative, or argument composition (Hinrichs and Nakazawa, 1990). Note that I am not employing a biclausal construal throughout, however. I am in agreement with Kathol and Müller in preferring argument composition for 'coherent' constructions (Kathol, 2000; Müller, 2002).

constituents are linearised in DOM, ruling out the unacceptable sequences while endorsing grammatical ones such as the examples in (1').

DOM is a list of signs or 'domain objects' (consisting of PHONs and *synsem*s) cumulatively percolated and as such contains a considerable duplication of information with other parts of the feature structure. This is necessitated, it is claimed, by the existence of non-local word order constraints that operate across local domains. Yet what I find striking about Reape's work is that despite his invocation of separate machineries to enforce the potentially non-local constraints, the majority of the word order conditions are applied in fact to *sisters*. Even for discontinuity, inherently non-local though it is, the intervenability information originates from a local feature, UNIONED. Genuinely non-local word order conditions, namely those that linearise particular constituents from inside different local nodes, seem far and few between. Provided all LP constraints are rendered locally applicable – a contentious proposition I will discuss in the next section – all that would remain for DOM to do is percolation of intervenability information. This suggests the possibility to dispense with a linearisation-specific feature like DOM, if the fragmented word-order related information can be accordingly streamlined. I will argue that this is indeed possible in the following section.

3 Word Order Constraints Lexicalised

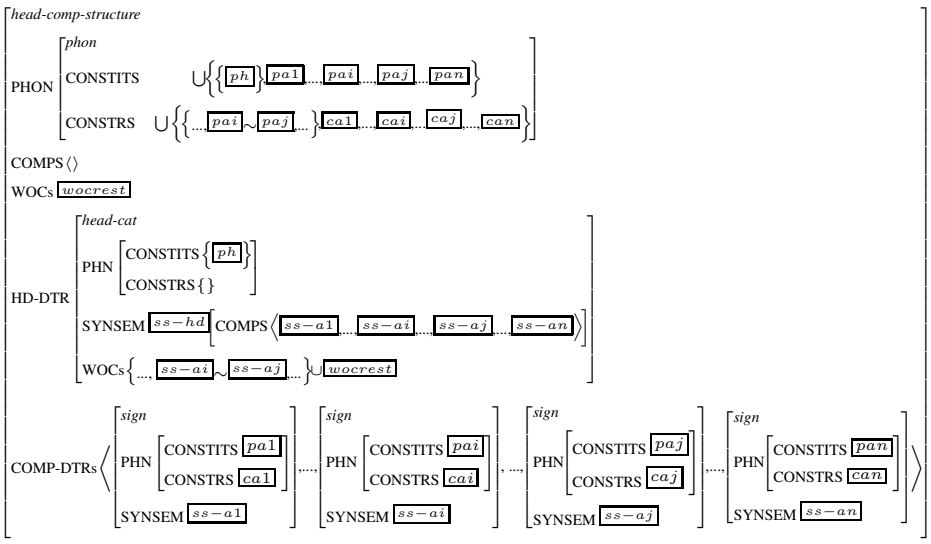
The underlying idea for lexically encoded word-order constraints (WOCs) is simple: since the dependents of a lexical head are available as its valences, it should be possible to state the relative linear order and adjacency between the head and a dependent sister, as well as between its dependent sisters, *inside* it. The WOC-incorporated feature structure would look like the following, with the German verb and noun we saw earlier in the examples:

$$\left[\begin{array}{l} \textit{zu-inf-verb} \\ \text{PHON}\left[\begin{array}{l}\text{CONSTITS}\left\{\text{zu-lesen}\right\}\\ \text{CONSTRS}\{\}\end{array}\right] \\ \boxed{v}\,\text{SYNSEM}\,|\,\ldots\,|\,\text{COMPS}\left\langle \boxed{np3}\left[\begin{array}{l}\textit{np}\\ \text{CASE Acc}\end{array}\right]\right\rangle \\ \text{WOCS}\left\{\boxed{np}\prec\boxed{v}\right\}\end{array}\right] \quad \left[\begin{array}{l} \textit{noun} \\ \text{PHON}\left[\begin{array}{l}\text{CONSTITS}\left\{\text{Buch}\right\}\\ \text{CONSTRS}\{\}\end{array}\right] \\ \boxed{n}\,\text{SYNSEM}\,|\,\ldots\,|\,\text{SPR}\left\langle \boxed{det}\left[\begin{array}{l}\textit{det}\\ \text{GEN Neut}\end{array}\right]\right\rangle \\ \text{WOCS}\left\{\boxed{n}\sim\boxed{det},\ \boxed{det}\prec\boxed{n}\right\}\end{array}\right]$$

Let us first focus on the WOCs feature, whose value is a set of word-order related constraints. For the current proposal I include ADJ (for adjacency, represented above as $\sim$) and LP ($\prec$) though the feature may contain any relational constraint with the proviso of its formalisability. The crucial point is that intervenability and LP constraints both come from a single feature, working essentially in the like manner. Naturally, there is a restriction on the operands of these relations: they have to be either the synsem of the head or of one of the complements. Also,

it is stipulated that one cannot state a constituent is adjacent to/precedes itself. [2] In the examples the WOCs feature of *zu-lesen* says, for its projection, its accusative complement NP must precede the verb itself, while that of the noun *Buch* says that the attached determiner must both precede and be adjacent to itself.[3]

These lexically encoded WOCs are enforced in a modified *Head-Complement Schema* (Pollard and Sag, 1994) (in the case of the head-complement projection), as shown below. I am assuming a flat structure for VPs, therefore COMPS include the subject.[4] For simplicity only the ADJ constraint is shown, but the LP constraint would work in an analogous manner. Notice that a new, enriched PHON feature now contains the subfeature CONSTRS (constraints), as well as the CONSTITS (constituents), the unordered set of its phonological components. Thus, the PHON feature overall represents any of the legitimate word order patterns endorsed by CONSTRS with the words in CONSTITS in an underspecified way. Crucially, this is where WOCs are percolated into, and hence linearisation takes place.



The reader is asked to interpret *ss-ai* and *ss-aj* in the head daughter's WOCs to represent any two *synsem*s chosen from the daughters including the head, namely *ss-ai*, *ss-aj* $\in \{$*ss-hd*,*ss-a*$_1$,...,*ss-an*$\}$. The structure sharing of *ss-ai* and *ss-aj* between WOCS and COMPS indicates that the ADJ constraint applies to these two arguments, i.e. *ai* must be adjacent to *aj*. Notice that the categories being unified

[2] Furthermore we define A[lex]$\prec$B, where A is a lexical head, to mean A linearly precedes *all* the constituents of, or alternatively, the right periphery of, B. A$\prec$B[lex] can be similarly defined, such that the left periphery of A precedes B. Meanwhile A[lex]$\sim$B is taken to mean A and B together constitute a contiguous string, whatever the order is. Therefore the adjacency relation is symmetric. Also, the non-head string, B, may itself be non-contiguous.

[3] For the sake of the argument I am glossing over two facts here: (1) *zu lesen* is not really a word and (2) a noun can be non-adjacent if adjoined by a nominal modifier e.g. an adjective. We will come back to this point in Section 4.1.

[4] Our treatment is extended to the configurational analysis in Section 4.1.

between WOCS and COMPS, their *synsem* information is fully available for linearisation. Now, only for these WOC-applicable daughters, the PHON|CONSTITS values are paired up with the appropriate operator (in this case $pai \sim paj$) and pushed to the mother's PHON|CONSTRS feature. In short, the relevant WOCs, originally stated in a lexical head on a pair of categories, is converted into the LP or ADJ specification between the corresponding PHONs and passed up into the mother.

Another important point is that the CONSTRS subfeature is *cumulatively* inherited. Notice that all the *non-head* daughters' CONSTRS values (ca_1,...,ca_n) – the word order constraints applicable to each of *their* daughters, namely the result of WOC application at the lower nodes – are also passed up, collecting effectively all the CONSTRS values of its descendants. This means the information concerning word order, as tied to particular string pairs, is never lost and passed up all the way through, enabling WOCs to be enforced at any point at an upper node. This is how the discontinuity/adjacency condition can be enforced, since the ADJ specification gets percolated up to the top node and blocks/endorses the relevant phrase being intervened wherever such intervention is to take place. This is the task that was borne by the UNIONED feature and domain union in Reape's framework.

Lastly, the applied WOCs are discharged, in a similar manner to the COMPS feature except that for WOCs both operands of an ADJ/LP pair have to be encountered for discharge. Thus there may remain undischarged WOC pairs in the mother ($wocrest$). This is in anticipation for extending the schema to other phrasal structures, which we will discuss in the next section.

Let us now see how the Schema works out with our control verb examples (1) and (1'). Following is the WOC specification of the head, *erlaubt*. Notice in particular that there is no WOC involving the infinitival VP complement:

$$\left[\begin{array}{l} \textit{subord-obj-ctrl-verb} \\ \text{PHON}\left[\begin{array}{l}\text{CONSTITS}\{\text{erlaubt}\}\\ \text{CONSTRS}\{\}\end{array}\right] \\ v\ \text{SYNSEM}\,|\,\ldots\,|\,\text{COMPS}\left\langle np1\left[\begin{array}{l}np\\ \text{CASE Nom}\end{array}\right], np2\left[\begin{array}{l}np\\ \text{CASE Dat}\end{array}\right], \left[zu\text{-}inf\text{-}vp\right]\right\rangle \\ \text{WOCS}\{np1 \prec v, np2 \prec v\} \end{array}\right]$$

The result of successively applying the Schema up to the *erlaubt* projection is shown below (only the PHON feature).

$$\left[\begin{array}{l} \textit{subordinate-clause} \\ \text{PHON}\left[\begin{array}{l} \text{CONSTITS}\left\{\begin{array}{l} v1\{\text{erlaubt}\} \cup np1\{n1\{\text{Vater}\}, d1\{\text{der}\}\} \cup np2\{n2\{\text{Jungen}\}, d2\{\text{dem}\}\} \\ \cup vp\{v2\{\text{zu-lesen}\} \cup np3\{n3\{\text{Buch}\}, d3\{\text{das}\}\}\} \end{array}\right\} \\ \text{CONSTRS}\{np1 \prec v1,\ np2 \prec v1,\ d1 \sim n1,\ d2 \sim n2,\ np3 \prec v2,\ d3 \sim n3\} \end{array}\right] \end{array}\right]$$

All the scrambled variants as in (1') would be endorsed by this representation. Notice that it endorses extraposed instances e.g. *der Vater dem Jungen erlaubt das*

Buch zu lesen, due to the lack of LP requirement between *erlaubt* and its complement VP, as well as 'the third construction' *der Vater dem Jungen das Buch erlaubt zu lesen*, coupled with the lack of adjacency requirement therebetween. It seems that all the acceptable word order patterns are captured by this representation.

The 'weakness' – or price for simplicity – of our monostratal representation lies in the fact that the PHON feature, if augmented by the word order information in CONSTRs, is (naturally) still devoid of local, above all synsem, features. Once a (maximal) projection of a phrase has been completed, the local information of its non-immediate lower nodes is no longer available, making a higher-node LP condition impossible that works 'down' the trees and checks the LP between elements in its non-immediate lower nodes. For example, problematic cases arise when a control verb like *erlauben* further embeds another control verb in a non-extraposed, or intraclausal, construction. The first of the following examples is generally considered ungrammatical, as opposed to the second, grammatical extraposed counterpart:

(2) * ...dass der Vater dem Jungen zu versuchen das Buch zu lesen erlaubt.
Comp the father the boy to try the book to read allow

intended: '...that the father allows the boy to try to read the book'

(2') ...dass der Vater dem Jungen erlaubt, zu versuchen, das Buch zu lesen.

There is nothing to rule out (2) in our current WOC specification for *erlauben* and it might seem as if some non-local constraint was at play, presumably to the effect that *if* another control verb (in this case, *zu versuchen*) is embedded, *its* complement VP (*das Buch zu lesen*) must precede it. To generalise, in the intraclausal environment, multiply embedded zu-infinitive VPs must obey what can be called *directionality* of government: let the highest governor that appears at the clause-final position be V_1 (in this case *erlaubt*), its immediate governee and second highest governor V_2 (*zu versuchen*) and *its* governee V_3 (*zu lesen*), then $V_3 \prec V_2 \prec V_1$ is the only acceptable order, not the 'crossing' $V_2 \prec V_3 \prec V_1$.

My tentative response is as follows: I am sceptical about the validity of describing the constraint operating in examples such as the above as instances of non-local LP condition. Generally speaking, other means inside our lexicalist approach are available that render the LP constraints local that would nevertheless have the same effect. Regarding the above case, differentiating intraclausal and non-intraclausal VPs[5] by means of subtyping would do the job of ruling out (2) while retaining (2'), as we will see in Section 4.2, where we discuss subtyping. To be sure, there are more difficult cases in German[6] or in Japanese and Korean[7] and it would be a

[5] I am using the term 'non-intraclausal' as a cover term to refer both the (fully) extraposed case and the third construction (partially extraposed) case. Further subdivision may well become necessary if, as indicated by Rambow (1994) in his analyses of the relevant data, the two cases differ in word order patterns.

[6] As Rambow points out, the third construction shows more involved constraints if a control verb is further embedded.

[7] Floating quantifiers could count as examples.

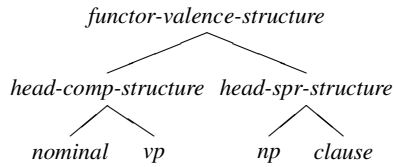
folly to prejudge for other languages. However, our locality-abiding head-driven approach can adequately cover the core phenomena with a due augmentation.

4 Extension

So far we have only been focusing on Head-Complement Structure, of a particular clausal type at that. I do aspire to make the proposed lexicalised WOCs applicable generally, so some additions and modifications to the standard theory are in order.

4.1 Head-Specifier Structure

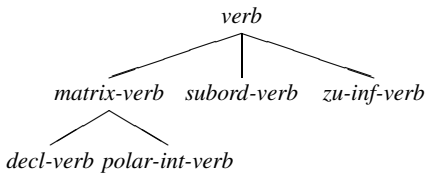
Firstly, the same treatment can be extended to cover Head-Specifier Structure such as NPs as well as clauses in a configurational analysis quite straightforwardly. WOCs can be written into a specifier-taking word in pretty much the same way, and the corresponding Schema would be analogous to Head-Complement Schema. I assume both verbs and nouns select for both SPR and COMPS valences (though either may be an empty list), so the both WOCs applicable to the head-complement projection and to the head-specifier projection should be written into these word types. Given the similarity between these structures, a supertype, *functor-valence-structure*, that contains the WOCs feature is proposed, as in the following type hierarchy:



The preceding consideration also leads us to a second point, mentioned earlier in the footnotes in the preceding section: it is not just words but also their bar-level projections that should carry WOC information. Nominals or the subject-less VP in a configurational analysis should keep its SPR valence undischarged, and hence retain the WOCs for SPR. This is why we employed the staggered discharge mechanism: WOCs are applied step by step, first to COMPS and next to SPR, each time the relevant WOCs being discharged.

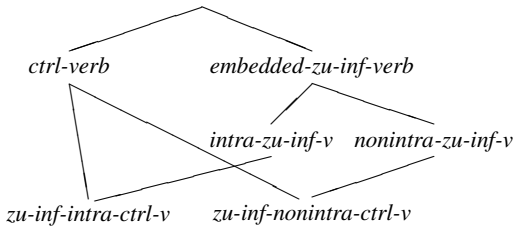
4.2 Subtyping

Now that the WOCs are encoded in lexical heads, it is essential, for succinct and non-redundant specification of word order, to have a type hierarchy of words in terms of WOCs for specific languages. For example German verbs may be subtyped as in the following. Types *subord-verb* and *zu-inf-verb* should contain a WOC that requires that its complements precede the verb, while for the matrix verb types one needs to specify the V2 (declarative) and V1 (polar interrogative) word order patterns.



I expect such subtyping based on the word order of complements to raise some issues of broader concern. One is of *plausibility*: as Kathol (2000) argues (Ch. 7), the issue of clause types may be a matter that should not be determined on the level of the head a clause is a projection of but on the level of clause itself. However, I defer this question for later consideration, as our first priority is to examine whether our approach is technically extensible at all to other principal constructions. Closer to the bone in this sense are two technical issues the German V2 word order evokes, as this word order pattern involves the requirement that *any, but only one* of the *arguments/adjuncts* be in the preverval position. We consider here the first issue, the singularity of the fronted constituent, and will discuss the second issue of adjuncts in the following separate section. The singularity of the fronted constituent could cause a problem under our lexicalist but linearisation-based approach, since the standard lexicalist device invoked for this purpose, SLASH percolation (Pollard, 1990; Netter, 1992), would be at odds with our linearisation-based WOCs feature, but linearisation is usually neutral to the number of fronted constituents.[8] However, we could get around the problem by using disjunctive WOCs, namely by requiring that only one of the complements of a verb both precedes and is adjacent to the verb and all the other complements follow it. That is, provided that V of the type *decl-verb* subcategorises for Comp_1, ... Comp_i, ... and Comp_n, we require that $\text{V} \precsim \text{Comp}_i$ and $\text{V} \prec \text{Comp}_1$, ... and $\text{V} \prec \text{Comp}_n$ for any (but only one) i.[9]

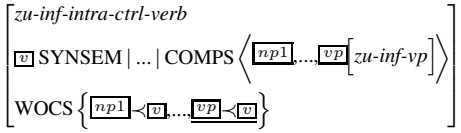
Such subtyping affords us certain flexibility to adapt to more subtle differences in word order. We have seen in Section 3 (examples of (2)) that a stronger constraint applies to intraclausal zu-infinitive VPs than extraposed counterparts, namely that of directionality. The following subtyping is proposed, essentially to make a distinction between intraclausal and non-intraclausal zu-infinitives, the attributes of which may be inherited by control verbs.



[8] In fact a purely linearisation-based account that ensures this singularity of the preverbal constituent is offered by Kathol (ibid., Ch.5), but clause-types, on which he crucially relies to enforce LP conditions, are not available to our lexicalist approach.

[9] The actual processing of such WOCs however would require a mechanism of satisfying disjunctive constraints, which can be a source of inefficiency. For methods to process such a disjunctive statement efficiently see Sato (forthcoming); Maxwell III and Kaplan (1981).

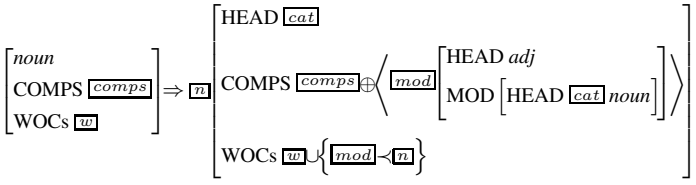
We could then add an extra WOC only for the *zu-inf-intra-ctrl-verb* type, as below. The additional WOC (underlined) requires for this type of verb that the complement VP must precede it, in order to enforce the desired directionality effect.



The last jigsaw to complete the picture is to specify a finite control verb like *erlaubt* to subcategorise either for *zu-inf-intra-verb* or for *zu-inf-nonintra-verb*, and to require in its WOCs that it follows its complement VP for the former case.

4.3 Head-Adjunct Structure

The distinction between complement and adjunct is notoriously elusive and has been a matter of considerable debate (see e.g. Przepiórkowski (1999)). This fuzziness also manifests itself in the German V2 word order, where an adjunct equally qualifies as the constituent to front to the preverbal position. The need somehow to treat adjuncts on 'equal' terms to arguments is particularly acute in our approach, since we would need an access to adjuncts as well as arguments in the same valence entry of a lexical head. The tentative solution I offer here is to adopt the increasingly influential Adjunct-As-Complement account proposed by Bouma and van Noord amongst others (van Noord and Bouma, 1994), which will afford us a local list including adjuncts to operate on. Under a more recent version of this proposal (Bouma et al., 2001), an adjunct is iteratively added through *Argument Structure Extension* to the COMPS list and this is combined with other valence lists (e.g. SUBJ) to form an extended list, DEPS (dependents) list. This list enables us to state the desired WOC statements that hold between a head, its complements and (now dependent) adjuncts in a straightforward manner.[10] Below is an example of a noun, English or German, which states it is modified by an adjective, which must precede the noun. We could drop this LP requirement for verb modification by adverbs to express they can appear before or after the verb.



[10] Bouma et al. (op. cit) are however sceptical about the uniform application of Adjunct-As-Complement theory to all the head-adjunct structures (pp.35f). Also, under this setup an infinite number of DEPS list is produced for a single head, which can be problematic in (particularly bottom-up) processing. For an eclectic approach to adjuncts that controls such explosion and can adapt to both traditional and Adjunct-As-Complement treatments see Sato (forthcoming).

5 Conclusion and future tasks

In the above I have given an overview of a possible lexicalist grammar with the incorporated WOCs feature that handles word order phenomena problematic to CFG including discontinuous constituency. In particular, I have shown that with a due augmentation of the PHON feature the classical cases of discontinuity-causing scrambling can be adequately covered, without invoking a linearisation-specific domain.

Yet the ideas presented here remain at a rather high level of abstraction and need yet to be tested thoroughly against more real data. One issue missing from the discussion above is how to constrain linearisation according to categories/types of the constituents involved rather than cases/obliqueness of complements. For example, it is generally preferred to put pronominals before non-pronominals in the Mittelfeld of a German subordinate clause. In our framework, where no linearisation-specific domain is available, this information would have to be somehow written into the WOCs. This would involve putting into a lexical supertype generic WOCs, which are then to be unified with the dependents of its subtypes, as and when applicable. However, since such a generic WOC is not anchored to particular dependents, quantified statements (such as '*all* the pronominal complement NPs should precede non-pronominal counterparts') would be required.

Another major issue yet to be addressed is unbounded dependency. A fully linearisation-based account of UDCs would be advantageous to our approach in terms of uniformity, but no such account has been fully developed to the best of my knowledge, though Penn (1999) attempts at a limited use of linearisation for this purpose. If the standard SLASH mechanism was to be adopted as well, then the way the gapped element should interact with WOCs would need to be specified. On the other hand, a linearisation account of UDCs does not seem entirely inconceivable, if the singularity of the gap/filler can be warranted by disjunctive WOCs.[11]

Also, what has been presented here is a rather radicalised (fully lexicalist) version, the plausibility of which may well be a matter of debate particularly as we have been witnessing a significant shift towards the constructionist paradigm in HPSG. A radicalism can breed a bias: we have already seen that our insistence on lexicalised WOCs compels us to adopt a non-traditional treatment of adjuncts. This radicality is an intended one, however, to make the contrast with the existent approaches clear. Though I intend to pursue the lexicalist possibility further, it is worth noting our central proposal, a 'head-driven' mechanism of word order specification, would essentially remain intact if the WOCs feature was introduced to phrasal heads as well. This move may pave way to a more plausible and powerful grammar, where one could state non-local word order conditions more naturally.

[11] Unboundedness would pose no problem to such a linearisation-based account as discontinuous phrases can be endorsed however long the interval may be, but the main difficulty would concern how to prevent the gap from being filled in some intermediate (non-leftmost) position.

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A unified analysis of French causatives

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Abstract

The treatment of French causatives and pronominal affixes outlined in Miller and Sag (1997) and Abeillé et al. (1998) is notable for its comprehensive coverage and analytic detail, but it relies on a number of *ad hoc* features and types that have little empirical justification. We sketch a new treatment of the same data set, which eliminates multiple lexical entries for the causative, as well as a number of other undesirable analytic devices. Our account builds on a long-standing observation that seeming irregularities in the system of case assignment to the "causee" of *faire* are not in fact exceptional, but determined by the general case assignment behavior of transitive verbs. This generalization, first incorporated into an HPSG analysis by Bratt (1990), was abandoned in subsequent HPSG work that sought to expand the coverage of French beyond that of Bratt's analysis. Our goal here is to show that broad coverage need not come at the expense of linguistically significant generalizations.

1 Introduction

1.1 The composition causative

The verb *faire* is the canonical French causative, exemplified by the following sentences from Miller (1991) and Abeillé et al. (1998).[1]

(1) a. Pierre fait écouter Jean à Marie
Pierre makes to.listen Jean.A Marie.D
'Pierre makes Marie listen to Jean'

b. Paul le-fera lire aux élèves de terminale
Paul it.A-will.make to.read the senior year students.D
'Paul will make the senior year students read it'

c. la chaleur a fait s'évanouir Paul
the heat.N has made SE.to.faint Paul.A
'The heat made Paul faint'

Within the lexicalist literature, a recent and successful trend in the analysis of French complex predicates has suggested that much of the internal structure assumed for (e.g.) English complex VPs is unjustified for French (Miller, 1991; Abeillé et al., 1998; Abeillé and Godard, 2000, 2002). In particular, certain verbs

[†]Thanks are due to Marie Catherine de Marneffe and Frédérique Passot for judgments; to Frank Richter, François Mouret, Olivier Bonami, Stefan Müller and others at the HPSG06 conference for their input; and especially to Danièle Godard and Anne Abeillé for generously giving their time and expertise to guide our analysis towards its final revision.

[1]In the glosses throughout, .N, .A and .D are used to differentiate between the nominative, accusative, and dative (à$_1$ in Miller's terms) arguments of a verb. We make no claims about the status of case in French. SE indicates a reflexive pronominal in the family *me, te, se...*

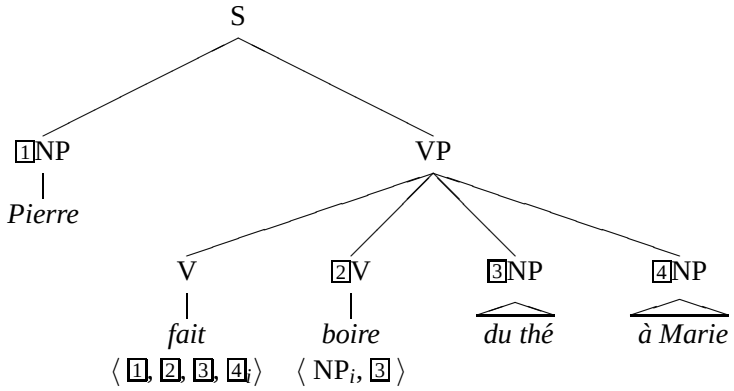


Figure 1: *'Pierre makes Marie drink tea'*

which appear to subcategorize for a dependent verb phrase have been successfully analysed as consisting of only a single VP, in which the embedded verb and all of its complements are treated as complements of the upstairs verb. This analysis applies to the causatives as well as certain other verbs, notably the tense auxiliaries. This analysis is achieved via the technique of "argument composition" (Hinrichs and Nakazawa, 1990), and results in a structure where the two verbs and all of their complements are sisters. An illustration is given in Figure 1.

One of the chief pieces of evidence for the flat VP is the placement of pronominal affixes,[2] which always appear on the finite verb, even when they are arguments of the subordinate verb. This can be seen in (1b), in which *le* ('it') is associated semantically with the downstairs verb *lire* but morphologically with the upstairs verb *fera* – it has "climbed". However, there is one exception: a class of pronominal affixes we will call *intrinsic* affixes, as well as the *se* family of reflexives, fail to climb onto the causative (although they do climb onto tense auxiliaries):

(2) a. La crainte du scandale a fait se-tuer le juge
the fear of.the scandal has made SE-to.kill the judge.A
'The fear of scandal made the judge kill himself/herself'

b. Cette décision fera en-vouloir à tout le monde à Jean
that decision will.make EN-to.want at everybody Jean.D
'Such a decision will make Jean angry at everybody'

The intrinsics are affixes that are lexically/idiomatically associated with a verb and carry no reference. For example, the verb *en vouloir* ('to get angry at someone') has an associated affix *en* which is identical in form to the general purpose pronominal

[2]Romance grammarians have often taken these dependent pronouns to be clitics. This has led to a terminological difficulty for modern lexicalist accounts, which follow Miller (1991), who argues at length that the "clitics" are in fact affixes by the criteria of Zwicky and Pullum (1983). We also follow Miller here and consistently use the term "affix", rather than "clitic".

en ('of them'), but does not contribute any independent meaning to the VP. In (2b), *en* does not climb onto the causative *fera*. Moreover, when any one intrinsic or reflexive is present on the subcategorized verb, *all* other affixal arguments of that verb must also be realized locally: they are "trapped". For example, in (3), the affix *en* is a regular indirect argument of the subcategorized verb which would usually climb and be realized non-locally:

(3) Marie a fait s'en-souvenir Jean
Marie has made SE.EN-to.remember Jean
'Marie made Jean remember it'

The presence of the reflexive *se*, however, traps it on the subcategorized verb.

A further subtlety in the behavior of composition causative verbs is the case that they assign their 'causee' argument. Curiously, the case marking of the causee seems to be dependent on properties of the embedded verb. Given an intransitive infinitive as complement, *faire* assigns accusative case to its causee; given a transitive infinitive, it assigns dative case:[3]

(4) a. Le prof fait lire l'élève
the teacher makes to.read the student.A
'The teacher makes the student read'

b. Le prof fait lire Proust à l'élève
the teacher makes to.read Proust the student.D
'The teacher makes ('to') the student read Proust'

This is equally true when the causee is realized as a pronominal affix, as it is in (5):

(5) a. Le prof le-fait lire
the teacher him.A-makes to.read
'The teacher makes him read'

b. Le prof lui-fait lire Proust
the teacher him.D-makes to.read Proust
'The teacher makes 'to' him read Proust'

However, certain verbs resist this generalization. In (6a), the subcategorized verb realizes no direct object, and yet the causee is dative. Likewise, in (6b) the causee is dative:

(6) a. Le prof lui/∗le-fait voir / comprendre
The teacher him.D/∗.A-makes to.see / to.understand
'The teacher makes him see / understand'

[3]French does not have a strong morphological case marking system. Subjects, objects and indirect objects are distinguished by differing (but syncretic) morphological forms when they are realized as pronominal affixes. When realized syntactically (as an NP), subjects and direct objects are not distinguished, but indirect objects appear with the dummy prepositional marker *à* (for a broadly compatible treatment, see Abeillé et al. (2005)).

b. Son chef lui/∗le-fait en-vouloir à tout le monde
her boss her.D/∗.A-makes EN-to.want at everyone
'Her boss makes her angry at everyone'

c. Il.fait se.les-laver aux/∗les enfants
he.makes SE.them.A-to.wash the children.D/∗.A
'He makes the children wash them (their hands)'

Even if we consider the intrinsic affix *en* to be a direct object, it is realized downstairs before argument composition occurs. Therefore, no unsaturated argument of *vouloir* can be visible when *faire* selects it, and so we would expect the intransitive behavior. The same problem is illustrated in (6c): the direct object of the downstairs verb is "trapped" on the subcategorized infinitive because of the presence of the reflexive *se*, and yet the causee case marking remains dative. If affixal realization suppresses an argument, as all analyses of which we are aware suggest, then one would expect an infinitive that has realized its direct object to pattern as an intransitive. Given these exceptions, it does not seem possible to rely on the simple generalization that the transitivity of the subcategorized verb determines the causee's case marking.

1.2 Miller and Sag 1997

In the first section, we listed three important facts that an analysis of the French composition causative should incorporate:

- the causative verb must compose the arguments of its subcategorized verb to give rise to the flat VP;
- pronominal affixes associated with the subcategorized verb must climb onto the causative, except where any among them is intrinsic or reflexive;
- the causee argument must be assigned the appropriate case, taking into account the transitivity generalization and its apparent exceptions.

The analysis presented by Miller and Sag (1997) (henceforth MS97) is the most comprehensive account of the causative that we are aware of, and will serve as our starting point.[4] Hence, we will assume a degree of familiarity with this analysis, including its type hierarchy (which will be similar to our own) and its basic treatment of morphology.

[4]A number of other authors have presented analyses influenced by Miller and Sag. Notable among them are Calcagno and Pollard (1999), who consider a broader range of causatives than we discuss here, and focus on providing a more elaborate and nuanced theory of argument realization and structural case, but not the details of pronominal placement. Crysmann (2003) attempts both to eliminate the type *aff* and to remove ad-hoc book-keeping features (an issue that we also address), while providing a uniform treatment for Italian. However, Crysmann's analysis does not address the issue of having multiple lexical entries for the causative.

MS97 succeeds in accounting for the above facts, though it does so at a cost – it posits additional "bookkeeping" features and types to capture the empirical data, rather than finding a parsimonious generalization. For example, MS97 subtypes words into *clitic-words* which have realized pronominal affixes, and *plain-words* which have not, despite there being little evidence that this distinction is ever selected for. It also imposes an almost equivalent distinction between *basic-verb* and *reduced-verb* to identify those verbs that have suppressed arguments by realizing them affixally. However, to state the selection restrictions of the causative and capture the trapping effect described above, it is necessary to assume that verbs that have realized arguments affixally as well as having intrinsic affixes are *basic-verbs* and not *reduced-verbs*. This stipulation reduces the distinction to an *ad hoc* descriptive solution.

Another expedient but undesirable device relied on by MS97 is the binary feature TRANS, used to stipulate the transitivity of a verb. In order to account for the apparent failure of some intransitives to respect the causee case marking generalization described above, transitivity is stipulated on a verb-by-verb basis, ignoring the actual length of the argument structure list. This is linguistically unnatural, reducing the notion of transitivity to an arbitrary distinction unrelated to ARGUMENT-STRUCTURE length. Moreover, in order to make this work, one has to posit two lexical entries for composition causative *faire*: one which selects for a [TRANS +] verb and assigns its causee dative case; and another which selects for a [TRANS −] verb and assigns its causee accusative case.

In this paper, we present a treatment of the composition causative *faire* based on Miller and Sag (1997) that equally well captures the facts described above, but which dispenses with the feature TRANS, the types *basic-verb*, *reduced-verb*, *plain-word* and *clitic-word* (though we instead make use of a book-keeping feature comparable to the former dichotomy), and the need for multiple lexical entries for *faire*. Instead, we suggest a principled lexical semantic basis for the phenomenon of differential causee case, and from this we derive a more parsimonious treatment.

2 Re-evaluating the data

As the issue of causee case marking is the least well treated in the existing literature, we will focus on it here. The basic pattern is shown in (4), repeated here as (7):

(7) a. Le prof fait lire l'élève
the teacher makes to.read the student.A
'The teacher makes the student read'

b. Le prof fait lire Proust à l'élève
the teacher makes to.read Proust the student.D
'The teacher makes 'to' the student read Proust'

$$\left[\text{ARG-ST} \quad \langle\, \text{NP}_i \,\rangle \oplus \boxed{A} \oplus \langle\, \text{NP}_j,\ \text{V}\left[\text{ARG-ST} \quad \langle\, \text{NP}_j \,\rangle \oplus \boxed{A}\right] \rangle\right]$$

Figure 2: Simplified lexical entry for composition causative *faire*

Given an argument composition analysis of the complex VP as described above, a natural way to capture the causee case-marking facts is given by Bratt (1990). First, we assume that the first object on every verb's argument structure is constrained to be accusative, and any further objects are required to be dative or oblique. Then, achieving the correct case-marking facts is simply a matter of performing argument composition in a novel way: rather than appending the subcategorized verb's arguments to the end of *faire*'s argument structure, we insert them before the causee. This constraint is schematized in Figure 2.

Now, when the subcategorized verb is transitive, its list of objects ($\boxed{A}$) is non-empty, and so the causee (NP_j) is not *faire*'s first object, and receives dative case. Only when the subcategorized verb is intransitive is $\boxed{A}$ empty, in which case the causee ends up the first object, receiving accusative case.[5] Thus the causee's case falls out naturally from the observation that French verbs take at most one accusative object (henceforth *Bratt's generalization*).

Unfortunately, this simple treatment does not deal with irregularities like (6a), repeated here as (8):

(8) Le prof lui/∗le-fait voir / comprendre
The teacher him.D/∗.A-makes to.see / to.understand
'The teacher makes him see / understand'

MS97 deals with the irregularities in the data through stipulation: although most intransitive verbs bear the value [TRANS −], certain verbs (such as the use of *voir* in (8) above) are lexically specified to be [TRANS +].

An alternative approach that would enable us to preserve Bratt's generalization would be to suppose that there is an invisible ("null") direct object on the argument structure of those seemingly intransitive verbs that pattern like transitives. This null object, indicated *pro*,[6] will be inherited as *faire*'s direct object and result in dative marking on the causee, as sketched in Figure 2.

At first glance, positing a null argument seems no less *ad hoc* than the feature TRANS. However, there does appear to be some linguistic justification for the presence of null arguments in French. The phenomenon of *null instantiation* has been studied in some depth (Fillmore, 1986): certain verbal arguments may be omitted according to verb-specific lexical licensing restrictions, and when appropriate

[5] In this simple sketch, we ignore the possibility of non-object items on the inherited ARG-ST. The final analysis given later resolves this issue.

[6] Here we assume that *pro* is a phonologically null subtype of *sign*, choosing terminology familiar from the analysis of unexpressed subjects. In work in preparation, Fillmore, Kay and Michaelis and Sag flesh out a typology of unexpressed arguments compatible with the analysis here. We assume that the daughters list of a phrasal construction may include any number of *pros*; thus they are "silently saturated".

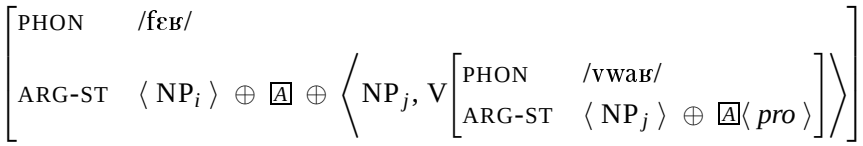


Figure 3: Deriving dative causee case marking given intransitive *voir*

pragmatic conditions are met. Lambrecht and Lemoine (2005) provide a typology of null instantiation for French based on Fillmore's work on English.

In Lambrecht and Lemoine's classification, and following Fillmore's, *indefinite null instantiation* (INI) refers to cases where the specific identity of the missing object is not and cannot be inferred from the context by the speaker. Such instances impose a "generic" interpretation of the missing argument. *Definite null instantiation* (DNI), on the other hand, is more closely related to anaphora. Missing objects whose specific referent is readily identifiable in context are classified as instances of DNI. The sentences in (9) illustrate INI, while (10) illustrates DNI:[7]

(9) a. Maman est occupée; elle.coud
mother is busy; she.sews
'Mother is busy; she is sewing'

b. Il-a encore bu
he-has again drunk
'He drank again'

(10) Je-jouais du piano. Puis nous-avons éteint
I-played piano. Then we-have turned.out
'I played piano. Then we turned out (the lights)'

We can compare this behavior with the problematic example given in (8). It appears that the intransitive use of *voir* which leads to dative case marking is an instance of (or is at least closely related to) DNI. The argument cannot receive a generic interpretation: there must be some appropriate referent that is seen for the sentence to be felicitous. Therefore, we claim that DNI missing objects are in fact present as *pro*s on the argument structure, though INI objects are truly absent.

Lambrecht and Lemoine (2005) also discuss the following contrast in acceptability between verbs with an INI object depending on their aspectual class:

(11) a. Une fois sortie de la forêt, on-voyait/#on-a vu de nouveau
once left from the forest one-saw/#one-has seen anew
'Once you were out of the forest, you could see again'

[7]These data are taken from Lambrecht and Lemoine (2005). It should be noted that these sentences were produced in natural casual speech, but are subject to quite specific contextual and pragmatic licensing and so may seem less acceptable out of context or in written form.

b. Deux heures plus tard, je-mangeais/#j'ai mangé de nouveau
two hours later, I-ate/#I.have eaten anew
'Two hours later, I was eating again'

The examples in (11) are intended as a continuation of a passage describing a situation where the speaker could temporarily not see, or was so full that they could not eat.

Both of these examples are well formed in the imperfect ('I was eating') but not the perfect ('I ate') construction. Lambrecht and Lemoine interpret this in terms of the inability of a definite referent to be the direct object of these verbs, as in these contexts, they are coerced from their default aspectual classes into a stative reading expressing the property of being able to see or eat:

> ... the perfect form *on a vu* 'you saw' would necessarily be interpreted as evoking a definite object referent (e.g. *on a vu ce qui s'était passé* 'you saw what (had) happened'). Likewise, ... the perfect form *j'ai mangé* would evoke the idea of a meal rather than some undefined edible thing. —Lambrecht and Lemoine (2005)

If this is the case, then we need not treat the fact that verbs like *voir* fail to obey the pattern of the transitive infinitive as an arbitrary lexical stipulation. Rather, it is the interpretation of the (missing) argument itself which is relevant, and the identity of the verb is only relevant insofar as it constrains the realization potential of that argument. In fact, we find occurrences of a causative combining with intransitive *voir* that *do* give rise to an accusative causee; such uses are exactly those where the interpretation of the argument carries a generic rather than specific reference:

(12) Jésus fait voir les aveugles
Jesus makes to.see the blind.A
'Jesus makes the blind see' (become able to see)

3 Analysis

3.1 The construction-based grammar

Following Sag (to appear) and Fillmore et al. (ms.), we model constructs as feature structures of the form sketched in Figure 4:[8] The immediate subtypes of *construct* are *lexical-construct* (*lex-cxt*) and *phrasal-construct* (*phr-cxt*), which form the top of the hierarchy of construct types sketched in Figure 5:[9]

[8]Note that we write type constraints as AVMs where the type specification is followed by an implication arrow, indicating that all objects of the specified type or its subtypes must obey the constraints given. We deliberately avoid writing the type name outside the AVM, as such notation is associated with the more expressive implications associated with RSRL-style HPSGs (Richter, 2004), in which an arbitrary feature structure description may be provided as the antecedent.

[9]Here *derv-cxt* abbreviates *derivational-construct*; *infl-cxt*, *inflectional-construct*; *pinfl-cxt*, *postinflectional-construct*; and *lex-item*, *lexical item*.

$$\begin{bmatrix} \textit{construct} \Rightarrow & \\ \text{MTR} & \textit{sign} \\ \text{DTRS} & \textit{list}(\textit{sign}) \end{bmatrix}$$

Figure 4: Type constraint on *constructs*

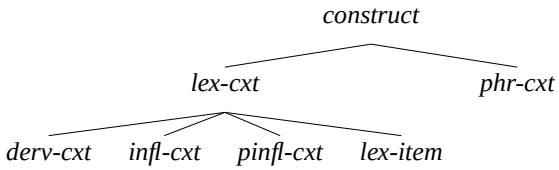


Figure 5: The construct type hierarchy

What then is a construction? According to Fillmore et al. (ms.), a construction is a constraint defining the properties that are common to all members of a family of constructs. That is, a construction is a constraint of the form shown in Figure 6, where *x-cxt* is the name of some construct type, i.e. some subtype of the type *construct*. Each construction licenses a grammatically distinctive class of constructs.

$$\begin{bmatrix} \textit{x-cxt} \\ \ldots \end{bmatrix}$$

Figure 6: A construction

Even lexical items, since they too are constructs, have a MTR and DTRS value. Lexical items are subject to a constraint requiring the DTRS value to be the empty list, which means that lexical entries will license constructs like the one in Figure 7. On this view of things, lexical entries are also constructions. That is, a lexical entry is a constraint that defines a class of lexical items. Larger signs are "constructed" from lexical items via lexical and phrasal constructions.

Much of the motivation for a construction-based analysis in HPSG has to do with delimiting the locality of selection (Sag, to appear). For this reason, the valency geometry is slightly different from Pollard and Sag (1994). In particular, the feature VAL(ENCY) is a list (of signs!) that contains all of a sign's valents that remain to be saturated, and EXTERNAL-ARGUMENT (X-ARG) is a list containing at most one privileged member of VAL (e.g. the subject of a verb).

3.2 Pronominal affixes

Rather than segregating pronominal affixes into pronominal (*p-aff*) and anaphoric (*a-aff*) types as Miller and Sag do, we instead introduce a binary feature INTRIN(SIC) on objects of type *aff*. Intrinsic affixes and reflexives carry the value [INTRIN +],

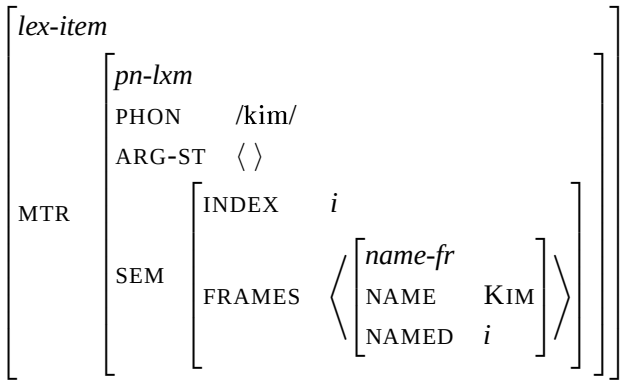


Figure 7: A lexical item

while all other affixes carry the value [INTRIN −].

In our proposal, a definite null realization of a verb's argument corresponds to the presence of a *pro* on argument structure. We claim that arguments suppressed by affixal realization have the same syntactic status as DNI arguments, and we formulate our treatment of affixal realization so as to ensure that these *pros* are present when an affix is realized. We do this via lexical constructions which remove an affixal element from ARG-ST (suppressing the argument) and which, in certain cases, insert a *pro* in its place. Rather than realizing the corresponding morphology at the moment that the argument is suppressed, we instead record the presence of an affix to be realized using a list-valued feature, PRAFS (PRONOMINAL-AFFIXES). This allows us to implement all of the morphological operations at a single point, using inflectional constructions to be described later.[10]

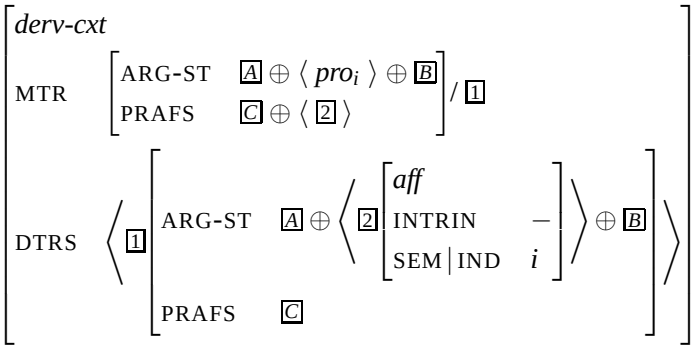


Figure 8: Nonintrinsic pronominal affixation construction

Each of the two lexical constructions in Figures 8 and 9 suppresses a single *aff*

[10] In an earlier version of this paper presented in Varna in summer 2006, we attempted to define a single construction which replaced all the relevant *affs* with *pros* in one step. However, its formulation went beyond the descriptive power of the constraint logic we assume here, and we consider the introduction of the feature PRAFS and addition of an extra construction preferable to extending the mathematical basis of the theory.

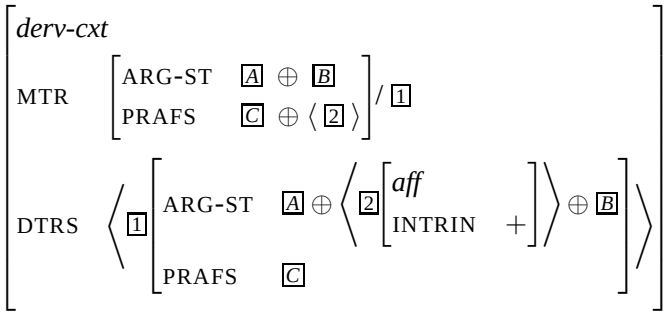


Figure 9: Intrinsic pronominal affixation construction

argument, and records the identity of that affix in the PRAFS list. Figure 8 only applies to lexemes with a [INTRIN −] affixal argument. The affix is removed from the argument structure, but a *pro* is inserted in its place. The second construction, in Figure 9, instead removes intrinsic affixes, and does not replace the removed argument. Hence, we ensure that verbs realizing a reflexive direct object have the same valency as intransitives, correctly predicting the causee's case in sentences like the following:

(13) Paul fait se.raser Figaro
Paul makes SE.shave Figaro-ACC
'Paul makes Figaro shave himself'

"Clitic climbing" and "clitic trapping" are discussed below.

The feature PRAFS performs a "bookkeeping" function – it records the feature structure's progress through a multi-step operation. It is comparable to the CLTS feature of Monachesi (1999). However, because we make PRAFS a feature of *lexeme* and not *word*, the distinction between units which have and which have not suppressed *aff* arguments is visible only to the morphology, and not to the syntax. This prevents a syntactic constraint from selecting directly for a word with certain affixes, which remains a technically available, but unattested possibility for Monachesi's grammar.

3.3 Inflectional constructions

In the construction-based grammar, *lexemes* are promoted to *words* by an *inflectional-cxt*. Subtypes of this construct correspond to the different parts of speech; verbs are handled by constructs of type *verb-infl-cxt*. There are a large number of constructions describing *verb-infl-cxt*s: one for each verb inflection class. However, as pronominal affixes are realized in basically the same way, regardless of the affixal ending, we can declare the necessity to realize pronominal affixes just once, as a constraint on all such constructions, as sketched in Figure 10.

The function `affix` takes three arguments: the syntactic category of the host, the (inflected) morphological form of the host, and and a list of pronominals to be affixed. The constraint in Figure 10 leaves the morphological form unspecified,

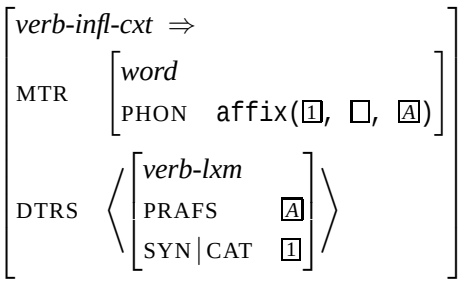


Figure 10: Type constraint on *verb-infl-cxt*s

leaving it to be filled in by the actual inflectional constructions. Space limitations preclude a detailed discussion of the morphological procedure that is implemented by `affix`, but this function behaves much like Miller and Sag's F_{PRAF}, a fairly trivial mapping between inflected verb forms and the fully affixed forms.

One property of F_{PRAF} crucial to the MS97 analysis is the requirement that the morphological realization of any affix on a past participle be null – French past participles can never host pronominal affixes. In MS97, this is guaranteed by a statement that F_{PRAF} is the identity function when given a past participle as argument, even if that participle has affixal arguments. The necessity for this stems from assumptions about structure sharing: in the case of auxiliary-participle constructions (unlike other flat complex VP constructions), *aff*s inherited from the participle appear on the argument structure of both the auxiliary and the subcategorized participle. As MS97 also states that an *aff* is always realized on the word in whose argument structure it appears, it should predict that an affixal argument of a participle is realized twice, on both the participle and the auxiliary.

In our analysis, by contrast, *aff* arguments and the morphological realization corresponding to them have complementary distribution. Only when a lexical construction has moved the *aff* to the PRAFS list will it be realized. We can therefore do without the stipulation that past participles realize their affixes covertly. Instead, we state that `inflect` is only a partial function, having no resolution given a past participle and any list of affixes other than the empty list. This is in fact a significant improvement: since the application of F_{PRAF} to any past participle yields a valid (but unaffixed) form, the MS97 account wrongly predicts that participles used outside of tense auxiliary constructions (for example, as noun modifiers) may have affixal arguments which are *never* realized.[11]

The initial value of PRAFS on all lexemes licensed directly by a lexical item is the empty list. This is simply to say that any affixes that end up realized must first

[11]The problems with MS97's definition of F_{PRAF} are even more striking when similar phenomena are considered cross-linguistically. Italian, for instance, does not prohibit affixation on past participles in all cases; in fact, it only prohibits them in auxiliary constructions (Monachesi, 1999). If we relax for Italian the statement that `inflect` cannot be resolved to an affixed past participle, our analysis goes part way towards predicting the Italian data without generating the ungrammatical "double realization" VPs that MS97 must avoid by stipulation. We leave a fuller investigation of the application of this approach to Italian for subsequent research.

have been introduced on the argument structure. We specify this with the constraint on *lex-items* in Figure 11.

$$\begin{bmatrix} \textit{lex-item} \Rightarrow & \\ \text{MTR} & \begin{bmatrix} \textit{lexeme} & \\ \text{PRAFS} & \textit{elist} \end{bmatrix} \\ \text{DTRS} & \textit{elist} \end{bmatrix}$$

Figure 11: Type constraint on lexical items

An example of an inflectional construction which produces the third-person singular form of a regular *-er* verb is given in Figure 12.

$$\begin{bmatrix} \textit{verb-infl-cxt} & \\ \text{MTR} & \begin{bmatrix} \text{PHON} & \texttt{inflect}(\square, \boxed{2}, \square) \\ \text{SYN} & \begin{bmatrix} \text{X-ARG} & \langle\ \text{NP}[\textit{3sg}]\ \rangle \\ \text{CAT}\,|\,\text{VFORM} & \textit{fin} \end{bmatrix} \\ \text{SEM} & \ldots \end{bmatrix} / \boxed{1} \\ \text{DTRS} & \left\langle \boxed{1}\begin{bmatrix} \text{STEMS}\,|\,\text{SLOT-3} & \boxed{2} \end{bmatrix} \right\rangle \end{bmatrix}$$

Figure 12: A simplified *inflectional-cxt*

We adopt the theory of inflection presented by Bonami and Boyé (this volume), which assumes that morphological information on the lexeme is encoded as a *stem space*, with a feature for each slot in the inflectional paradigm, and where regularity is encoded as constraints on those slots. A fuller exposition of this theory as it applies to French verbs is given in Bonami and Boyé (2006). Our analysis does not depend on this, however, and is compatible with other treatments of morphology.

Most inflections are instantiated by a family of constructions much like Figure 12, and we will not spell out the details of the morphological paradigms here. For infinitives, we require a slightly more constrained construction, because we need to limit the infinitives that causative *faire* can combine with. It is the "trapping" property which is at issue here: we need to ensure that pronominal arguments of the downstairs verb obligatorily climb, unless they are accompanied by an intrinsic affix, in which case they must be realized on the infinitive. This amounts to saying that *faire* selects for either (1) an infinitive that has no intrinsic arguments and realizes no pronominal affixes or (2) an infinitive that has realized all its pronominal affixes, among which is at least one intrinsic.

Related properties of German embedded infinitivals led Bech (1955) to identify two classes of constructions: (1) the coherent constructions, where two verbs (or more) are adjacent and both verbs' arguments appear to function as arguments of the 'higher' verb, and (2) the incoherent constructions, where the verbs display the expected biphrasal behavior. With this precedent, we subtype the VFORM value

inf(*initive*) into two classes: *coh-inf* (*coherent-infinitive*) and *inc-inf* (*incoherent-infinitive*). This typing is shown in Figure 13.

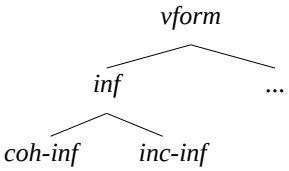


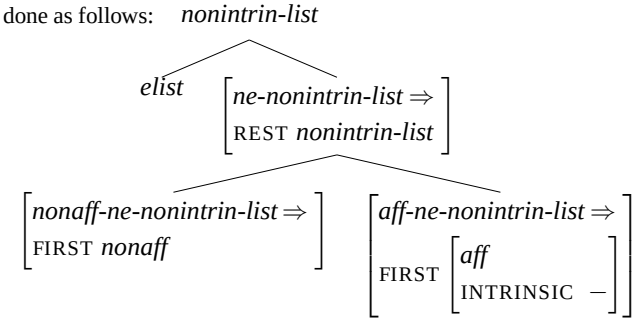
Figure 13: Subtypes of infinitive

Of course, this division is very similar to the distinction drawn in MS97 and in Abeillé et al. (1998) between *basic-verb* and *reduced-verb* – two subtypes of *head*. However, there are clear differences. Crysmann (2003) points out that MS97's type distinction should prohibit coordinations of basic verbs and reduced verbs, which he argues can be perfectly grammatical. Our system is not directly vulnerable to this criticism, since our coherence distinction does not express the actual presence or absence of pronominal affixes, but rather the suitability of the infinitive to be the subcategorized verb in an argument composition cluster. Infinitives that realize pronominals and those that don't may be coordinated, as long as their VFORM values resolve to the same coherence type (the same subtype of *inf*).

With these types in hand, we can proceed to specify inflectional constructions for infinitives that license coherent and incoherent infinitives. We place no constraints on the incoherent infinitives; any verbal lexeme may resolve to license an incoherent infinitive word. However, there are two narrow possibilities for the coherent infinitives: those which realize no affixes and have no intrinsic arguments, and those which realize all their affixes and have intrinsic arguments. This state of affairs is illustrated in Figure 14.

For an infinitive that realizes no pronominal affixes to be coherent, it must have no intrinsic affixes on its argument structure (since these must not be allowed to climb). We specify that the argument structure in this case is a *nonintrin-list*, a subtype of *list* which is guaranteed to contain no *affs* that are [INTRIN +]. This can be effected through the type inheritance system much as standard lists are implemented.[12]

[12]For example, this could be done as follows:



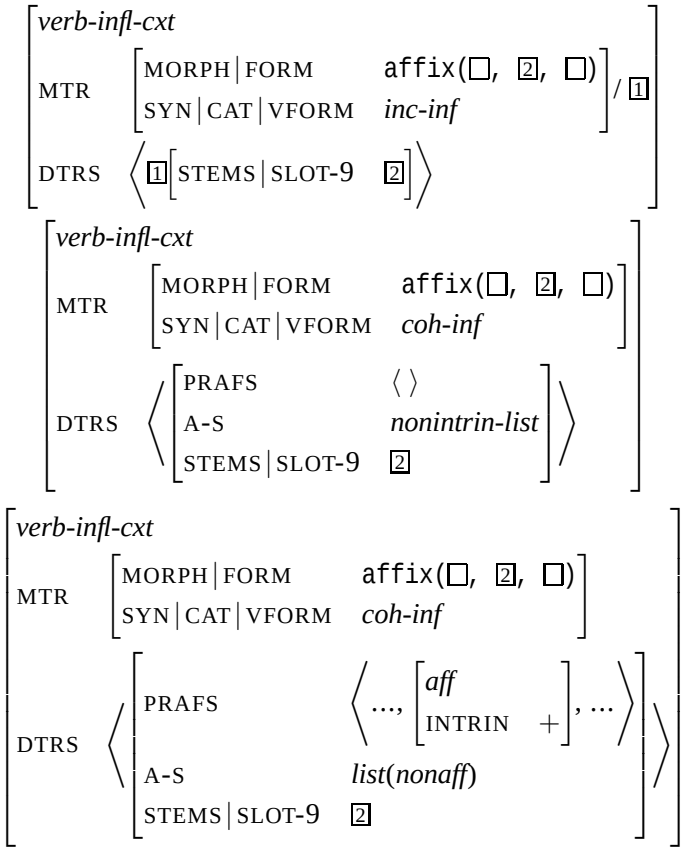


Figure 14: The infinitive inflectional constructions

3.4 Argument composition

In order to implement Bratt's generalization, we rely on a number of general structural properties of the language. First, we assume a standard obliqueness ordering of all ARG-ST lists: subjects precede direct objects, which precede indirect objects, which precede other arguments and then other adjuncts. Next, we capitalize on the fact that French verbs are either intransitive or transitive, but they never have more than a single direct object NP. In Figure 15 we sketch an appropriate simple structural case system: XP^{dir} abbreviates an unmarked direct argument (i.e. a subject or direct object) and XP^{obl} abbreviates a more oblique argument, encompassing indirect objects, prepositional and complement phrases, and predicative NPs.

We tacitly assume a theory of prepositions and oblique argument markers in the spirit of the "weak heads" of Tseng (2002), Abeillé et al. (2005) or Miller (1991). These authors suggest that certain apparent prepositions are in fact not the head of a PP, but something more like a *marker* modifying an NP, in much the same way as the treatment of complementizers given in Pollard and Sag (1994). The precise

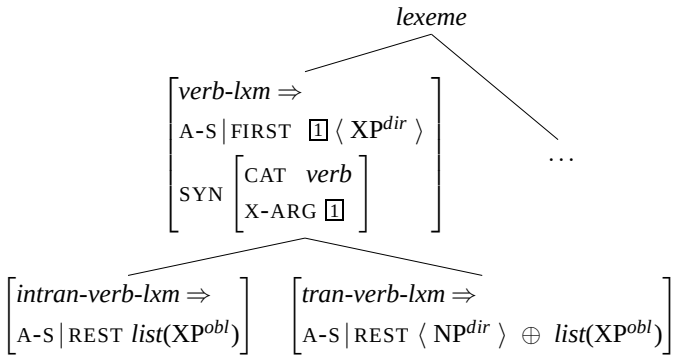


Figure 15: Constraints on lexeme types

details of this are not important for our purposes; all that is necessary is that we be able to underspecify a noun phrase so that it can resolve to be either a direct object or an indirect object – this is the status of the causee argument in our treatment.

Having set the stage in this way, the lexical entries for the complex predicate verbs are quite simple: both the causative (Figure 16) and tense auxiliary (Figure 17) compose the argument structure (A) of a subcategorized verb into their own argument structure. The causative additionally introduces a causee argument which is coindexed with the unexpressed subject of the subcategorized verb (NP_j). This argument is underspecified for case, so by constraints on *tran-verb-lexeme* in Figure 15 it must resolve to be direct (accusative) if it is the first object, or indirect (dative) if not.[13] The causee must resolve to be either a direct (accusative) or indirect (dative) object, and it is placed among the arguments inherited from the subcategorized verb. The subcategorized verb will have assigned appropriate case marking to its own arguments by the same constraints. So, if it is transitive, there will be an accusative object which must resolve as a member of A, meaning that the causee will be non-initial, and resolve to be an indirect object. If the verbal complement is intransitive, then A will resolve to the empty list, as the causee must resolve to either a direct or indirect object; *faire* is a *tran-verb-lxm* and hence requires a direct object. Thus we preserve Bratt's generalization.

It is worth noting that we only mention ARG-ST, and never VALENCE in our constraints. Previous treatments have varied in using valency or argument structure as the locus of composition. MS97 and Abeillé et al. (1998) make use of an argument structure/valency discrepancy to predict the different behavior of tense auxiliaries (which were taken to perform argument composition on ARG-ST) and the composition causative (which composed from the COMPS list). Because we do not rely on this distinction, we can retain the standard argument realization principle and assume that ARG-ST and VAL are identified in the normal case. Thus,

[13] We assume that the causee can be underspecified in such a way that it can resolve to a direct or indirect object, but nothing more oblique. It is possible to define a typing within a theory of structural case typing that allows this, but doing so is well beyond the scope of this paper.

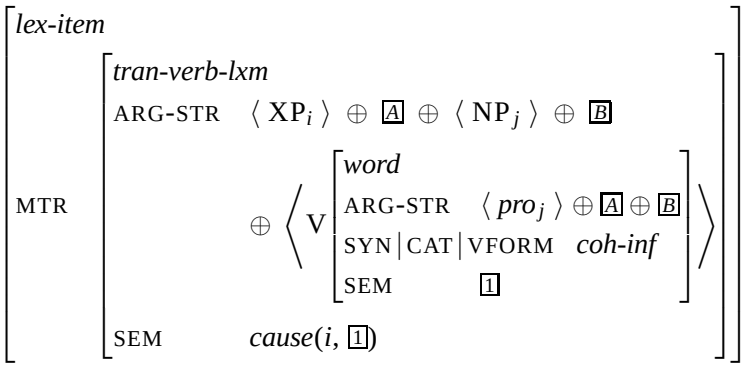


Figure 16: Lexical entry for composition causative *faire*

although we assume here that it is ARG-ST which is relevant, nothing hinges on this.

The entry for the tense auxiliary in Figure 17 simply inherits all of its participial complement's arguments. The possibility that the participle might realize any affixal arguments is ruled out by the morphological function `affix` as discussed in section 3.3.

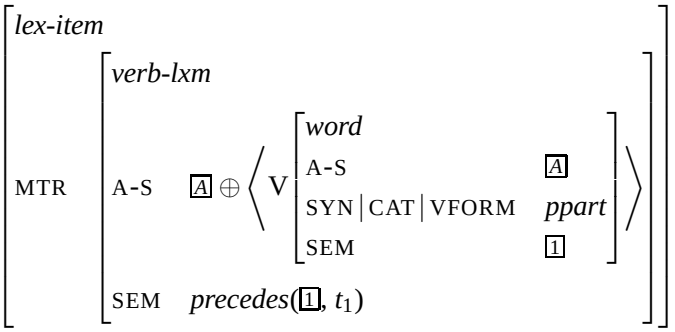


Figure 17: Lexical entry for tense auxiliary *avoir*

4 Summary

Our analysis improves on that of Miller and Sag (1997) in the following ways:

- It specifies a uniform analysis for composition *faire*, without needing multiple lexical entries, and it captures Bratt's generalization.
- It does so so in a principled way, appealing to the notion of null instantiation (Fillmore, 1986; Lambrecht and Lemoine, 2005; Fillmore et al., ms.).
- It eliminates much of Miller and Sag's partitioning of the type hierarchy, including:

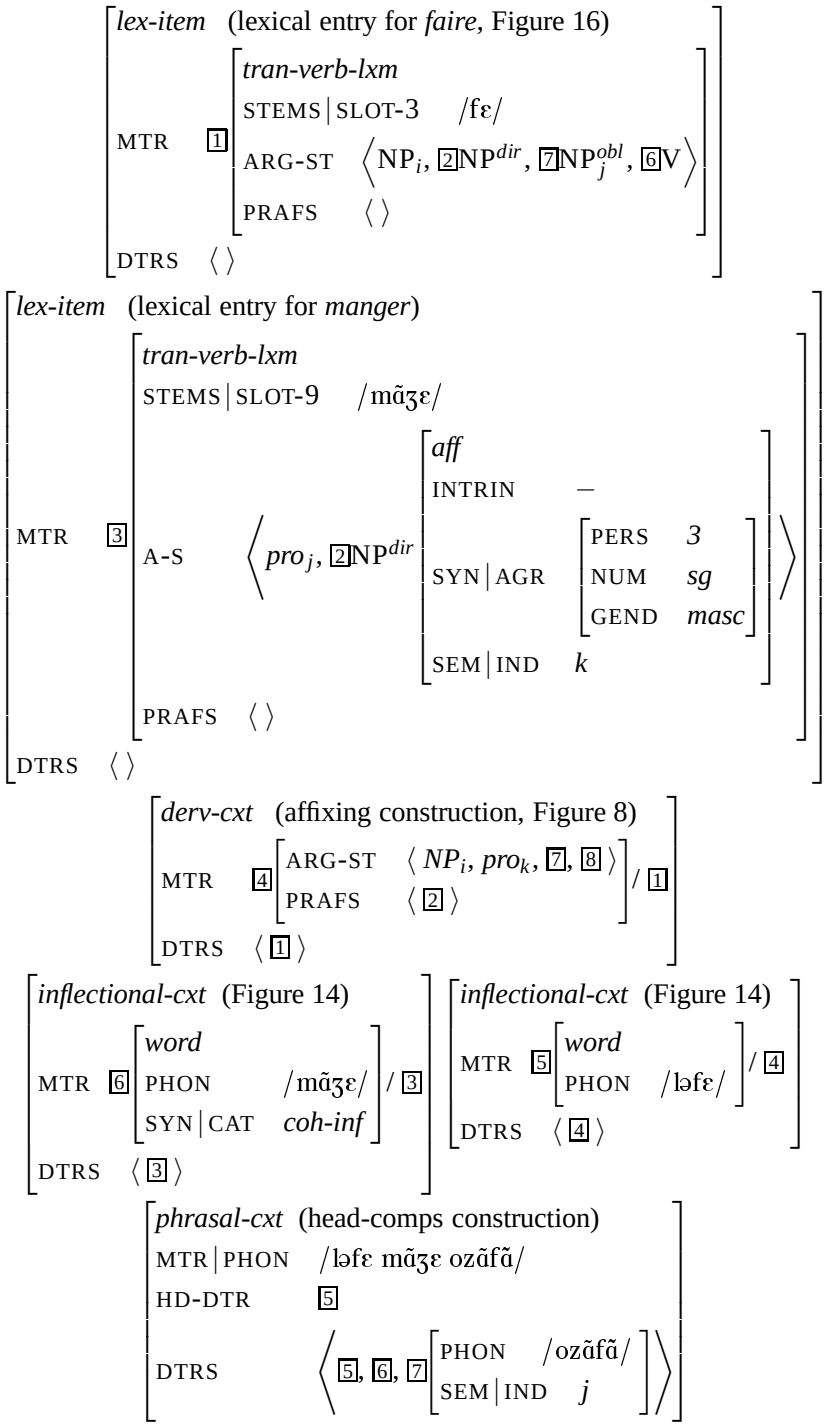


Figure 18: Partial analysis of *le fait manger aux enfants* ('make the children eat it')

  - the distinction between *plain-word* and *clitic-word*, which is now invisible to the syntax;
  - the distinction between *reduced-verb* and *basic-verb* (we retain a similar distinction in *coh-inf/inc-inf*, as discussed below)
  - the distinction between *a-aff* and *p-aff*. (Naturally, the binding theory must still have a way to discriminate between referential and anaphoric pronouns, but it can now be stated as a semantic property.)

- It dispenses with the *ad hoc* feature [TRANS $\pm$], and reverts to an empirical notion of transitivity as determined by argument structure.

The cost of these improvements are the additional features INTRIN and PRAFS, the subtyping *coh-inf/inc-inf*, and a number of new constructions.

The INTRIN feature is justified, as (1) there are nonintrinsic and intrinsic variants of every pronominal other than the reflexives, and (2) the non-existence of nonintrinsic reflexives shows that intrinsic status is a property of pronominals themselves rather than of the verbs that select them. The PRAFS feature and the constructions that move affixes from ARG-ST to PRAFS allow a complex operation (the replacement of a number of *affs* with *pros*) to be stated as several simpler steps. PRAFS is a *lexeme* feature, and so is not available to be selected syntactically. The *coh-inf/inc-inf* distinction is an improvement on MS97's *red-vb/bas-vb* in that (1) it is limited to infinitives, (2) it does not make incorrect predictions about coordination potential, and (3) it is motivated by similar phenomena cross-linguistically (Bech, 1955). Other than the two affixing constructions that process PRAFS, the only new constructions are the *inflectional-cxts* for infinitives that distinguish between coherent and incoherent infinitives. Any grammar must assume at least one *inflectional-cxt* for infinitives, so our net addition to the grammar is minimal.

We have outlined a treatment of pronominal affixes and their behavior under the composition causative and other argument composition verbs which continues an HPSG tradition of providing broad-coverage formal grammars for French. In doing so, however, we have eliminated a number of *ad-hoc* descriptive devices and have replaced them with a more principled linguistic account that appeals to null instantiation and argument composition to derive comparable coverage.

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Part II
Contributions to the Workshop

Deriving inflectional irregularity

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Head-Driven Phrase Structure Grammar

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Abstract

Conventional wisdom holds that productive morphology is regular morphology. Drawing evidence from French, we argue that the description of many lexeme formation processes is simplified if we hold that a productive rule may give rise to inflectionally irregular lexemes. We argue that the notion of a *stem space* allows for a straightforward description of this phenomenon: each lexeme comes equipped with a vector of possibly distinct stems, which serve as bases for inflectional form construction. The stem space is structured by default relations which encode the regular pattern of inflection; (partial) irregularities occur when a lexeme specifies a stem space violating the default relations. Derived irregularity is then the effect of a productive lexeme formation rule which specifies an irregular stem space for its output.

1 Productive irregular inflection

1.1 Background

A central issue in the modeling of inflection is how the notion of (ir)regular inflection is taken into account. A distinct possibility is to give the notion no theoretical status (see e.g. Stump, 2001). For morphologists that seek to preserve the intuition that irregular inflection necessitate specific modeling, there are two options. Either we take regularity to be a design property of morphological systems, and thus try to model every possible process as regular, limiting irregularity to the description of blatant suppletion phenomena; this position is the default for most morphophonological work in the tradition of Chomsky and Halle (1968), and is strongly defended by proponents of distributed morphology (Halle and Marantz, 1993). Or we take regularity to be an empirical property, that is manifest in performance: speakers are able to inflect an unknown lexeme according to a regular pattern, but will not be able to inflect a lexeme according to an irregular pattern. This position is assumed in much of the psycholinguistic litterature on inflection, and defended forcefully, if somewhat partially, by Pinker (1999) and work cited therein.

In this paper we assume the second position. Note that we do not commit ourselves to any particular view of the processing of inflection, but simply assume that (ir)regularity is a real grammatical phenomenon, that is manifest not only in psycholinguistic behavior but also in language change and in synchronic grammar. Our main empirical argument concerns the status of lexeme formation rules: we show that despite conventional wisdom, the output of lexeme formation rules should not always be considered inflectionally regular.

#	lexeme	trans.	ms. sg.	fem. sg.
(i)	RAPIDE	'fast'	/ʁapid/	/ʁapid/
(ii)	VIEUX	'old'	/vjø/	/vjɛj/
(iii)	PETIT	'small'	/pəti/	/pətit/
(iv)	BREF	'brief'	/bʁɛf/	/bʁɛv/
(v)	GITAN	'gipsy'	/ʒitɑ̃/	/ʒitan/
(vi)	RAGEUR	'rageful'	/ʁaʒœʁ/	/ʁaʒøz/
(vii)	DIRECTEUR	'directorial'	/diʁɛktœʁ/	/diʁɛktʁis/

Table 1: Inflection of a few adjectives in the singular

1.2 French adjective inflection

French adjectives inflect for both gender and number. Here we concentrate on singular forms of the adjectives. Table (1) gives a sample of inflectional forms for a number of typical adjectives. Case (i) clearly corresponds to a regular pattern: identical forms in the masculine and the feminine is what happens for the majority of existing French adjectives, as well as for borrowed adjectives and for adjectives formed by nonconcatenative morphological processes such as clipping (e.g. *sensas*, clipped form of *sensationnel* 'sensational' is /sɑ̃sas/ in the masculine and the feminine). It is also the pattern used by speakers facing a novel adjective not resembling anything known. Case (ii) clearly corresponds to an irregular pattern, since it holds for exactly one lexeme, and is usually treated as a case of suppletion.

Cases (iii) through (v) are the object of some debate in studies on French adjectives. In generative descriptions of French morphophonology, starting with Schane (1968), these are usually considered to be regular cases exhibiting phonologically governed alternations; but one may doubt that this is the whole story, since there are numerous nonalternating adjectives that meet the description of the relevant rule. For instance, case (iii) is described by Dell (1985) by postulating an underlying form /pətit/, and a rule deleting word final obtruants. This rule does not apply in the feminine, because the feminine morpheme is a suffix /ə/ which will be deleted later in the derivation. Yet there are non-alternating obstruent-final adjectives, such as *mat* 'matte', *net* 'clean', *bath* 'hip', *out* 'out', etc. Similar rules postulated to account for (iv) and (v) face problems with nonalternating *paf* 'drunk', *ouf* 'crazy', *gnangnan* 'soppy', *marron* 'brown'. Thus a more realistic analysis would take the inflectional alternations to be the manifestation of a variety of inflectional classes of adjectives. Concretely, we assume four different inflectional classes, specifying the functions in table 2 as exponents for masculine and feminine singular.[1] In such a setting we end up with two distinct notions of (ir)regularity: a regular lexeme belongs to the default, first inflectional class. Being irregular may either mean be-

[†]We thank the reviewers and the audience of the HPSG06 conference, and in particular Berthold Crysmann and Ivan A. Sag, for their comments and suggestion. The analysis presented in section 3 benefited considerably from discussions with Aurélien Giraud.

[1]We assume throughout an inferential-realizational approach to inflection (Stump, 2001).

class	example	proposed stem	ms. sg.	fem. sg.
A	RAPIDE	/ʁapid/	id	id
B	PETIT	/pətit/	delete final C.	id
C	BREF	/bʁɛ/	⊕/f/	⊕/v/
D	GITAN	/ʒita/	nasalize final V.	⊕/n/

Table 2: Inflectional classes for adjectives (first version)

longing to a nondefault inflectional class, like *petit*, or specifying suppletive forms, like *vieux*.

1.3 The problem: adjectives in *-eur*

The most interesting cases in table 1, cases (vi) and (vii), are not usually discussed in the context of adjective inflection. What is interesting is that adjectives in these classes have a uniform formation: class (vi) adjectives are all the output of a rule forming adjectives from the basic stem of the verb (the stem occurring in the present indicative 1pl and 2pl); class (vii) adjectives are the output of a rule forming adjectives from a 'Latinate' stem of the verb, which is formed by suffixing /at/ to the basic stem in most cases, but may take other forms. Note that both formation rules have the same categorial and semantic effects, to the point that many descriptions of French do not recognize them as distinct rules; yet their morphophonology is clearly distinct.[2]

Now, there is little hope of treating adjectives in classes (vi) and (vii) as cases of regular inflection. First, the relation between the masculine and the feminine cannot be seen as the effect of a regular phonological alternation: starting from the masculine, we have three options for forming the feminine of an adjective ending in /œʁ/, either /øz/ (as in *rageuse* /ʁaʒøz/), /ʁis/ (as in *directrice* /diʁɛktʁis/)

[2]Most studies of French derivational morphology do not explicitly discuss adjectives in *-eur*. This is certainly due to the fact that many adjectives in these two classes are homophonous with an agent noun, so that it is usually assumed without discussion that the noun is derived from the verb and the adjective a converted noun. Two arguments show that this is not correct. First, Corbin and Corbin (1991) shows that while it is easy to derive the nominal semantics from the adjective, the opposite route is problematic. Second, there are good reasons to think that gender is not an inflectional category for nouns in French: most nouns, including quite a number of human-denoting nouns (e.g. *personne* 'person') are found in only one gender, and apparent cases of gender-opposed pairs are best analyzed as pairs of independent lexemes related by mere semantic closeness (e.g. *bouc* 'male goat' vs. *chèvre* 'female goat'), derivational rules (e.g. *dinde* 'female turkey' vs. *dindon* 'male turkey') or parallel derivation from adjectives (e.g. *italien* 'male Italian' vs. *italienne* 'female Italian'). But if nouns have just one gender, then there is no single noun lexeme that could serve as the base for conversion for the masculine and feminine forms of the adjective *directeur*. On the other hand, if the adjective is the base, then the nouns *directeur* and *directrice* are the result of two parallel conversion processes from the adjective.

or /œʁ/ (as in *inférieure* /ɛ̃feʁjœʁ/ ‘inferior’). If we start from the feminine, we also have two options for the masculine of an adjective in /øz/: either /œʁ/ (as with adjectives in class (vi)) or /ø/ (as in denominal adjectives such as *respectueux* ‘respectful’, etc.).

Second, we might assume that cases (vi) and (vii) correspond to two further inflectional classes of adjectives, specifying respectively $\langle \oplus/\text{œʁ}/, \oplus/\text{øz}/ \rangle$ and $\langle \oplus/\text{œʁ}/, \oplus/\text{ʁis}/ \rangle$ as exponents in the singular. Yet these inflectional classes would have the very peculiar feature of each containing only lexemes derived from a single formation process. This contrasts strongly with the classes discussed in table 2, which all contain both derived and root lexemes, as exemplified in (1).

(1) Class A:
   i. *rapide* ‘fast’, *joli* ‘pretty’, *gai* ‘joyful’, etc.
   ii. *bancaire* ‘(of a) bank’, *mortel* ‘mortal’, *algébrique* ‘algebraic’, etc.

   Class B:
   i. *petit* ‘small’, *grand* ‘large’, *gros* ‘big’, etc.
   ii. *venteux* ‘windy’, *grossier* ‘crude’, *lyonnais* ‘from Lyon’, etc.

   Class C:
   i. *bref* ‘brief’, *naïf* ‘naïve’, etc.
   ii. *pensif* ‘thoughtful’, *alternatif* ‘alternative’, etc.

   Class D:
   i. *bon* ‘good’, *fin* ‘thin’, *plan* ‘flat’, etc.
   ii. *alpin* ‘alpine’, *euclidien* ‘Euclidian’, *pâlichon* ‘pale-ish’, etc.

We conclude that no satisfying analysis of adjectives in *-eur* is forthcoming in a traditional morphological setting. The following sections show that introducing the notion of a *stem space* offers a third, more satisfying possibility.

2 Motivating the stem space

2.1 The stem space of French verbs

Starting with (Aronoff, 1994), a number of recent studies challenge the idea that lexemes are associated with a single phonological representation, the lexeme’s stem. Lexemes should rather be associated with a vector of possibly different phonological representations, what Bonami and Boyé (2002) call a *stem space*; each inflectional or derivational rule specifies which coordinate in the vector it uses as its input. Such analyses have been proposed, among others, by Aronoff (1994) for Latin conjugation, Sadler et al. (1997) for Russian nominalizations, Brown (1998) for Russian conjugation, Pirelli and Battista (2000) for Italian conjugation, Stump (2001) for Sanskrit declension, Bonami and Boyé (2002) for French conjugation, Boyé and Cabredo Hofherr (2006) for Spanish conjugation. We illustrate with evidence from French for uniformity.

lexeme	1sg	2sg	3sg	1pl	2pl	3pl
LAVER ‘wash’	/lav/	/lav/	/lav/	/lav-ɔ̃/	/lav-e/	/lav/
TORDRE ‘bend’	/tɔʁ/	/tɔʁ/	/tɔʁ/	/tɔʁd-ɔ̃/	/tɔʁd-e/	/tɔʁd/
MOURIR ‘die’	/mœʁ/	/mœʁ/	/mœʁ/	/muʁ-ɔ̃/	/muʁ-e/	/mœʁ/
BOIRE ‘drink’	/bwa/	/bwa/	/bwa/	/byv-ɔ̃/	/byv-e/	/bwav/

Table 3: Present indicative conjugation

Inflectional systems often exhibit alternations which have no synchronic phonological motivation and concern arbitrary subparts of the paradigm. For instance, in French, in the present indicative, there is a partition between (i) the three singular forms, (ii) the plural 1 and 2 forms, and (iii) the plural 3 form. While there is a systematic similarity between members of each cell in the partition,[3] the content of the different cells may differ in arbitrary ways, as illustrated in table 3.

One can account for this pattern by assuming that French verbal lexemes come equipped with a stem space with at least three slots.[4] Each inflectional rule specifies which slot it uses as a base, and what phonological modification is made on this base. Slot 1 serves as the base for present 1pl and 2pl inflection, slot 2 serves for 3pl, and slot 3 for singular forms.

A direct advantage of the stem space is that it allows for an account of the diversity of patterns of irregular conjugation. In French, fully regular (so-called ‘first group’) verbs have identical stems in slots 1, 2, and 3. Irregular verbs may need either two or three distinct stems, but an exhaustive examination of the French lexicon shows that no verb has identical stems in slots 1 and 3 but a different stem in slot 2. Bonami and Boyé (2002) proposes to account for this by stating that the slots are related by default relations, which may be overruled by irregular lexemes. Slot 1 is identical to slot 2 by default, and slot 2 is indentical to slot 3, but there is no default relation between slot 1 and 3, which accounts for the observed pattern.

Further evidence for the stem space comes from the fact that lexeme formation rules are also sensitive to different slots. For instance, as illustrated in table 4, the rule constructing deverbal adjectives in *-eur/-euse* uses slot 1 as its base, while the rule constructing nominal V-N compounds relies on slot 3.

2.2 The stem space of French adjectives

A different type of argument in favor of the notion of a stem space comes from the inflection of French adjectives. In section 1, we suggested an analysis of French

[3]With the exception of a handful of maximally irregular verbs; see Bonami and Boyé (2002) for discussion.

[4]In a full analysis of French conjugation, 12 distinct slots are necessary.

base	stem 1	stem 3	*eur*/*euse* Adj.	V-N compound
laver ‘wash’	/lav/	/lav/	laveur /lavœʁ/ ‘washer’	lave-mains /lavmɛ̃/ ‘washbowl’
tordre ‘bend’	/tɔʁd/	/tɔʁ/	tordeur /tɔʁdœʁ/ ‘bender’	tord-boyaux /tɔʁbwajo/ ‘rotgut’
boire ‘drink’	/byv/	/bwa/	buveur /byvœʁ/ ‘drinker’	boitout /bwatu/ ‘stemless glass’
soutenir ‘support’	/sutən/	/sutjɛ̃/	souteneur /sutənœʁ/ ‘pimp’	soutien-gorge /sutjɛ̃gɔʁʒ/ ‘bra’

Table 4: Two lexeme formation processes

adjectives in terms of inflectional classes specifying the relationship between a single stem and two inflectional forms. The following data from Bonami and Boyé (2005) shows that this analysis is inadequate.

First, French adjectives take a special form in the masculine singular when preceding a vowel-initial noun, which we call the Masculine Singular Liaison Form (MSLF).[5] That this is a distinct inflectional form of the adjective is shown by the fact that it can be suppletive or defective (Morin, 2003). But when it is not, the form is either identical to the ‘ordinary’ masculine singular or to the feminine singular (table 5), in accordance with the generalization in (2). This situation is problematic, because for some adjectives there is a discrepancy between the morphosyntactic features manifested in syntax (masculine singular) and the morphosyntactic features expressed by the form (feminine singular).[6]

(2) If the masculine singular form ends in a consonant, then the MSLF is identical to the masculine singular. Otherwise it is identical to the feminine singular.

Second, French deadjectival adverbs in *-ment* are systematically formed on the feminine form, as illustrated in table 5. This is so despite the fact that adverbs do not inflect for gender in French, so that there is no sense in which the adverb can be said to be feminine.

Both observations argue in favor of a morphomic account (Aronoff, 1994): adjectives have two distinct stems, which express no morphosyntactic features by

[5] See Bonami et al. (2004) for an HPSG analysis of French liaison.

[6] Perlmutter (1998) and Tranel (1996) attempts to account for this data in an optimality-theoretic setting, by ranking phonological markedness constraints higher than syntactic agreement constraints. See Bonami and Boyé (2003, 2005) for a detailed criticism.

adjectival lexeme	MAS.SG form	FEM.SG form	MSLF	derived adverb
RAPIDE	ʁapid	ʁapid	ʁapid	ʁapidmɑ̃
PETIT	pəti	pətit	pətit	pətitmɑ̃
BEAU	bo	bɛl	bɛl	bɛlmɑ̃
VIF	vif	viv	vif	vivmɑ̃
FORT	fɔʁ	fɔʁt	fɔʁ	fɔʁtəmɑ̃
RÊVEUR	ʁɛvœʁ	ʁɛvøz	ʁɛvœʁ	ʁɛvøzmɑ̃

Table 5: Distribution of adjective stems

class	example		slot 2 $\rightsquigarrow$ slot 1
A	RAPIDE	/ʁapid/	identity
B	PETIT	/pətit/	delete final C
C	BREF	/bʁɛv/	devoice final C
D	GITAN	/ʒitan/	delete final C, and nasalize preceding V

Table 6: Inflectional classes for adjectives (final version)

themselves. (Bonami and Boyé, 2005) implement this idea by stating that adjectives have a two slot stem space, with different morphological processes selecting the appropriate slot as stated in (3).

(3) a. The masculine singular form is identical to stem 1.
b. The feminine singular form is identical to stem 2.
c. If stem 1 is consonant final, then the MSLF is identical to stem 1; otherwise it is identical to stem 2.
d. The lexeme formation rule for adverbs in *-ment* selects stem 2 as its input.

Notice that in the context of this analysis, both masculine singular and feminine singular have a null exponent in French; all the action occurs in stem selection rather than in exponence.[7] In this context, the inflectional class partition proposed in table 2 must be recast, not as a series of distinct ways of relating inflectional forms, but as a series of ways of relating the slots in the stem space, as shown in table 6.

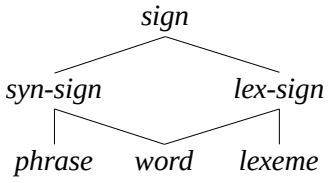
[7]By contrast, plural number has a uniform exponent, the latent consonant /z/.

3 Modeling stem spaces in HPSG

3.1 Stem spaces for verbs

There are two important issues when modeling the stem space in an HPSG grammar. First, one has to decide what status the stem space has. Bonami and Boyé (2002) treat each stem as a distinct member of the lexical hierarchy, typed for the slot it occupies in the stem space and the lexeme it belongs to. A simpler alternative is to assume that the stem space is a data structure internal to the lexical entry of a lexeme.[8] Thus we assume that lexemes carry a feature STEMS with features corresponding to each slot in the stem space (5), and that inflectional rules such as (6) take this as their input.[9]

(4)



a. *syn-sign*$\rightarrow$$\left[\text{PHON} \quad \textit{phon}\right]$

b. *lex-sign*$\rightarrow$$\left[\text{M-DTRS} \quad \textit{list}(\textit{lexeme})\right]$

c. *phrase*$\rightarrow$$\left[\text{DTRS} \quad \textit{list}(\textit{syn-sign})\right]$

d. *word*$\rightarrow$$\left[\text{M-DTRS} \quad \langle \textit{lexeme} \rangle\right]$

e. *lexeme*$\rightarrow$$\left[\text{STEMS} \quad \textit{stem-space}\right]$

(5) a. *v-lexeme*$\rightarrow$$\begin{bmatrix}\text{HEAD} & \textit{verb} \\ \text{STEMS} & \textit{v-stem-space}\end{bmatrix}$

b. *v-stem-space*$\rightarrow$$\begin{bmatrix}\text{SLOT1} & \textit{phon} \\ \text{SLOT2} & \textit{phon} \\ \text{SLOT3} & \textit{phon} \\ \dots & \end{bmatrix}$

[8] This type of analysis can be traced back to Pollard and Sag's (1987, p. 213) suggestion that lexical entries of irregulars contain a specification of their principal parts. It is also similar to the analysis of irregular inflection defended by (Spencer, 2004) as part of Generalized Paradigm Function Morphology.

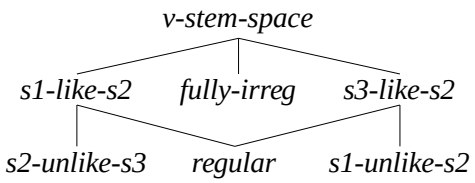
[9] We take phonological representations to be (at least) lists of objects of type *segment*; the hierarchy of segment types allows for an equivalent of phonetic feature decomposition. To improve readability, where possible, we note lists of segments as sequences of sans-serif IPA symbols, rather than using the standard HPSG notation for lists and types. Thus e.g. t is a shorthand for $\langle$*t-seg*$\rangle$.

(6) *prst-indic-1pl*→
$$\begin{bmatrix} \textit{word} & \\ \text{PHON} & \boxed{1}\oplus\tilde{\text{ɔ}} \\ \text{SYNSEM} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} & \\ \text{TENSE} & \textit{prst} \\ \text{MOOD} & \textit{indicative} \end{bmatrix} \\ \text{SUBJ} & \left\langle \text{NP}[\textit{1pl}] \right\rangle \end{bmatrix} \\ \text{M-DTRS} & \left\langle \begin{bmatrix} \textit{v-lexeme} & \\ \text{STEMS}\,|\,\text{SLOT1} & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix}$$

3.2 Relations within the stem space: Giraud (2005)

The second issue is to decide on a way of encoding the default relations structuring the stem space. Bonami and Boyé (2002) rely on an ontologically quite promiscuous system, using a combination of online type construction (Koenig, 1999) and default specifications (Lascarides and Copestake, 1999). At the other end of the spectrum, Giraud (2005) proposes a much more conventional implementation, where stem spaces are typed for the morphophonological relations they verify, and the regular case just corresponds to the stem space type verifying the maximal number of relations. (7) is basically a simplified version of Giraud's proposal specifying only the part of the hierarchy of verbal stem spaces needed to account for the present indicative. Leaf types correspond to particular conjugation patterns, and inherit from intermediate types stating a morphophonological relation between stem slots.

(7)



a. *s1-like-s2*→
$$\begin{bmatrix} \text{SLOT1} & \boxed{1} \\ \text{SLOT2} & \boxed{1} \end{bmatrix}$$

b. *s3-like-s2*→
$$\begin{bmatrix} \text{SLOT2} & \boxed{1} \\ \text{SLOT3} & \boxed{1} \end{bmatrix}$$

In Giraud's system, individual lexemes need to specify (i) a stem space type, and (ii) enough stems to fill up the stem space, as illustrated by the following lexical entries.

(8) a. *laver*:
$$\begin{bmatrix} \text{STEMS} & \begin{bmatrix} \textit{regular} & \\ \text{SLOT1} & \textsf{lav} \end{bmatrix} \end{bmatrix}$$

b. *valoir*: $\left[\text{STEMS} \quad \begin{bmatrix} \textit{s2-unlike-s3} \\ \text{SLOT2} \quad \text{val} \\ \text{SLOT3} \quad \text{vo} \end{bmatrix}\right]$

3.3 Regularity as default

While its formal clarity speaks in favor of Giraud's system, an obvious disadvantage is that (ir)regularity is not modeled directly. There is no formal difference between the type *regular* and the other leaf types of the stem space corresponding to the fact that regular verbs have a special status. Moreover, the lexical entry of every regular verb needs to include an explicit specification of the fact that this verb is regular, which goes against all evidence that speakers assume verbs to be regular in the absence of contradictory information. Clearly, a system where only irregulars would need explicit specification is more desirable.

We conclude that while Giraud's proposal succeeded in eliminating the need for online type construction to model the stem space, it did not eliminate the need for defaults. We thus propose to introduce a single modification to Giraud's system, the default specification in (9). By default lexemes are assumed to have a regular stem space. This means that every lexeme will inherit all morphophonological relations that are not incompatible with the morphophonological information in its lexical entry. Thus if a lexeme lists only the content of one of its slots, it will be of type *regular*. If it lists two distinct phonologies for slot 1 and slot 2, the stem space's type cannot be a subtype of *s1-like-s2*, and thus it will be of type *s1-unlike-s2*. The only way for a lexeme to be fully irregular is for it to list three distinct phonologies in slots 1, 2, and 3. (10) lists appropriate lexical entries for verbs with the four distinct patterns.

(9) *verb-lexeme*$\rightarrow \left[\text{STEMS} \quad / \textit{regular}\right]$

(10) a. *laver*: $\left[\text{STEMS} \quad \left[\text{SLOT1} \quad \text{lav}\right]\right]$

b. *valoir*: $\left[\text{STEMS} \quad \begin{bmatrix} \text{SLOT2} & \text{val} \\ \text{SLOT3} & \text{vo} \end{bmatrix}\right]$

c. *mourir*: $\left[\text{STEMS} \quad \begin{bmatrix} \text{SLOT1} & \text{muʁ} \\ \text{SLOT2} & \text{mœʁ} \end{bmatrix}\right]$

d. *boire*: $\left[\text{STEMS} \quad \begin{bmatrix} \text{SLOT1} & \text{byv} \\ \text{SLOT2} & \text{bwav} \\ \text{SLOT3} & \text{bwa} \end{bmatrix}\right]$

3.4 Discussion

The analysis proposed above crucially relies on the use of a default specification. Moreover this default cannot be considered to be simply of an abbreviatory nature, as e.g. the default specifications in Ginzburg and Sag (2000) can. In Ginzburg and Sag (2000)'s grammar, defaults are only used to avoid stating intuitively redundant constraints on types that are listed in the hierarchy anyway. In the current proposal, however, the default is used to constrain the members of an open lexicon: what we are attempting to model is the fact that speakers treat unknown verbs (that is, verbs that are just entering their lexicon) as regulars. Thus specifying in individual lexical entries the information represented by the default is not an option, and would amount to not model the relevant property in the grammar.[10]

Since the use of default specifications is controversial in HPSG, it is worth asking whether another way of accounting for regularity can be found. As an anonymous reviewer suggests, one possibility would be to use attempts to use online type construction, which is explicitly introduced by Koenig (1999) as a way of modeling productive morphological processes (of which regular inflection is arguably an instance). However all our attempts have failed. Here we consider two possible routes that illustrate why online type construction is not adequate.

One possible analysis, which is closest to the present proposal, is to cross-classify lexemes for stem-space type and some other dimension, say, the type of content they have. Figure 1 illustrates such an approach. Here we state at the level of lexemes the classification that was stated at the level of stem spaces in Giraud's approach. Irregular lexemes are explicitly listed as belonging to a particular stem space type, whereas regulars are not, but *can* inherit from the *regular* type. This is indicated by the dotted line from *regular* to *laver-lxm* in figure 1. Such a system predicts only one stem (irregular) stem space for irregular lexemes, and predicts a regular stem space as one possibility for regular lexemes. However the problem is that it overgenerates, since nothing precludes e.g. *laver-lxm* from having a common subtype with *s1-unlike-s2*. As far as we can see, the only way to avoid such overgeneration is to augment *laver-lxm*'s lexical entry with some information incompatible with *s1-unlike-s2*—in other word, to state explicitly in the lexical entry that *laver* is a regular verb, which is precisely what we set out not to do.

Another option is to modify the form of the lexicon so that the blocking issue does not arise. Suppose that we follow Bonami and Boyé (2002) and treat stems as objects in the lexical hierarchy, rather than simply phonological objects within a lexeme's lexical entry. Regular relations between slots are modeled as lexical rules such as those in (11) relating two stems. Within such a system, the issue is not to block irregular patterns for regular verbs, but to block the application of relevant

[10]Of course, an alternative is to take it that the default character of regular inflection is a psycholinguistic issue that needs not be modeled in the grammar *per se* but can be left to a model of performance. However we do not know of any model of inflectional performance that both recognizes a status for regularity and does not presuppose that the competence grammar provides a characterization of regularity.

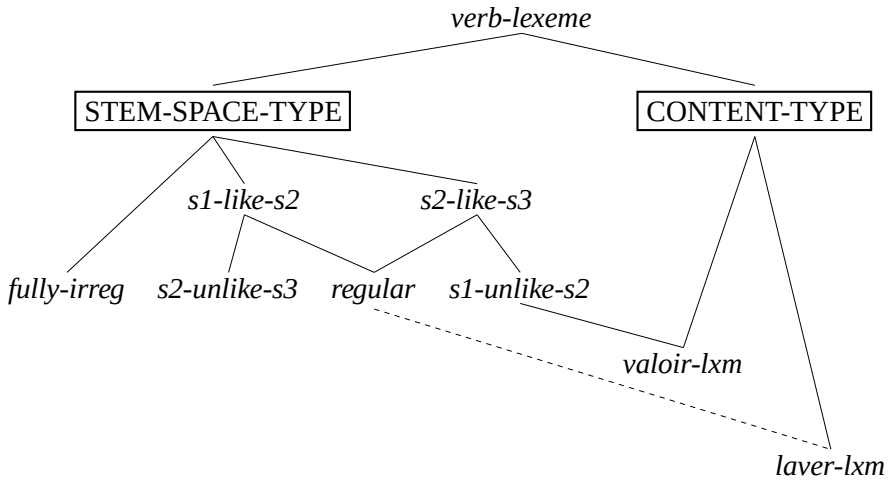


Figure 1: A failed analysis based on online type contruction

lexical rules to irregulars. Since stems are signs, one could use morphosyntactic information to this effect. For instance, the lexical entry for the slot 1 stem of *valoir* would include a feature specification ensuring that it cannot serve as the basis for a present singular form (12). The construction of an overregular slot 3 stem val for *valoir* is not blocked as such, but this stem will never be used as the base for an inflected form of the verb.

(11) a. *slot-2-stm*→
$$\begin{bmatrix} \textsc{synsem} & \boxed{1} \\ \textsc{m-dtrs} & \left\langle \begin{bmatrix} \textit{slot-1-stm} \\ \textsc{synsem} & \boxed{1} \\ \textsc{phon} & \boxed{2} \end{bmatrix} \right\rangle \\ \textsc{phon} & \boxed{2} \end{bmatrix}$$

b. *slot-3-stm*→
$$\begin{bmatrix} \textsc{synsem} & \boxed{1} \\ \textsc{m-dtrs} & \left\langle \begin{bmatrix} \textit{slot-2-stm} \\ \textsc{synsem} & \boxed{1} \\ \textsc{phon} & \boxed{2} \end{bmatrix} \right\rangle \\ \textsc{phon} & \boxed{2} \end{bmatrix}$$

(12) *valoir*:
$$\begin{bmatrix} \textsc{phon} & \textsf{val} \\ \textsc{synsem}|\textsc{cat} & \begin{bmatrix} \textsc{head}|\textsc{tense} & \textit{imperfective} \end{bmatrix} \vee \\ & \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textsc{tense} & \textit{present} \\ \textsc{mood} & \textit{indicative} \end{bmatrix} \\ \textsc{subj} & \left\langle \begin{bmatrix} \textsc{ind} & \begin{bmatrix} \textsc{nb} & \textit{pl} \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix} \end{bmatrix}$$

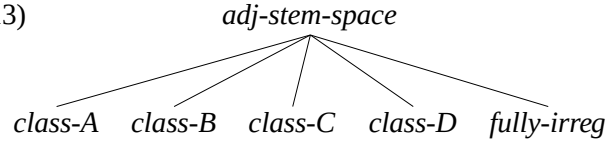
While such an approach arguably models irregularity as such, and is formally more conservative than the default-based approach defended here, it has a number of conceptual and empirical drawbacks. First, the feature specifications one needs to include in the description of stems of irregular verbs have a strong ad-hoc flavor. Second, the use of morphosyntactic features to ensure blocking is contradictory with the morphomic nature of the stem space; this is problematic for the modeling of derivation: the rule for V-N compounds can no longer state that its base is a slot-3 stem, because /val/ is not blocked as a slot-3 stem as such—rather the use of /val/ in the present singular is blocked. Finally, such a model forces one to structure the stem space of regular verbs as a directed tree, which is problematic for the modeling of morphophonological opacities in paradigms: as Bonami and Boyé (2006a) argues, although the full inflection of a regular verb can always be deduced from the knowledge of one stem, it is not always the same slot that must be known.

To conclude this section, our attempts to avoid the use of defaults in the modeling of regularity have failed. In the absence of an explicit alternative, we take it that the use of defaults is the only known way to model regularity in an HPSG implementation of the stem space.

3.5 Extending the analysis to adjectives

The general approach to stem spaces just outlined can be adapted to the analysis of adjectives with just a few modifications. Remember that we assume adjectives to have a two-slot stem space, where slot 1 is used for ordinary masculine forms and slot 2 for all feminine forms. The inflectional classes postulated in table 2 can be recast as types of stem spaces, as shown in (13);[11] note that contrary to what happens with verbs, types of adjectival stem spaces are mutually exclusive, because the constraints they impose on the structure of the stem space are incompatible. Class A is the default type; thus the vast majority of adjective lexical entries need not mention a stem space type, but can just specify the content of a slot (15a). Lexemes belonging to a different class must specify the stem space type (15b-d), and true irregulars such as *vieux* need to specify the content of both slots.

(13)



a. *class-A*→ $\begin{bmatrix} \text{SLOT}1 & \boxed{1} \\ \text{SLOT}2 & \boxed{1} \end{bmatrix}$

[11] In fact it is more satisfactory to treat the alternating endings as parts of the stems, rather than inflectional exponents, since they show up in derived lexemes: e.g. *petitesse* /pətitɛs/ 'smallness', not */petiɛs/; *pensivement* /pɑ̃sivmɑ̃/ 'thoughtfully', not */pɑ̃simɑ̃/.

b. *class-B*→$\begin{bmatrix}\text{SLOT1} & \boxed{1} \\ \text{SLOT2} & \boxed{1}\oplus\langle \textit{cons} \rangle\end{bmatrix}$

c. *class-C*→$\begin{bmatrix}\text{SLOT1} & \boxed{1}\oplus\text{f} \\ \text{SLOT2} & \boxed{1}\oplus\text{v}\end{bmatrix}$

d. *class-D*→$\begin{bmatrix}\text{SLOT1} & \boxed{1}\oplus\langle \text{nasal}(\boxed{2}) \rangle \\ \text{SLOT2} & \boxed{1}\oplus\langle \boxed{2}\textit{oral-vow} \rangle\oplus\text{n}\end{bmatrix}$

where:

i. $\text{nasal}(\text{a}) = \tilde{\text{a}}$

ii. $\text{nasal}(\varepsilon) = \text{nasal}(\text{i}) = \text{nasal}(\text{y}) = \tilde{\varepsilon}$

iii. $\text{nasal}(\text{o}) = \text{nasal}(\text{ɔ}) = \tilde{\text{ɔ}}$

(14) *adj-lexeme*→$\left[\text{STEMS } \textit{adj-stem-space/class-A}\right]$

(15) a. *rapide*:$\left[\text{STEMS} \quad \left[\text{SLOT2} \quad \text{ʁapid}\right]\right]$

b. *petit*:$\left[\text{STEMS} \quad \begin{bmatrix}\textit{class-B} \\ \text{SLOT2} \quad \text{pətit}\end{bmatrix}\right]$

c. *bref*:$\left[\text{STEMS} \quad \begin{bmatrix}\textit{class-C} \\ \text{SLOT2} \quad \text{bʁɛv}\end{bmatrix}\right]$

d. *gitan*:$\left[\text{STEMS} \quad \begin{bmatrix}\textit{class-D} \\ \text{SLOT2} \quad \text{ʒitan}\end{bmatrix}\right]$

e. *vieux*:$\left[\text{STEMS} \quad \begin{bmatrix}\text{SLOT1} \quad \text{vjø} \\ \text{SLOT2} \quad \text{vjɛj}\end{bmatrix}\right]$

With these stem space specifications, we can now state appropriate inflectional rules on the basis of (Bonami et al., 2004)'s analysis of liaison. The ordinary masculine is specified as [LFORM −], which means that it can be used in contexts where liaison cannot occur, e.g. before a consonant-initial noun or post-nominally.[12] For the MSLF, we implement the stem selection rule described in (3d) using a function that inspects the phonology of the slot1-stem.

(16) a. *masc-sg-adj*→$\begin{bmatrix}\textit{word} & \\ \text{PHON} & \boxed{1} \\ \text{SYNSEM} & \begin{bmatrix}\text{HEAD} & \textit{adj}[\textit{mas},\textit{sg}] \\ \text{LFORM} & -\end{bmatrix} \\ \text{M-DTRS} & \left\langle\begin{bmatrix}\textit{adj-lexeme} & \\ \text{STEMS}|\text{SLOT1} & \boxed{1}\end{bmatrix}\right\rangle\end{bmatrix}$

[12] However it *can* occur before a vowel-initial noun, because liaison is not obligatory for prenominal adjectives; see (Bonami et al., 2004) for extended discussion and analysis.

b. *MSLF-adj*→
$$\begin{bmatrix} \textit{word} & \\ \textsc{phon} & \textsf{select-stem}(\boxed{1},\boxed{2}) \\ \textsc{synsem} & \begin{bmatrix} \textsc{head} & \textit{adj}[\textit{mas},\textit{sg}] \\ \textsc{lform} & + \end{bmatrix} \\ \textsc{m-dtrs} & \left\langle \begin{bmatrix} \textit{adj-lexeme} & \\ \textsc{stems} & \begin{bmatrix} \textsc{slot}1 & \boxed{1} \\ \textsc{slot}2 & \boxed{2} \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix}$$

where

i. $\textsf{select-stem}(\boxed{1}\langle \ldots, \textit{cons}\rangle, \boxed{2}) = \boxed{1}$

ii. $\textsf{select-stem}(\boxed{1}\langle \ldots, \textit{vow}\rangle, \boxed{2}) = \boxed{2}$

c. *fem-sg-adj* →
$$\begin{bmatrix} \textit{word} & \\ \textsc{phon} & \boxed{1} \\ \textsc{synsem} & \begin{bmatrix} \textsc{head} & \textit{adj}[\textit{fem},\textit{sg}] \end{bmatrix} \\ \textsc{m-dtrs} & \left\langle \begin{bmatrix} \textit{adj-lexeme} & \\ \textsc{stems}|\textsc{slot}2 & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix}$$

4 Modeling derived irregularity

We can now turn to our account of derived irregularity. Notice that in the current setup, a lexeme formation rule does not derive a single stem from a single stem, but it derives a stem space from another stem space. Thus every specification of the stem space that is open to lexical entries is also open to lexeme formation rules. A rule may just specify a single slot of the stem space, in which case the output of the rule will fall in the default inflection pattern. Or it may specify extra information that is incompatible with the default pattern, in which case one ends up with an output that is inflectionally irregular despite being derived productively.

Now let us turn to a few examples of adjectival lexeme formation rules. These have the exact same typology as root adjectives. Denominal adjectives in *-aire* fall into the default class A (17). The rule for adjectives *-eux* must specify that its output falls in class B (18). Finally, we come to the crucial case: rule (19) for adjectives in *-eur* with a feminine in *-euse* directly specifies two stems for its output. Since no inflectional class can accommodate two stems with such a morphophonological relation, the output of the rule necessarily ends up with a type *fully-irreg* stem space.

(17) *_aire-adj-lxm*→
$$\begin{bmatrix} \textsc{stems} & \left[\textsc{slot}2 \quad \boxed{1}\oplus\text{ɛʁ}\right] \\ \textsc{synsem} & \left[\textsc{head} \quad \textit{adj}\right] \\ \textsc{m-dtrs} & \left\langle \begin{bmatrix} \textsc{head} & \textit{noun} \\ \textsc{stems}|\textsc{slot}1 & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix}$$

(18) *_eux-adj-lxm*→
$$\begin{bmatrix} \textsc{stems} & \begin{bmatrix} \textit{class-B} \\ \textsc{slot}2 \quad \boxed{1}\oplus\text{øz} \end{bmatrix} \\ \textsc{synsem} & \left[\textsc{head} \quad \textit{adj}\right] \\ \textsc{m-dtrs} & \left\langle \begin{bmatrix} \textsc{head} & \textit{noun} \\ \textsc{stems}|\textsc{slot}1 & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix}$$

(19) *_eur/_euse-adj-lxm*→
$$\begin{bmatrix} \textsc{stems} & \begin{bmatrix} \textsc{slot}1 \quad \boxed{1}\oplus\text{œʁ} \\ \textsc{slot}2 \quad \boxed{1}\oplus\text{øz} \end{bmatrix} \\ \textsc{synsem} & \left[\textsc{head} \quad \textit{adj}\right] \\ \textsc{m-dtrs} & \left\langle \begin{bmatrix} \textsc{head} & \textit{verb} \\ \textsc{stems}|\textsc{slot}1 & \boxed{1} \end{bmatrix} \right\rangle \end{bmatrix}$$

The case of deverbal adjectives in *-eur* with a feminine in *-rice* is entirely parallel, but with two complications. First, we must account for the special form of the verbal stem these adjectives are based on. Following Bonami et al. (to appear), we assume that French verbs have an extra slot for a special stem, which never shows up in inflection, but serves as the base for at least three lexeme formation rules: the rule for nominalizations in *-ion*, the rule for adjectives in *-eur*/*-rice*, and the rule for adjectives in *-if*.In the default case, this stem is obtained by adding *at* to the end of the stem in slot 1. The corresponding stem slot is labelled SLOT13 in (20) because it comes in addition to the 12 slots necessary for a full treatment of French conjugation.

Second, we must account for the fact that some adjectives in *-eur* in this class are defective in the feminine. Specifically, all adjectives which have a (nondefault) stem 13 ending in /s/ have no feminine form; e.g. *antidépresseur* 'antidepressive' **antidépressrice*. To account for this, we assume that the stem in slot 2 is the empty list if the input's stem 13 does not end in /t/. We assume that it is a general constraint on inflectional rules that they need a phonologically nonempty input; thus no feminine form will be generated from the lexical entry of *antidépresseur*.

(20) *_eur/_rice-adj-lxm*→

$$\begin{bmatrix} \text{STEMS} & \begin{bmatrix} \text{SLOT1} & \boxed{1}\oplus \text{œʁ} \\ \text{SLOT2} & f_{rice}(\boxed{1}) \end{bmatrix} \\ \text{SYNSEM} & \begin{bmatrix} \text{HEAD} & \textit{adj} \end{bmatrix} \\ \text{M-DTRS} & \left\langle \begin{bmatrix} \text{HEAD} & \textit{verb} \\ \text{STEMS} & \begin{bmatrix} \text{SLOT13} & \boxed{1} \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix}$$

where

a. $(\boxed{3} = \text{t}) \rightarrow f_{rice}(\boxed{2} \oplus \boxed{3}) = \boxed{2} \oplus \text{tʁis}$

b. $(\boxed{3} = \langle \textit{seg} \rangle \wedge \boxed{3} \neq \text{t}) \rightarrow f_{rice}(\boxed{2} \oplus \boxed{3}) = \textit{elist}$

5 Conclusions

In this paper we presented a general approach to stem allomorphy based on the notion of a *stem space*. While a previous HPSG implementation of the stem space has been presented in Bonami and Boyé (2002), the current, streamlined approach has a number of distinct advantages. It is compatible with a surface-oriented account of phonological opacities in regular inflection (Bonami and Boyé, 2006a); it is more easily embeddable in a model of morphological performance (Bonami and Boyé, 2006b); and as shown in the present paper, it interacts correctly with data from derivational morphology, accounting directly for the otherwise mysterious phenomenon of derived irregularity.

One issue we did not discuss at all is the modeling of (ir)regular exponents: all the irregularities discussed in the present paper correspond to cases of morphomic stem allomorphy. This is mainly due to the fact that, in French, irregular exponents turn out to be a sporadic phenomenon at best; for instance, there are exactly 5 verbs with irregular *forms*, whereas there are more than 350 verbs with irregular *stems*. For languages with real inflection classes though, the issue of (ir)regular exponents must of course be taken seriously. We submit that the use of hierarchies of inflection patterns should be applicable in such cases too, the difference being that patterns are characterized by the relation between stems and forms rather than the relations among the stems discussed here.

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Uncovering regularities: On bare and evaluated controllers in Tigrinya

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1 Introduction

This paper presents an investigation of the gender system in Tigrinya (ISO/DIS 639- 3:tir)[1]. Considering the literature on the topic (see under *gender* or *genre* in Schreiber (1887); Leslau (1941); Agostinos (1994); Lipiński (2001)) in which it is basically presented as a "flexible" or "free" gender system, the present analysis predicts the behavior of gender in the language. The following exemplifies what we believe is the issue to cover.

(1) a. mʌtʾħaf "a book"

b. qʌyyiħ$_{masc}$ mʌtʾħaf "a red book"

c. qʌyyaħ$_{fem}$ mʌtʾħaf "a red (beloved, small or particular) book"

Following Corbett (Corbett, 1991; Corbett and Fraser, 2000; Corbett, 2001, 2006), we assume that a nominal classification (i.e. genders or noun classes) in a language reduces to the evidences the agreement system of the language provides. Tigrinya has two values for gender traditionally labeled as masculine and feminine, as displayed in (1). One problem is the fact that the word for *mʌtʾħaf*; '*book*' triggers both feminine and masculine in the same agreement domain (see Corbett, 2006, pg 4). Even more problematic is the fact that most nouns behave in the same way. While one can say that speakers of Tigrinya have the liberty of choice, such an assumption creates several problems, among others: (i) the existence of a language having an *unsystematic* gender *system*[2] and (ii) reduplication in the lexicon, for each noun must trigger the right value for gender[3].

2 Typology

It is important to make a division between a primary and a secondary role or function of gender values, irrespective of them being natural or grammatical. On the one hand the inherent values for gender are those associated with nominals at the lexical level, be it semantically or formally assigned by the speaker. On the other hand a noun can trigger a different value than its inherent one on target(s). In that case it appears that the noun has undergone a *gender shift*. To present the sort of phenomenon we are concerned with, let's consider the following data from Swahili and Kasem. In Swahili (Table 1) building an augmentative out of a given noun is done by gender shift. The word for *basket* is in class (cl.) 9/10 in unmarked cases but shifts to cl. 5/6 and/or cl. 3/4. For Kasem (Table 2), cl. 1 in the first column is

[1] `http://www.ethnologue.com/showlanguage.asp?code=tir`

[2] Considering Corbett's explanation of *double* or *multi-gender nouns* as non applicable (Corbett, 1991, pg 181).

[3] As we endorse Corbett's typology of agreement (Corbett, 2006), underspecifying each noun for its gender value cannot be done for directionality reasons; a noun acts as a controller and determines a particular feature's value on a target. However, it is still possible to talk about controllers even if directionality is "hidden" by unification.

seen as the unmarked value for the four nouns. Changing the gender of a cl. 1 noun to cl. 3 has a pejorative value. The phenomenon is productive in both languages, but typically of evaluative morphologies, it is not applicable across all Swahili cl. 9/10 nor Kasem cl. 1 nouns.

swh	gloss	class
k^hapu	"basket"	CL.9/10
kapu	"large basket"	CL.5/6
ji-kapu	"larger basket"	CL.5/6
m-kapu	"very large basket"	CL.3/4
m-ji-kapu	"huge basket"	CL.3/4

Table 1: Swahili (swh): Beard (1995, pg. 164) and A.A. Assibi (pers. comm)

cl. 1	gloss	cl. 3	gloss
jawɪnʊ	patient	jawɪna	weakling
chɪrʊ	'witch	chiriga	wicked person
ŋwɪnʊ	thief	ŋwɪniŋa	petty thief
kaanɪ	woman	kanɪŋa	bad woman

Table 2: Kasem (xsm): Awedoba (2003, pg 11) and pers. comm.

(2) a. ʔɨtti-a wʌddi
DEMART-3.FEM.SG boy
'this (small, cute, lovely) boy' (Tigrinya)

b. ʔɨtti-u wʌddi
DEMART-3.MASC.SG boy
'this boy' (Tigrinya)

In the Tigrinya examples in (2) the demonstrative article agrees with the noun wʌddi; '*boy*'. In (2a) the noun's referent is analysed as having received an evaluation, which is signaled by the gender shift. Inherently masculine, it can nonetheless trigger feminine on targets. Within the parentheses in the translation three predicates are given, reflecting the range of meaning such an evaluation brings about in different contexts. Kasem and Swahili are two languages similar to Tigrinya in the sense that they allow gender shift to convey additional meaning. What these three languages have in common is: (i) a gender system of at least two values, (ii) a common formal means of expressing a quantitative/qualitative evaluation, which is the gender shift and (iii) the evaluation itself which glues some additional meaning to the referent. Our assumption is that in languages in which gender shift is at work, there must be an unmarked gender given to each noun; in Swahili k^hapu; '*basket*'

is in cl. 9/10, in Kasem kaanɪ; '*woman*' is in cl. 1 and in Tigrinya wʌddi; '*boy*' is masculine. Since a shift is a change one needs an origin for the shift. Claiming such assignment of gender value, that is, inherent value, has a consequence in considering underspecification in the model.

The literature on evaluative morphology usually uses *quantitative* and *qualitative* as scales to which a referent is graded and compared to its standard reference. The terminology is further broken down into diminutive-augmentative and caritative-pejorative, respectively, terms which usually stand for the meaning conveyed. But nothing has ever been said about familiarity, specificity or what in section 4.3 is called particularization. Are they evaluations?

The general statements on evaluations available in the literature are : (i) they do not change the lexical meaning of the morphological base or referent, (ii) they do not change the syntactic category of the lexeme, (iii) they reflect subjective attitude of the speaker and (iv) they can be recursive (Beard, 1995, pg 163). The signals can take different forms: many languages use affixes (Grandi and Montermini, 2003), others use a gender shift.

It can be said that for a language X to have gender shift, X must have a semantically-based nominal clasification. The secondary function of gender comes in if at first place gender could convey sense outside its primary assignment. Notice that only nominals are analysed in the present work, but evidences from many languages tell us that pronouns and adjectives (i.e. at least those used predicatively) are also susceptible to undergo evaluation (see Geertz, 1960; Slobin, 1963; Brown and Gilman, 1960; Das, 1968).

3 Nominal Classification

It is shown in Corbett (1991, pg 7) that assigning a class to a noun depends on semantic or phonological criteria, or a mixture of both. As argued in Brindle (2005a, pg 36) Tigrinya speakers assign classes to nouns following semantic criteria (see also Leslau, 1941).

(3) *Semantic criteria*

- Sex-differentiable entities denoting females are feminine (e.g. living organisms).
- Sex-differentiable entities denoting males are masculine (e.g. living organisms).
- Animals are assigned either feminine or masculine, somehow reflecting aggressiveness, size and wiseness dimension.
- Some small items are assigned feminine gender (i.e. lexicalized diminutives)
- Some items with power and respect connotation are masculine.

- Some items with wiseness or fertility connotation are feminine.
- Country names are assigned feminine gender
- Collective of inhabitants are assigned masculine gender
- The moon and the sun are feminine
- A corpse, irrespective of the dead's sex, is masculine

The first two criteria are seen in gender systems cross-linguistically. The third one applies when animals are referred to without reference to their sex. Notice that at the bottom of the list, the criteria are much less generalizing. However, these are generalisations that seem to hold according to native speakers and in canonical agreement. The criteria allow the separatation of the nouns in a hierarchy as in Figure 1. Going down the hierarchy, two mutually exclusive classes are created: *Class-I* and *Class-II*.

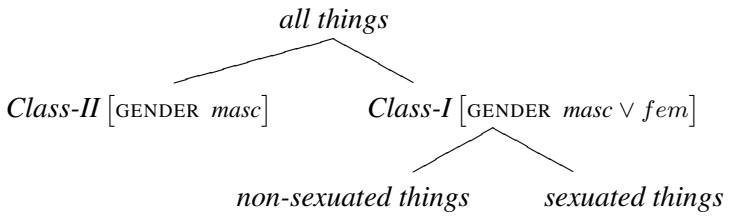


Figure 1: Classification Hierarchy

The dichotomy is defined as follows: nouns are of *Class-I* if they satisfy at least one criterion in the list of semantic criteria. Under *Class-I*, a distinction is made between *sexuated things* and *non-sexuated things*. Under *sexuated things*, grammatical gender assignments follow from natural gender. They are automatically assigned masculine or feminine, respecting a male/female distinction. A more complex issue is the classification of the non-sexuated things. Animals are good examples to motivate some of the criteria in the list. They are classified according to how they are seen by the linguistic community following concepts like strength, agressivity, fertility, stupidity and so on.

All *Class-II* nouns are masculine. Contrary to *Class-I* nouns, the masculine value is seen as a default; *Class-II* are residuals. Understandably, one might wonder what the evidence is for a split between *non-sexuated Class-I masculine* and *Class-II* nouns, since they both trigger masculine on target(s): the answer is that *Class-II* gathers nouns that are **not** satisfying one of the semantic criteria. The distinction between *Class-I* and *Class-II* gets further motivated when one observes which evaluation is appropriate for each class. We will show that *Class-II* nouns are appropriate candidates for certain types of evaluations, while *Class-I* are appropriate for others. We believe that this situation brings an argument in favor of the classification proposed. Therefore, apart from a classification separating nouns into two genders based on the agreement system operating in the language (i.e.

masculine and feminine), we propose two classes of nouns in Tigrinya (i.e. *Class-I* and *Class-II*) derived from semantic criteria.

4 Evaluations

What is an evaluation in Tigrinya?

4.1 qualitative-/quantitative+

It is easy to insult a man: simply mark the target(s) in a construction with feminine.[4] Using feminine value for gender for a male is read as an insult. These usages are categorized as diminishing the status of a male. In example (4) we see the effect on gender when reference is made to an animal.

(4) a. zɨbʔi bɨ-tʼɨkʾay ħalifom , bɨ-fɨrhat rɨʕidʌ
hyena by-near passed.MASC , in-fear shook.1.MASC.SG
'A group of hyena passed near me, I was terrified' (Brindle, 2005b)

b. zɨbʔi bɨ-tʼɨkʾay ħalifʌn , gɨna hanti ʔaygʌbʌrʌnin
hyena by-near passed.FEM , but nothing/one did.not.3.PL
'A group of hyena passed near me, they did not hurt me' (Brindle, 2005b)

The word zɨbʔi; '*hyena*' is in *Class-I masculine*, value assigned by the semantic criteria. In (4a) the word triggers masculine on the verb, but in (4b) it triggers feminine. In both of these sentences, the word zɨbʔi manages to determine either feminine or masculine on the target verb. This is an evidence which shows a change

[4]Evaluations of that sort are even penalised by customary laws. The following examples are taken from the written customary laws of the highlands of Eritrea.

(1) nɨ-tʌbaʕɨtay ʔatti ɨnnabʌlʌ bʌ-nɨstʌyti zɨ-tʼʌrʌfʌ 12 hɨlqi
to-male pro.2.FEM.SG saying in-female who-insults 12 hɨlqi
yʌχhas
he.should.pay.indemnity
'If a person insults a male (man) in a female form (grammatical expression), then as indemnity, he should pay 12 helqi' (Law (1918))

(2) bɨ-gʷal ʔanstʌyti zɨ-tʼʌwʕe ... 110 qɨrʃi yʌχhas ...
to-girl female who-calls ... 110 qɨrsi he.must.pay.as.indemnity ...
'Who calls a man by a female form, must pay 110 qɨrsi as indemnity' (Law (1946))

in its agreement class. This is understood as the aggressiveness status of a typical hyena is being diminished.[5] Now look at the following examples:

(5) ʔɨzza wʌddi bʌ-ʕalti sɨrrʌ ʔɨmbʌr
DEMART.FEM.SG boy of-owner.FEM.SG pants indeed
koyn-a
become;$\sqrt{kwm}$:‖A.PERF.FEM.SG‖
'This boy became courageous' (Gebrechristos, 1993, pg. 97)

(6) ʔɨzza wʌddi mʌʕantʾa ʔɨmbʌr gʌjɨra
DEMART.FEM.SG boy intestine indeed do;$\sqrt{gbr}$:‖A.PERF.FEM.SG‖
'This boy became courageous' (Gebrechristos, 1993, pg. 139)

Sentences (5) and (6) are appropriate in a context in which a timid young boy suddenly becomes energetic, outspoken or even aggressive. At a certain moment, contrary to all expectations, he behaves in opposition to his socially substract nature. In fact, the verb phrases in these examples are considered idioms, but we still consider them evidence for satiric connotation since the inherent gender of the word for "boy" has shifted (i.e. target ʔɨzza.FEM, not ʔɨzzu.MASC). We showed that using feminine value for gender to a male is not only read as insulting but could also in some context be regarded as satiric. This occurs specifically to males. Now consider the opposite situation for an adult female.

(7) ʔɨzzi sʌbʌjti jɨnʌbɨħ ʔallo
DEMART.MASC.SG woman bark AUX.MASC.SG
'This woman is shouting (at somebody)' (Brindle, 2005b)

The same evaluation can apply on sʌbʌjti; '*woman*' in (7) but there the gender shift goes $fem \rightarrow masc$ instead of the $masc \rightarrow fem$. The semantic effect of gender shift emphasizes the aggressiveness or insensibleness of that particular woman.

[5]The nominal in (4) is used for collective reference. Further, consider this verse of a traditional children song.

(1) zɨbʔɨ tɨwʌlɨd ʔalla, ʔɨzgi ʔajʌʕɨbjʌlla
hyena giving.birth is.FEM, God not.grow.up.FEM
'A hyena is giving birth, God don't let them grow up!' (Brindle, 2005b)

In that verse the word zɨbʔɨ; '*hyena*' must refer to female since only female hyena can give birth, so the use of feminine is covered by the semantic criteria, since individuated hyenas are 'sexually' classified. Thus example (1) is not a case of evaluation.

4.2 qualitative+/quantitative-

Interestingly, diminutives with a unique meaning $small(x)$ are not common, if they exist at all. These are called true diminutives in Hasselrot (1957). It was found that speakers prefer to form true diminutives synthetically (i.e. $adj \vee verb + noun$).[6] However, we believe that all diminutives in Tigrinya are colored by endearment. Therefore, we gather under caritative the evaluation of the type *dear(x)*, *small(x)*. This means that a translation (i.e. from native speakers) involving predicates such as *small*, *dear*, *lovely*, *close*, *affectionate*, *beloved* will treat those properties as caritative-diminutive. Friendship is another issue that we wish to include. Friendship can be thought of as an evaluation affecting only human entities or humanized characters. This evaluation seems to follow what we have gathered under caritative. Tigrinya speakers typically use these types of evaluation among close friends and (appreciated) family members. For example, Solomon is a proper name associated with a human male. In (8) speaker A and B are discussing Solomon's well-being and he is not part of the conversation.

(8) a. A: solomon kʌmʌy ti-sʌrrɨħ ʔall-a
Solomon how IPFV-work.FEM.SG have-FEM.SG
'How is Solomon doing?'

b. B: nɨssa tʾɨbuq ti-sʌrrɨħ ʔall-a
3.FEM.SG fine/good IPFV-work.FEM.SG have-FEM.SG
'He is doing good! (lit; She is doing good)'

Both speakers are close friends with Solomon since they both talked about him using the feminine value for gender. In this case it is a male that asks a fellow male about his present life satisfaction. While these examples involve friendship relation, the following is concerned with what we called affectionate use. Compare (9), (10) and (11):

(9) ʔɨzza wʌdd-ʌy kɨtzareb ʤʌmmira
DEMART.FEM.SG boy.SG-POSS.1.SG.MASC speak start
'My (dear , lovely,..) son started to speak'

(10) wʌdd-ʌy nɨfuʕɨ ʔɨyyu
boy.SG-POSS.1.SG.MASC nice.3.MASC.SG AUXP.3.MASC.SG
'My son is nice'

(11) wʌdd-ʌy nɨfɨʕɨ-ti ʔɨyya
boy.SG-POSS.1.SG nice.3.SG-FEM AUXP.3.FEM.SG
'My (dear , lovely,..) son is nice'

[6]The closest to true diminutives we have found are the lexicalized forms (i.e. some *Class-I*:FEM ending in *-t* or *-ti*) or borrowed Italian words carrying a diminutive morpheme. Italian -ino and -ina are not used outside borrowed words (mostly proper nouns) and *Class I*:FEM nouns ending in *-t* or *-ti* are considered non-decomposable.

Examples (8) to (11) all involve *Class-I* nouns, but it is easy to find *Class-II* in the case of affectionate. Having affection or appreciation toward an object can be done likewise:

(12) saʔinʌy t'ibuq ʔiyyu
shoe.SG-POSS.1.SG nice.MASC.SG AUXP.3.MASC.SG
'My shoe is nice'

(13) saʔinʌy t'ibuq-ti ʔiyya
shoe.SG-POSS.1.SG nice-FEM.SG AUXP.3.FEM.SG
'My (dear, lovely) shoe is nice'

Thus *small*, *dear*, *lovely* and *affectionate* can apply to non-human as well. The data tells us that a word of *Class-II* like saʔinʌy; '*shoe*' undergoes similar process as *Class-I* nouns do when it comes to affection towards a referent. Besides, we consider the possibility for a female to undergo gender shift under that evaluation. No data are given in this work since only one speaker agreed with what we presented to her. The context in which one could retrieve gender shift on females under caritative evaluation involves the affection of a mother towards her daughter.

4.3 Particularization

We analysed all *class-II* nouns as masculine. The reason why we choose that value for gender is that, on the one hand, when a *class-II* noun determines feminine agreement, we observed a meaning difference, either a caritative or a particularization. On the other hand, when it is masculine the noun's denotation is the only representation available. We observed that Tigrinya uses gender shift on *Class-II* nouns to *particularize* or *specify* them in certain contexts. Thus we say that a noun is *particularized* by an evaluation ignoring *definiteness*. This allows a noun to not get particularized but still to receive the referencial function of items bearing definiteness. Consider a *Class-II* noun and the example (14) below:

(14) ʔizzi kʌfli
DEMART.MASC.SG room
'this room'

Thus the noun phrase in (14) is made up of a *Class-II* noun, is definite but not particularized. Particularization is a term that is closely related to specificity and familiairity[7]. It is an evaluation found especially in indefinite singular noun phrase, but in theory since it is the controller that is evaluated, other syntactic environments are possible. In fact we shall present the consequence of this type of evaluation in a quantifier phrase in (17) below. In indefinite singular noun phrase

[7]The discussion surrounding initial vowel, also called augment, in the Bantu literature has a strong similarity with what we call particularization for Tigrinya (see de Blois, 1970; Hyman and Katamba, 1993; Petzell, 2003).

particularization is an evaluation which narrows down the identification of, renders distinct or individuates an object for both the speaker and the hearer. Both speaker and hearer should have the same object in mind. If an object gets particularized by the speaker, the hearer must have the object token in mind, not only its type[8]. This is exemplified in (15a) and (15b).

(15) a. litʃi ʔall-o-ka-do
bulb have-3.MASC.SG-2.MASC.SG-QM
'Do you have a (any) bulb?'

b. litʃi ʔall-ati-ka-do
bulb have-3.FEM.SG-2.MASC.SG-QM
'Do you have a (particular) bulb?'

In (15a) the customer asks the shop-keeper if he has light bulbs in his shop. The shop keeper has the bulbs in the backroom of his shop. As the customer cannot see any bulbs around on the shelves or he doesn't have a sample with him, he cannot point at them. But the context in which (15b) is uttered is that the customer has a bulb in his hand, showing the kind of bulb he is seeking to purchase but still uses an indefinite noun phrase. Notice that the meaning conveyed is better translated as a quantifier (i.e. eng: any) in (15a) and as an adjective or determiner (i.e. eng: particular, this, such) in (15b). This reflects (i.e. what we judged) the interpretations of native speakers. While in English the noun phrase in (15b) should have been used with another element in the noun phrase, Tigrinya has a grammatical device that signals the particularization of *Class-II* nouns. This device is gender shift.

(16) a. mʌbrahti wʌlliʕ-i-ya
electric light put.on-2.FEM.SG-3.FEM.SG
'(You$_{fem}$) switch on the light!'

b. mʌbrahti wʌlliʕ-i-yo
electric light put.on-2.FEM.SG-3.MASC.SG
'(You$_{fem}$) switch on a light!'

The situation is similar in (16). When mʌbrahti; '*electric light*' is used in masculine, the hearer's answer is to switch on any light in the room (i.e. the light is not specified. It could be a lamp or any other sources of electric light). If the feminine is used, the source of the light and possibly the location of the switch is known by both speaker and hearer. We decided to gloss this sentence making an *a/the* distinction in English. Further, particularization can affect the interpretation of noun phrases involving a quantifier like kwullʊm; '*all*'.

[8]In Borthen (2003), a *type* discourse referent is seen as a genre, a kind or a category, while a *token* discourse referent is seen as an individual or an instance of an object. A future work is to make the link between an implementation of referential properties of nominals in a HPSG grammar (Borthen and Haugereid, 2004)) and the phenonemon we label *particularization*.

(17) a. kʷullom (ʔɨtom) mʌtʾħaf-ti
all.MASC (the.MASC) books-PL
'all (the) books'

b. kʷullʌn (ʔɨtʌn) mʌtʾħaf-ti
all.FEM (the.FEM) book-PL
'all (the) books'

The meaning conveyed by the cohabitation of the particularization evaluation and a quantifier like kwullʌn in (17b) is the one in which the books are seen as individuated and forming a totality (i.e. similar to the combination of 'each' and 'all' in English, some sort of distributive reading). The sentence (17a) is seen as the gathering, the whole, the totality of the books. In figure 2 we present two environments in which *particularization* have been elicited and the consequence of gender shift in the interpretation of the noun phrase.

	MASC		FEM
$[N]_{np}$	type of object	$\Rightarrow$	token of object
$[\forall N]_{np}$	all-whole	$\Rightarrow$	each-whole

Figure 2: Evaluation: particularization

Table 3 summarizes what we have presented under the term evaluations. Currently, the evaluations we are providing will obviously raise ambiguities. If one looks at the summary table, one can see overlapping statements having different evaluations. Evaluations need situation or context to be processed. Even cases in which a man insults his best friend or shows great affection towards his enemy are easily interpreted by native speakers. The pragmatic level of evaluations is left out of the present analysis.

if *Class-I* human female is assigned masculine =	status -
if *Class-I* human male is assigned feminine =	status -
if *Class-I*:MASC is assigned feminine =	status -
if *Class-II* is assigned feminine =	status+/size-
if *Class-I* human male is assigned feminine =	status +
if *Class-I* human female is assigned masculine =	status +
if *Class-II* is assigned feminine =	particularized

Table 3: Evaluations

Evaluations involve three distinguishable but inter-related parts: a lexical, a syntactic and a semantic component. In the lexical component, inherent values for gender are changed. The language having two values for gender, the given *shift* of value has only one option, the other value. The syntactic component should reflect

canonical agreement, since no agreement mismatches are observable in what we are covering (Corbett, 2006, pg 143). The controller, evaluated or not, informs the target(s) in what respect they should inflect. The semantic component of the noun stays unchanged: a male stays a male and a shoe stays a shoe. It is their agreement features, more presicely gender, that gets affected and, as we argue, this is a syntactic matter. What is happening in the semantic components is a property addition through evaluation, corresponding to what we have presented in this section. We are simply saying that a first-order logic representation of sentence (13) should look like $Dear(x) \wedge Shoe(x) \wedge Nice(x)$, and for French examples involving true diminutives *bâtonnet*: $Small(x) \wedge Stick(x)$, *garconnet*: $Small(x) \wedge Boy(x)$, *livret*: $Small(x) \wedge Book(x)$, and so on. For all evaluations, one predicate is added to the logical formula.

5 HPSG

How do these grammatical properties look like in an HPSG architecture? The nominal classification presented in section 3 is reflected in the hierarchy under *gend*, as in Figure 3. The type *gend* is compatible with both *fem* and *masc*. The types *Class-I* and *Class-II* are abstract types reflecting the dichotomy argued for in section 3. Within the dichotomy, a noun gets assigned a value for gender. The three leaf types we get, *CI-masc*, *CI-fem* and *CII-masc* reflect the only defined types declared for gender assignment in the language.

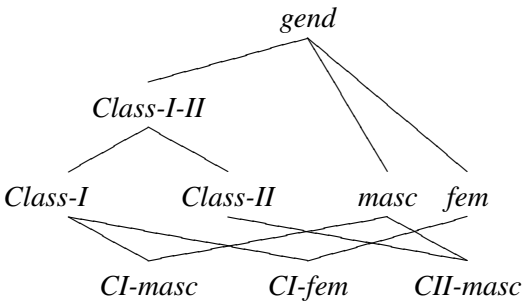


Figure 3: Gender Hierarchy

In the lexicon all nouns should have one of these types as a value for gender. That point is illustrated by taking three nouns out of the classification proposed. The differences between (18) a, b and c lie in their value for PHON, their value for PRED and their value for GEND.

(18) a. *'shoe'*

$$\begin{bmatrix} \textit{cn-lxm} & \\ \text{PHON} & \textit{sa?ini} \\ \text{SYNSEM} & \begin{bmatrix} \text{CAT}|\text{HEAD}|\text{AGR}|\text{GEND} & \textit{CII-masc} \\ \text{CONT}|\text{RELS}|\text{PRED} & \textit{sa?ini} \end{bmatrix} \end{bmatrix}$$

b. *'man'*

$$\begin{bmatrix} \textit{cn-lxm} & \\ \text{PHON} & \textit{sʌbay} \\ \text{SYNSEM} & \begin{bmatrix} \text{CAT}|\text{HEAD}|\text{AGR}|\text{GEND} & \textit{CI-masc} \\ \text{CONT}|\text{RELS}|\text{PRED} & \textit{sʌbay} \end{bmatrix} \end{bmatrix}$$

c. *'woman'*

$$\begin{bmatrix} \textit{cn-lxm} & \\ \text{PHON} & \textit{sʌbayti} \\ \text{SYNSEM} & \begin{bmatrix} \text{CAT}|\text{HEAD}|\text{AGR}|\text{GEND} & \textit{CI-fem} \\ \text{CONT}|\text{RELS}|\text{PRED} & \textit{sʌbayti} \end{bmatrix} \end{bmatrix}$$

This organisation would allow, for example, a noun of gender *CI-fem* unifying with an adjective of gender *fem* resulting in a phrase where *fem* is the common type shared by both. For example, consider the case in which an attributive adjective and a noun combine. Following Eynde Eynde (2002), the combination of the adjective and the noun is done by a grammar rule labeled *head-functor* phrase, as described in Figure 4. The SELECT value in the functor daughter is structure-shared with the SYNSEM value in the head daughter. Moreover, adjectives have constraints specified on them which ensure that the morpho-syntactic agreement features (i.e. AGR in Kathol (1999) and Sag et al. (2003) and NUMGEN in Eynde (2002)) on the selected nominal are structure-shared with the adjective.

In section 4 evaluative morphologies were presented as operations in which (i) the resulting categories stay unchanged, (ii) they provide a flag to signal that a semantic composition is being conveyed and (iii) they add some meaning. Another property is that the "derivation" brings a lexeme into another lexeme form, evidences come from pluralisation (Derzhanski, 2003). HPSG offers an appropriate mechanism that can capture all these grammatical processes. The formalism allows us to change the value for the gender feature and to add an elementary predication through lexical rules. Even though the phenomena could be accounted for by assuming a different lexical representation for gender encoding (i.e. underspecification), respecting the typology of agreement (Corbett, 2006) and the nature of a shift place us in a situation in which evaluations can be appropriately described using lexical rules. The sort of lexical rules created to capture evaluations are derivational.[9]

[9]We did not implement the present work, but we were influenced by the Grammar Matrix (Bender et al., 2003). The *cat-E* type was conceived to be a subtype of constant lexeme-to-lexeme rule (i.e. *const-ltol-rule*), a spelling preserving rule, since the phenomena under Category E do not add overt morphological material (i.e. in Tigrinya). The term Category E is borrowed from Delhay (1996): "La *Catégorie D* est une construction abstraite destinée à rendre compte des phénomènes de construction d'un sens dit "diminutif" en contexte et ne vise pas a créer une archi-catégorie morpho-syntactique. Elle ne saurait donc se prévaloir d'une quelconque prétention à la prédictabilité, mais cherche à décrire la diversité de procédés et de valeurs que l'on peut subsumer sous l'idée de DIMINUTION." Thus Category E is seen here as a global term scoping over a family of evaluations on nouns,

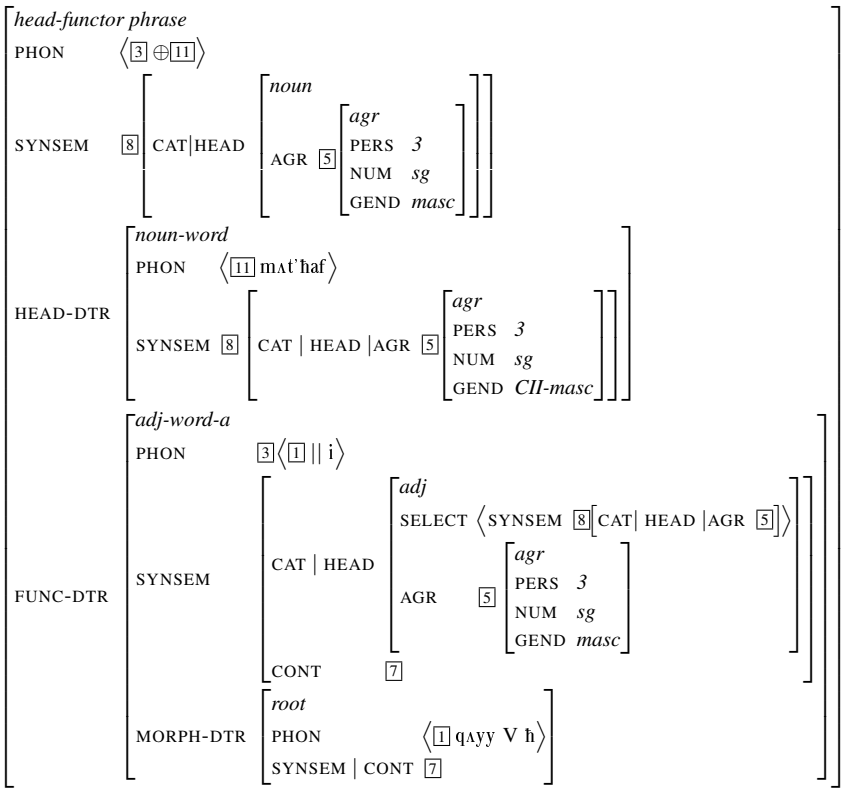


Figure 4: Composition of qʌyyiħ mʌtˀħaf 'a red$_{masc}$ book'

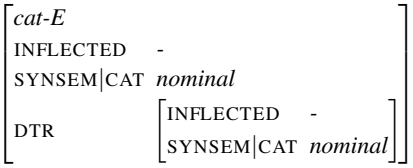


Figure 5: *cat-E* type ("subtype" of *const-ltol-rule* (Bender et al., 2003))

The type *cat-E* displayed in figure 5 is the root of the family of evaluations. It inherits the constraints declared on the type *lexeme-to-lexeme-rule*, that is, the constraints that interest us are in a rule in which (i) the input and the output are not fully inflected and (ii) the rule has one daughter, the input. The input for *cat-E* is always a nominal and under this rule, nominals cannot undergo a categorial change. The semantic representation in figure 6 is a simplified form of Minimal Recursion Semantics (MRS).[10] The *mrs* type declares two features: INDEX and RELS. The feature INDEX can take two values, *event* or *ref-ind*. The value of INDEX is unified

grammatically signalled by gender shift. Contrary to her Category D, Tigrinya offers other types of evaluation and lacks some of the compositions French offers.

[10]Simplified form in the sense that we use only some features declared on a full fledged MRS (Copestake et al., 2006) to accommodate the phenomena in question.

with the value of ARG0 in RELS. Figure 7 displays the TFS of a type labeled *sem-cat-E*, a type which constrains the insertion of a particular relation in the bag, an *arg1-rel*.

$$\begin{bmatrix} \textit{mrs} \\ \text{INDEX } \boxed{5} \\ \text{RELS } \left\langle ! \begin{bmatrix} \textit{noun-rel} \\ \text{PRED } \textit{string} \\ \text{ARG0 } \boxed{5} \end{bmatrix} ! \right\rangle \end{bmatrix}$$

Figure 6: Reduced *mrs* type

$$\begin{bmatrix} \textit{sem-cat-E} \\ \text{INFLECTED } - \\ \text{SYNSEM} \begin{bmatrix} \text{CAT} & \textit{nominal} \\ \text{CONT}|\text{RELS } \left\langle ! \boxed{2} \begin{bmatrix} \textit{noun-rel} \\ \text{ARG0 } \boxed{3} \end{bmatrix}, \begin{bmatrix} \textit{arg1-rel} \\ \text{PRED } \textit{string} \\ \text{ARG0 } \textit{y} \\ \text{ARG1 } \boxed{3} \end{bmatrix} ! \right\rangle \end{bmatrix} \\ \text{DTR} \begin{bmatrix} \text{INFLECTED } - \\ \text{SYNSEM} \begin{bmatrix} \text{CAT} & \textit{nominal} \\ \text{CONT}|\text{RELS } \left\langle ! \boxed{2} ! \right\rangle \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Figure 7: *sem-cat-E* type

In Figure 7, the type *sem-cat-E* constrains the output of the rule to contain an additional elementary predication (EP) in the RELS's list. This elementary predication (i.e. *arg1-rel*) is the locus of evaluation. It corresponds to the meaning representation of *-ette* in French, *-ish* in East Cree (Junker et al., 2002) and likewise in other languages having evaluative morphology.

$$\begin{bmatrix} \textit{arg1-rel} \\ \text{PRED } \textit{string} \\ \text{ARG0 } \textit{event} \\ \text{ARG1 } \textit{ref-ind} \end{bmatrix}$$

Figure 8: *arg1-rel* Relation

The hierarchy in Figure 9 shows three subtypes of *sem-cat-E*: *quant-/qual+*, *particu* and *quant+/qual-*. Each type constrains the appropriate nominal it can add an evaluation to, using the *gend* type introduced earlier[11]. These act as filters, blocking some undesirable evaluations. For example, such declaration restricts the *particu* evaluation to be compatible only with GEND *Class-II*, *quant- /qual+* with *Class-I-II* (i.e. underspecified) and *quant+/qual-* with *Class-I*.

[11] In Figure 9 the feature GEND ends the following path in the three lowest type:
$\left[\text{DTR}|\text{SYNSEM}|\text{CAT}|\text{HEAD}|\text{AGR}|\text{GEND } \textit{Class-I-II} \vee \textit{Class-I} \vee \textit{Class-II}\right]$

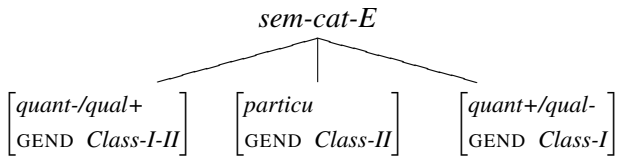
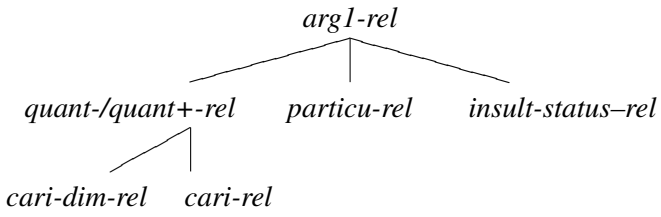


Figure 9: sem-cat-E subtypes

The type *arg1-rel* has subtypes, corresponding to the findings shown in section 4. The hierarchy in Figure 10 displays evaluation relation possibilities. Moreover, *arg1-rel* types constrain the relation with a value for PRED.



cari-dim-rel	PRED "*small-beloved*"
cari-rel	PRED "*beloved*"
particu-rel	PRED "*particular*"
insult-status–rel	PRED "*status -*"

Figure 10: Hierarchy of Evaluation Relations and respective PRED Value

The notion of friendship and insult is seen as only applicable to humans. The semantic representation of INDEX is extended, using the SORT feature, to split things in the world that are human or not with the feature HUMAN having *bool* as a value, where *bool* represents +/-.

(19) *Human or not in a Sign*
$\left[\text{SYNSEM|CONT|INDEX|SORT|HUMAN } \textit{bool}\right]$

With that in mind, there are two rules which can apply to nouns that are constrained as HUMAN +. These rules are appropriately used in cases where humans are endeared or insulted. Augmented with that constraint, lexical rules built from the types *insult* and *cari* are appropriate only for nouns having that feature. Figure 11 illustrates the constraints gathered under the *insult* type.

(20) a. $\begin{bmatrix} \textit{ge-sh-fem} & \\ \text{SYNSEM|CAT|HEAD|AGR|GEND} & \textit{fem} \\ \text{DTR|SYNSEM|CAT|HEAD|AGR|GEND} & \textit{masc} \end{bmatrix}$

b. $\begin{bmatrix} \textit{ge-sh-masc} & \\ \text{SYNSEM|CAT|HEAD|AGR|GEND} & \textit{masc} \\ \text{DTR|SYNSEM|CAT|HEAD|AGR|GEND} & \textit{fem} \end{bmatrix}$

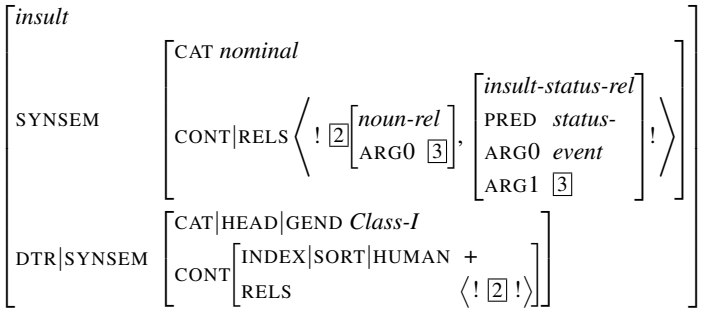


Figure 11: Constraints introduced under *insult*

As for the signal of an evaluation, the type *ge-sh* stands for gender shift and has two subtypes, *ge-sh-masc* and *ge-sh-fem*. These are the types that do the actual shift in gender value. Informally, if the GEND of the daughter is α, *ge-sh* makes it $-\alpha$. The two types needed are shown in (20). The actual lexeme-to-lexeme rules are the join of subtypes of *sem-cat-E* and *ge-sh*. This means that all the possibilities of unification of the leaf types (i.e. the glbs) of both sides equal ten. On these ten possibilities, six of them were found in Tigrinya, two need further investigation and two are simply impossible.

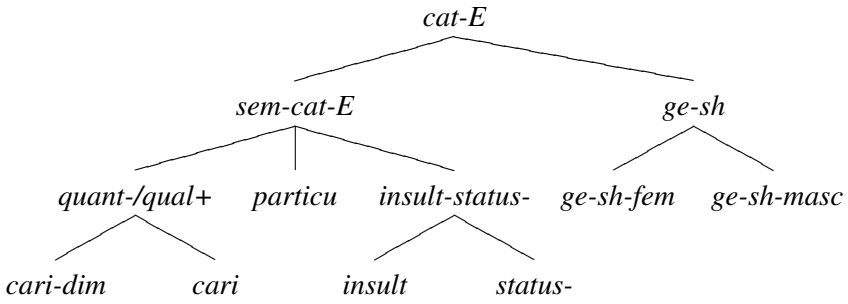


Figure 12: Category E Hierarchy

(21) *10 possibilities*

a. *ge-sh-fem* ⊓ *insult*
b. *ge-sh-fem* ⊓ *status-*
c. *ge-sh-masc* ⊓ *insult*
d. *ge-sh-fem* ⊓ *particu*
e. *ge-sh-fem* ⊓ *cari*
f. *ge-sh-fem* ⊓ *cari-dim*
g. ? *ge-sh-masc* ⊓ *cari*
h. * *ge-sh-masc* ⊓ *particu*
i. * *ge-sh-masc* ⊓ *cari-dim*

j. ? *ge-sh-masc* ⊓ *status-*

Figure 13 provides one of them. This rule is typed *ge-sh-fem-cari-dim-rule*. The rule is constrained, so either *Class-I* or *Class-II* is a possible input and gender shift needs anything that has masculine as a value for GEND in the daughter. So only *CI-masc* and *CII-masc* are possible input. The elementary predication is inserted and the ARG1 of the added relation is structure-shared with the ARG0 of the referent.

6 Conclusion

A solution for the so-called gender flexibility in Tigrinya was presented. Storing some nouns with both genders raises the problem of reduplication in the lexicon. Further, having their value underspecified undermines the internal structure of controllers in the language and the nature of a shift. Nouns should be encoded with one value for gender. The semantic criteria (in section 3) together with the notion of evaluation (in section 4) predict a *class-I* and *class-II* dichotomy. The former is derived from the assignment of a set of semantic criteria and the latter is considered residual. Evidences show that masculine was the right default assignment for *class-II*. If a noun's value for gender shifts, that noun has undergone an evaluation. Evaluations are gathered under the term Category E, which subsumes all the phenomena that received an analysis compatible with those described. In an HPSG format, the type *cat-E* roots a set of lexeme-to-lexeme rules which basically shifts the value for the feature GEND and add an EP in the RELS' list. Following this approach, semantically-driven transfer becomes eligible between analytic and synthetic types of languages (i.e. morphological vs. syntactical composition of EPs) and between languages in which evaluative morphology is either present or absent.

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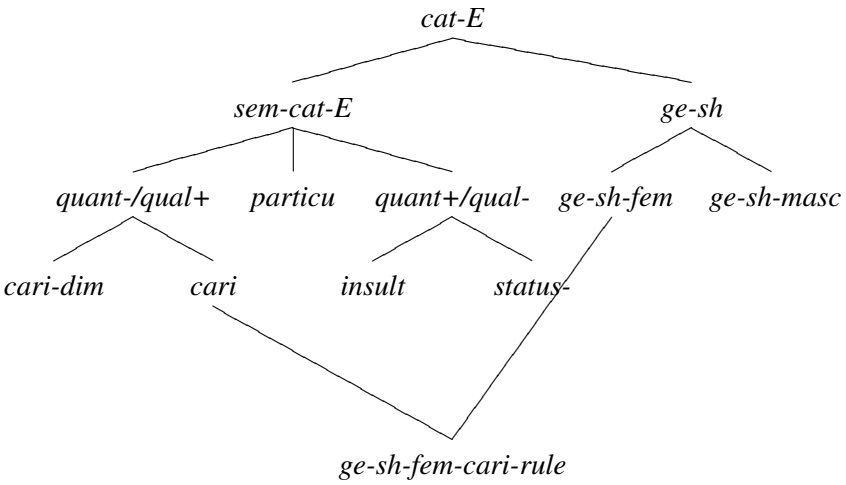
Figure 13: *ge-sh-fem-cari-rule*

"A asks B how C (Solomon) is doing. A and B are close friends with C. By using the feminine on male entity, A is expressing his affection toward C."

ʃomon kʌmʌy ti-sʌrih ʔall-a
Solomon how IPFV.FEM.SG.work have-FEM.SG
'How is Solomon doing? (*evaluated*)'



$$\left[\begin{array}{ll} \textit{ge-sh-fem-cari-rule} & \\ \text{SYNSEM} & \left[\begin{array}{l} \text{CAT}\left[\text{HEAD}|\text{AGR}|\text{GEND}\ \textit{fem}\right] \\ \text{CONT}|\text{RELS}\left\langle !\ \boxed{2}\left[\begin{array}{l}\textit{solomon-rel}\\ \text{ARG0}\ \boxed{3}\end{array}\right], \left[\begin{array}{l}\textit{cari-rel}\\ \text{PRED}\ \textit{beloved}\\ \text{ARG0}\ \textit{event}\\ \text{ARG1}\ \boxed{3}\end{array}\right] !\right\rangle \end{array}\right] \\ \text{DTR}|\text{SYNSEM} & \left[\begin{array}{l} \text{CAT}|\text{HEAD}|\text{GEND}\ \textit{CI-masc} \\ \text{CONT}\left[\begin{array}{ll}\text{INDEX}|\text{SORT}|\text{HUMAN} & +\\ \text{RELS} & \langle !\ \boxed{2}\ !\rangle\end{array}\right] \end{array}\right] \end{array}\right]$$

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Number agreement in Russian predicates

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Abstract

Russian shows the mixed agreement with the polite pronoun *vy* and *pluralia tantum* nouns, both of which have plural number in form but either singular or plural number in meaning. Two different forms of adjectives – short form and long form – agree in different number with those number mismatch nominals.

I adopted the idea of Siegel (1976) etc. that when a long-form adjective appears in the predicate position, there is always a null head that it modifies, with the HPSG's agreement theory of Wechsler & Zlatič (2003). I propose that all predicates – verbs, SF and LF adjectives – except predicate nominals show CONCORD agreement. LF adjectives show CONC agreement with the null anaphor *'one'*. The different number values of LF adjectives results from index agreement between the null anaphor and the subject of the sentence.

1 Introduction[1]

This paper explores the mixed agreement in Russian. In Russian, the second person plural pronoun *vy* can be used politely of a single person, which is often shown in both Indo-European languages (like *vous* in French) and non-Indo-European languages (like *siz* in Turkish etc.).

The mixed agreement in French has been studied in the HPSG framework (Pollard and Sag 1994, Kathol 1999, Wechsler & Zlatič 2003). In French as in *Vous*$_{[you.PL]}$ *êtes*$_{[be.2\mathbf{PL}]}$ *loyal*$_{[loyal.\mathbf{SG}]}$ 'You$_{[polite.SG]}$ are loyal.', plural pronoun *vous* in single referent triggers PL agreement on verbs and SG agreement on adjectives.

Russian shows interesting data in that they have two different forms of adjectives (e.g. *krasiv* 'nice.SF' vs. *krasivyj* 'nice.LF') and polite pronoun *vy* triggers different number values on those – plural on short-form adjectives vs. singular on long-form adjectives. On the other hand, *pluralia tantum* nouns (e.g. *očki* 'glasses', *bryuki* 'pants', etc.) are another important source to examine number agreement since they are analogous to polite pronoun *vy* in that they have plural number in form but can refer to one single entity.

[1] Data in this paper are from native Russian speaker informants, except where noted. Thanks to Tatiana Segura, Nadya Clayton, and Marina Alexandrova for help with Russian.

Pluralia tantum nouns do not trigger different numbers on two different forms of adjectives – plural number in both adjectives.

Russian has not been studied much in the HPSG framework. This paper tries to solve the agreement puzzle, triggered by nominals with number mismatch in form and meaning. All those puzzles are untangled by figuring out the properties of long-form adjectives and nominals causing the mixed agreement. I will adopt the Babby (1973), Siegel (1976), Baylin (1994)'s idea that when a long-form adjective appears in the predicate position, there is always a null head that it modifies, together with the HPSG's agreement theory of Wechsler & Zlatič (2003) which divide the grammatical agreement features into the index agreement and the concord agreement.

2 Mixed agreement in Russian

This section shows how agreement puzzles look like in Russian. In Russian, there are two different forms of adjectives – short-form adjectives (e.g. *krasiv* 'nice.SF.SG' and *krasivy* 'nice.SF.PL' etc.) and long-form adjectives (e.g. *krasivyj* 'nice.NOM.SG', *krasivye* 'nice.PL' etc.).[2] They behave quite different. The verb and SF adjective agreement is quite simple: they all agree morphosyntactically with any type of subject. The pronoun *vy* 'you.PL' triggers PL number in finite verbs and short-form adjectives no matter how many people *vy* is referring to:

(1) a. Ty 2SG — byl be.past.2SG — sčastliv happy.SF.SG
'You (one informal addressee) were happy.'

b. Vy 2PL — byli / *byl be.past.**PL / SG** — sčastlivy / *sčastliv happy.SF.**PL**/ *SG
'You (one formal addressee or multiple addressees) were happy.'

[2] Hereafter, I call them SF or LF adjectives as in the gloss. Long-form adjectives show different forms by case unlike short-form adjectives, so that the glosses do not indicate long-form adjectives but case.

pluralia tantum nouns (e.g. *scissors*, *trousers*, etc.) trigger plural agreement morphosyntactically when they are semantically either singular (one pair) or plural (more than one pair):

(2) Èti otčki krasivy /*krasiv
these glasses.PL nice.SF.**PL** /*SG
'These glasses (**one** or more than one pair) are nice.'

Not all predicates show morphological agreement in plural with a plural subject. LF adjectives, which can be either attributive or predicative, show semantic agreement with polite pronoun *vy* in a single referent:[3]

(3) Vy krasivyj / *krasivye
you.polite nice.NOM.**SG** / PL
'You (one formal addressee) are nice.'

On the other hand, *pluralia tantum* subject still triggers plural agreement on LF:

(4) a. Èti otčki krasivye /*krasivyj
these glasses.PL nice.Nom.**PL** / SG
'These glasses (one or more than one pair) are nice.'

b. makarony vkusnye / *vkusnyj
spagetti.PL tasty.NOM.**PL** / SG
'The spaghetti is tasty.'

Let's consider predicate nominals. They are somewhat different from other predicates. Predicate nominals show pure semantic agreement with any type of agreement trigger (e.g. pronoun, *pluralia tantum*, etc.) if the predicate noun can have both number values. It would be because the predicate nominals can have their own inherent numbers, they have restrictions on their number value morphologically or semantically, and they themselves are agreement triggers:

[3] In 19th c., long-form adjectives show PL agreement with the polite pronoun *vy*, regardless of number of referents (Corbett 1983).

(5) a. Vy / Ty byli / byl geroem
you.PL / SG be.past.PL / SG hero.Inst.**SG**
'You (one formal / informal addressee) were a hero.'

b. Vy byli gerojami
you.PL be.past.PL hero.Inst.PL
'You (multiple addressees) were heroes.'

(6) a. Èti očki special'ny' instrument čtoby smotret' fil'm
these glasses special.SG tool.**SG** so_that to_watch film
'These glasses (**one** pair) are a special tool to watch a (e.g. IMAX) movie.'

b. Èti očki special'nye instrumenty čtoby smotret' fil'm
these glasses special.PL tool.**PL** so_that to_watch film
'These glasses (more than one pair) are special tools to watch a movie.'

Here is the summarization of Russian predicate agreement patterns with two different types of nominals – polite pronoun *vy* and *pluralia tantum* noun:

• morpholgocially **PL** & semantically **SG** triggers	finite verbs	adjectives		predicate nominal
		SF	LF	
vy	PL	PL	**SG**	SG
pluralia tantum	PL	PL	**PL**	SG

Russian shows mixed agreement – i.e. one agreement trigger causes different agreement values in its agreement targets. This predicate agreement patterns follow Comrie (1975) and Corbett (1983)'s predicate hierarchy (verb > participle > adjective > noun), which says the one on the left shows syntactic agreement than the others on the right. Two different types of nominals, polite pronoun and *pluralia tantum* nouns, trigger different number values in predicates but each pattern confirms the predicate hierarchy.

This research shows how to analyze the agreement puzzle in Russian. Next section analyzes the agreement of verbs, SF adjectives, and predicate nominals, which behave straightforward – either morphological or semantic agreement with any type of agreement triggers. The main focus of this paper is on LF adjectives. The following section deals with the LF adjective issue.

3 Predicates except LF adjectives: Simple things first!

The straightforward agreement targets – verbs, SF adjectives and predicate nouns – are dealt with in this section. Section 3.1 will propose lexical entries of pronoun *vy* and *pluralia tantum* nouns, introducing the features of previous analysis on (mixed) agreement in the HPSG framework. Section 3.2, I will show the analysis for those predicates.

3.1 Lexical entries of polite pronoun *vy* and *pluralia tantum* nouns

Mixed agreement with polite pronoun in French has been examined well in HPSG framework. Pollard & Sag (1994) and Kathol (1999) analyze them by making the verbs and predicate adjectives agree in a different feature of polite pronoun. Pollard & Sag (1994) analyzes that the verb agrees with INDEX feature of the pronoun, but the adjective agrees with its semantic RESTRICTION feature (RESTR, hereafter). Kathol (1999) advocates the morphosyntactic AGR feature, which is distinct from the semantic INDEX feature.[4] In his analysis, adjective agreement is handled by structure sharing of INDEX values, while verb agreement is handled by structure sharing of the AGR values.

Wechsler & Zlatič (2003) analyze Serbo-Croatian agreement with two different CONCORD (CONC, hereafter) and INDEX features, which are analogous to Kathol's AGR vs. INDEX features. They give a unified agreement analysis in different languages and show the Serbo-Croatian data that we need to treat subject and verb agreement as INDEX agreement. As for mixed agreement, Wechsler & Zlatič (2003) in HPSG and Wechsler (2004, 2005) in LFG suggest that French first and second person pronouns are morphosyntactically distinguished by four different person values *1s*, *2s*, *1a* and *2a*, and the traditionally called first and second person finite verbs agree with their subjects in person only. Agreement triggers with no number force the semantic agreement on agreement targets. Thus, in predicate adjectives, polite pronoun triggers semantic agreement due to its lack of number, while *pluralia tantum* nouns trigger morphosyntactic agreement in

[4] Instead of AGR feature, I call this CONCORD feature following Wechsler & Zlatič (2003).

plural number. Hahm (2006) applies Wechsler's ideas to Czech in LFG framework: the finite verbs agree only in person; singular predicate has constraints that the agreement trigger has to be in singular both morphosyntactically and semantically, while plural one has elsewhere condition.

However, Russian pronouns should be explained in the traditional way which they are distinguished by three persons and two numbers, contrary to Czech and French. It is supported by the fact that Russian verbs in past tense do not agree in person. The plural verbs show the same form when the subject is any traditionally called plural nominals, including first, second, and third person:

(7) a. Ja *'I'*
Ty *'you (SG)'* } byl *'be.past.masc.SG'* ...
On *'he'*
'I/You(*SG*)/He was ... '

b. My *'we'*
Vy *'you (PL)'* } byli *'be.past.PL'* ...
Oni *'they'*
'We/You(*PL*)/They were ... '

If we assume that Russian second person pronouns are not marked for number and have separate person values (e.g. *2s* and *2a* as in Wechsler 2004 for French), we have to have uneconomical explanation – for example, the verb *byl* can have the subject in [[PERS *2s*] ∨ [NUM *sg*]] disjunctively. If we assume that all pronouns are marked for number in Russian, the agreement can be explained simply: verbs agree in number with any nominals including pronouns.

This paper follows Kathol (1999) and Wechsler and Zlatíc (2003), the grammatical agreement is subdivided into syntactic CONC and INDEX. Plus, following Wechsler and Zlatíc (2003), RESTR has the feature COUNT for pure semantic number. I propose the lexical entries for pronoun *vy* 'you' and the *pluralia tantum* nouns *očki* 'glasses' or *bryuki* 'pants' as follows:

(8) a. polite pronoun *vy*

$$\begin{bmatrix} \text{...} \mid \text{CONC} & \begin{bmatrix} \text{NUM} & \text{pl} \\ \text{...} \end{bmatrix} \\ \text{...} \mid \text{INDEX} & \begin{bmatrix} \text{NUM} & [1] \\ \text{...} \end{bmatrix} \\ \text{...} \mid \text{RESTR} & \begin{bmatrix} \text{COUNT} & [1] \\ \text{...} \end{bmatrix} \end{bmatrix}$$

b. *pluralia tantum* nouns

$$\begin{bmatrix} \text{...} \mid \text{CONC} & \begin{bmatrix} \text{NUM} & \text{pl} \\ \text{...} \end{bmatrix} \\ \text{...} \mid \text{INDEX} & \begin{bmatrix} \text{NUM} & \text{pl} \\ \text{...} \end{bmatrix} \\ \text{...} \mid \text{RESTR} & \begin{bmatrix} \text{COUNT} \\ \text{...} \end{bmatrix} \end{bmatrix}$$

The polite pronoun *vy* has *plural* number in CONC but INDEX number is identical with COUNT value. When the COUNT value is decided in the real world depending on how many persons are referred, INDEX number value follows this. On the other hand, *pluralia tantum* nouns are specified as PL number for both CONC and INDEX, and in the context either singular or plural number is possible for COUNT feature.

Thus, even when polite pronoun *vy* and *pluralia tantum* noun both refer to a single referent, INDEX number values are different – *sg* vs. *pl* respectively. Their INDEX numbers explain the referential agreement with relative pronoun:[5]

(9) a. Vy kotoraja (>>kotorie) stol'ko čitaete, mnogo znaete
you, rel-pron.F.**SG** (PL) so_much read.2PL much know.2PL
'You (polite.SG), who read much, know much.'

b. eti bryuki, kotorie /*kotorij dala mne moya babuška,
this.PL pants.PL rel-pron.**PL**/*SG gave to.me my grandmother
moi lyubimaya
my.PL favorite.PL
'These pants, which my grandmother gave me, are my favorite.'

Pronoun and antecedent show INDEX agreement. In the above sentences, the polite pronoun *vy* triggers singular agreement in the relative pronoun but *pluralia tantum* noun *bryuki* triggers plural agreement. When the third person pronoun co-refers to *pluralia tantum* noun, the pronoun has to be in plural:

(10) Ja kupil eti bryuki vchera. Ja lyublyu ix / *ego.
I bought.1sg this.PL pants yesterday I love.1sg them.acc/it.acc
'I bought a pair of pants yesterday. I love them.'

[5] When the relative pronoun agrees with polite pronoun, singular form is much more preferred than plural form or plural sounds bad completely depending on a speaker.

Thus, it is plausible to say that two different nominal types, polite pronoun *vy* and *pluralia tantum* noun have different INDEX number.

One separate issue to mention about is the possibility between animacy and different INDEX number values of polite pronoun *vy* and *pluralia tantum* noun. The INDEX number I gave for two lexical entries might be related to animacy. The controllers referring to animates are more likely to take semantically justified agreement than are those referring to inanimates. Corbett (1983a) shows the evidence coming from different Slavic languages, involving quantified expressions and conjoined NPs. When animates are conjoined or in quantified expressions, they trigger more semantic agreement than inanimates' cases. It is possible to say that *pluralia tantum* nouns are inanimate, so it has morphological PL number in INDEX triggering PL agreement to a relative pronoun, while polite pronoun refers to human, so it can have semantic SG number in INDEX triggering SG agreement to a relative pronoun. This fact can be another evidence for semantic agreement with an animate in Russian.

3.2 Verbs, SF adjectives and predicate nominals

It is quite clear what verbs, SF adjectives, and predicate nominals want to agree with. Finite verbs and SF adjectives only show morphological agreement regardless of the agreement trigger type. Thus, we can analyze that in Russian the number value of finite verbs or short-form adjectives have to be identical with the CONC's number value of the subject. For example, the partial lexical information for the plural SF adjective *krasivy* 'nice' is as follows:

(11) Lexical sign for *krasivy*:

$$\begin{bmatrix} \text{PHON} & /\text{krasivy}/ \\ \text{SUBJ} & \langle [\text{CONCORD} [\text{NUM} \quad pl]] \rangle \end{bmatrix}$$

This plural adjective agrees with morphologically plural agreement trigger like pronoun *vy* and *pluralia tantum* subjects. On the other hand, singular SF adjective *krasiv* 'nice.SG' requires the subject to be singular, which make impossible to agree with pronoun *vy* and *pluralia tantum* subjects regardless of the number of its referent:

(12) a. Vy krasivy /*krasiv
2PL nice.SF.**PL**/ *SG
'You (one formal addressee or multiple addressees) were nice.'

b. Eti otčki krasivy /*krasiv
these glasses.PL nice.SF.**PL** /*SG
'These glasses (**one** or more than one pair) are nice.'

Predicate nominals also show consistent agreement pattern for different subject types, but it should be semantic agreement. The relationship between predicate nominal and subject is purely semantic. They do not have any grammatical agreement. If the subject is an aggregate, which is semantically plural, predicate nouns are always in plural. Otherwise they are in singular. Let's think about *pluralia tantum* subject cases again:

(13) a. Èti očki special'ny' instrument čtoby smotret' fil'm
these glasses special.SG tool.**SG** so_that to_watch film
'These glasses (**one** pair) are a special tool to watch a (e.g. IMAX) movie.'

b. Èti očki special'nye instrumenty čtoby smotret' fil'm
these glasses special.PL tool.**PL** so_that to_watch film
'These glasses (more than one pair) are special tools to watch a movie.'

The predicate nouns show different number depending on 'real' number of referent. We see the attributive adjective *special'ny'* 'special' shows the morphological agreement with the predicate noun as SG or PL. The predicate noun *instrument* 'tool' is an agreement trigger as well as an agreement target.

The lexical sign of the noun *instrumenty* 'tool.PL' has the following information:

(14) Lexical sign for *instrumenty*:

$$\begin{bmatrix} \text{PHON} & /\text{instrumenty}/ \\ \text{CONC} & \begin{bmatrix} \text{NUM} & [1] \end{bmatrix} \\ \text{SUBJ} & \left\langle \begin{bmatrix} \text{RESTR} & \begin{bmatrix} \text{COUNT} & [1]\, pl \end{bmatrix} \end{bmatrix} \right\rangle \end{bmatrix}$$

The number value of predicate nouns is identical with the COUNT number in RESTR of the subject. When the subject is *vy* 'you.PL', then it triggers

different numbers on predicate nominals depending on how many addressees are referred to. One thing to note is that the number value of the predicate noun has to be a default value. The predicate noun itself can be restricted for number like collective noun, *pluralia/singularia tantum* noun, etc. In that case, the predicate noun does not show the agreement with its subject. It has to have its lexically constrained number no matter what semantic number the subject nominal has.

4 LF adjectives

Let's move on to LF adjectives. First, the differences between SF and LF are discussed with the previous studies. We will come to conclusion that LF adjectives behave only attributive – i.e. when a LF adjective appears in the predicate position, there is always a null head noun that it modifies. Then, I will give the analysis for LF adjective agreement.

There have been researches on different behavior of SF and LF adjectives (Babby 1973, Siegel 1976, Baylin 1994, etc.). Their common conclusion is that LF adjectives in predicate position modify a null noun. First, SF adjectives are never used attributively and appear only in the predicate position; whereas LF adjectives appear to be unconstrained – i.e. LF can appear in either attributive or predicate position. Following examples are from Matushansky (2006):

(15) a. Marija byla umnaja ženščina.
M. be.past.SG clever.LF.Fem.Nom woman.Fem.Nom
'Maria was an intelligent woman.'

b. Marija byla umnaja
M. be.past.SG clever.LF.Nom.Fem.
'Maria was an intelligent woman (lit. an intelligent one).

c. *Marija byla umna ženščina
M. be.past.SG clever.SF.Fem. woman.Fem.Nom

Second, as we can see from the above examples, LF adjectives inflect fully for case like nouns, while SF adjectives do not inflect for case at all.

Third, as Siegel (1976) noted, SF and LF adjectives have different interpretation – absolute vs. relative respectively. The sentence *the student is smart* with **SF** adjective, *Studentka* ***umna***, means that the student is intelligent in general – i.e. absolute term. On the other hand, the sentence with **LF** adjective, *Studentka* ***umnaja***, means that she is intelligent compared with other students, i.e. '*The student is an intelligent one*.'

Due to the different interpretation between LF and SF adjectives, when we need the relative interpretation, we cannot use LF adjectives:[6]

(16) a. Prostrantsvo beskonečno (SF) / *beskonečnoe (LF)
'Space is infinite.'
b. Vse jasno (SF) / *jasnoe (LF)
'Everything is clear.'
c. Prixodit' domoj očen' prijatno (SF) / *prijatnoe (LF)
'To come home is very pleasant.'

Those sentences can be compared with the following English sentences. We cannot insert the anaphora *one* in the above sentences like: ?#*Space is an infinite one* / ?#*Everything is a clear one* / ?#*To come home is a very pleasant one*. In Russian, those sentences should use SF adjectives, not LF.

In similar reason, impersonal adjectives of weather or physical state do not have LF adjective forms (Matushansky 2006):

(17) a. (Utrom) bylo solnečno(*e)
morning.Inst was.Neut sunny.Neut.SG(-LF)
'It was sunny in the morning.'
b. Utro bylo solnečno(*e)
morning.Nom was.Neut sunny.Neut.SG(-LF)
'It was a sunny morning. (lit. The morning was sunny.)'

(18) Lene ploxo / *ploxoe
Lena.Dat bad.SF.Neut.SG / LF.Neut.Nom.SG
'Lena is unwell.' (*cp*. ?Lena is an unwell one.)

[6] My informant has the same judgment on these sentences.

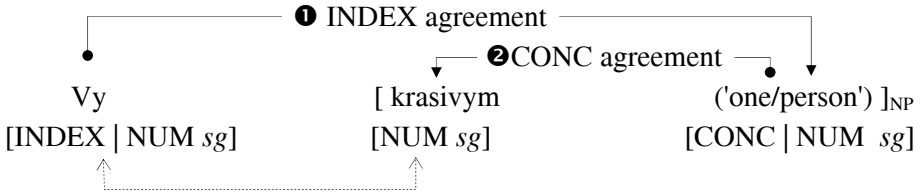
The above examples support their common conclusion that LF adjectives are always attributive and if they are in predicate position there is always an elided null nominal. For example below (19a)=(3) and (19b)=(4a), the LF adjective *krasivyj* is actually modifying a null head:

(19) a. Vy krasivyj / *krasivye Ø
you.polite nice.NOM.**SG** / PL (one)
'You (one formal addressee) are nice.'

b. Eti otčki krasivye /*krasivyj Ø
these glasses.PL nice.Nom.**PL** / SG (ones)
'These glasses (one or more than one pair) are nice.'

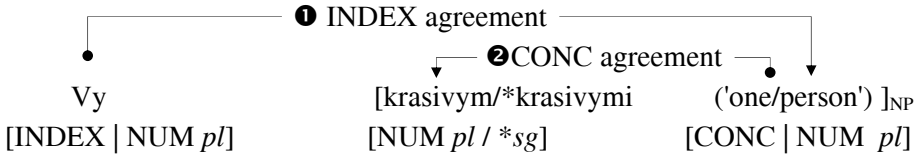
Thus, the agreement of LF adjective in predicate position shows actually CONCORD agreement, not INDEX, like those in attributive position:

(20) a. 'You (one male formal addressee) are nice. = You are a nice person.'

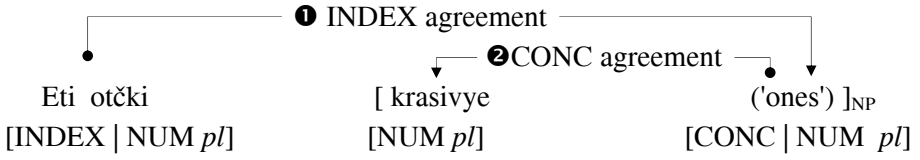


Result? Just looks like INDEX agreement.

b. 'You (more than one male or mixed gender addressees) are nice.'
= 'You are nice people.'



c. 'These glasses (one or more than one pair) are nice.'
= 'These glasses are nice ones.'



Pronoun *vy* can have either number in INDEX depending on how many persons it refers to. When it refers to more than one person, as in (20a), the unexpressed anaphora *'one'* has *singular* number by INDEX agreement with *vy*, and LF adjective agrees in CONC number with its null head, whereas when *vy* refers to more than one person as in (20b), then its INDEX number is plural which trigger plural INDEX agreement in null anaphora, which triggers CONC agreement to LF adjective. *Pluralia tantum* nouns are constrained to have "PL" INDEX number as in (20c). In the same reason, LF adjective should be in PL.

I adopt the idea of previous studies on Russian LF adjectives. One same constraint applies for all LF adjectives in attributive position or predicate position. When they are in predicate position, the head which is modified by LF adjective is not overt. I propose that the LF adjective *krasivyj* (in any position, either attributive or predicative) has the following lexical information:

(21) Lexical sign for *krasivyj*:

$$\begin{bmatrix} \text{PHON} & /\text{krasivym}/ \\ \text{MOD} & \text{N}'\begin{bmatrix} \text{CONCORD} & \begin{bmatrix} \text{NUM} & [1]\,sg \\ \text{GEND} & masc \\ \text{CASE} & inst \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

In the HPSG framework, there has not been any analysis on adjectives or nominal ellipsis in Russian. However, few researches try to explain nominal ellipsis in Spanish, German, Hebrew, etc. (e.g. Nerbonne and Mullen 2000). Nerbonne and Mullen (2000) assume the empty lexical heads and those missing nouns are analyzed as actual, but phonetically null, lexical items. The empty-headed N' is selected by the constituent to its left, either an adjective or a determiner. They postulate the Nonempty Left Periphery Constraint which ensures that the null constituent may not be the first leftmost element of the phrase. Thus, when nominal does not have any modifier, it cannot be omitted. Following their idea about the existence of phonetically null lexical items, the lexical sign for the null anaphora 'one' is proposed like the following:

(22)
$$\begin{bmatrix} \text{PHON} & [\quad] \\ \text{SYN} & \begin{bmatrix} \textit{noun} \\ \text{CONCORD} & (\textit{see below}) \end{bmatrix} \\ \text{SEM} & [\ldots.\text{'}\textit{one}\text{'}\ldots\ ] \end{bmatrix}$$

Nominal Ellipsis Agreement Rule:
The CONCORD value of the null anaphor matches the INDEX of its antecedent.

Bailyn (1994) shows interesting diachronic change. Adjectives in Old Russian had quite different distribution from ones in Modern Russian. LF adjectives were used only in predicate position; while SF adjectives were able to be used in attributive position in only indefinite meaning. It supports the idea that LF adjectives are only attributive so that there is always a null head noun that LF adjectives modify when LF adjective is in predicate position.

Independent evidence for null-nominal hypothesis comes from the extremely productive nominal ellipsis in Russian like the following:

(23) a. ja pokazal tu ujutnuyu komnatx i etu ujutnuyu komnatu
I showed.1sg that.acc cozy.acc room.acc and this cozy room
b. ja pokazal tu ujutnuyu komnatx i etu ujutnuyu Ø
c. ja pokazal tu ujutnuyu komnatx i etu Ø Ø
'I showed that cozy room and this cozy room.'

As in the above, the null NP are allowed with almost any adjectives in the discourse context. Those elided nominals are explained in the same way as the predicate noun modified by LF adjective.

To explain the LF adjective agreement, some might want to suggest that we can add the constraint on LF adjectives saying that they should agree with the subject's INDEX number. But, then we cannot explain why SF and LF adjectives have all the different morphosyntactic and semantic differences.

5 Non-nominative *vy* and agreement

Section 5 briefly examines the non-nominative pronoun and agreement. Wechsler (2004, 2005) propose that in Serbo-Croatian pronouns have number only when they are in nominative case showing the following examples, where the adjectives show morphosyntactic agreement with polite pronoun in

nominative case but semantic agreement with non-nominative polite pronoun:

(24) a. Vi ste duhoviti
2PL AUX.2PL funny.masc.PL
'You (one formal addressee or multiple addressees) are funny.'
b. Ja vas smatram duhovitom.
I you.PL.ACC consider funny.INST.fem.SG
'I consider you (one formal female addressee) funny.'
[Serbo-Croatian (Wechsler 2004)]

In Russian, when the pronouns are in non-nominative case, the analysis works the same. In secondary predicate position, case is required so that only LF adjectives can be in that position as in the following sentences:

(25) a. Ya šitayu vas sčastlivym /*sčastlivymi
I consider you.masc.ACC.PL happy.INST.masc.**SG**/PL
'I consider you (one formal male addressee) happy.'
b. Ya šitayu eti očki krasivymi
I consider these glasses nice.INST.**PL**
'I consider these glasses (one or more than one pair) nice.'

LF adjectives in the secondary predicate position also agree with the null 'one' and showing the same pattern of agreement as in the main predicate position.

6 Other special nominals

This section illustrates a few different nominal types. They have different constraints on their nominal types. But, still predicate adjectives are explained in the same way. One type is *singularia tantum* nouns like *metro* 'subway'. They have morphologically singular number only so that they trigger only singular number although they can mean either one or more. They can refer to more than one subways changing COUNT number value but they are constrained to have only singular number in CONC and INDEX which is opposite to *pluralia tantum* nouns:

(26) metro horošee /*horošie / horoš / *horošy
subway.SG nice.LF.NOM.Neut.SG /LF.PL / SF.SG / SF.PL
'The subway is nice. or The subways are nice.'

Another type is *sheep*-type. Like in English *sheep*, they have one morphological form but trigger any number depending on meaning (e.g. *shempanze* 'chimpanzee', *pal'to* 'coat'). This type will have any number value in CONC/INDEX/COUNT but morphologically does not change in number:

(27) a. pal'to bylo krasivo / krasivoe
coat.neut be.neut.SG beautiful.SF.Neut.SG / LF.NOM.Neut.SG
'The coat was beautiful.'
b. pal'to byli krasivy / krasivye
coat.neut be.PL beautiful.SF.PL / LF.PL
'The coats were beautiful.'

(28) a. šimpanze krasivyj /krasiv
chimpanzee.SG nice.LF.Masc.Nom.SG /SF.Masc
'The chimpanzee is nice.'
b. šimpanze krasivye / krasivy
chimpanzee.SG nice.Nom.PL / SF.PL
'The chimpanzees are nice.'

Finally, there is a collective nominal type, meaning only PL but morphologically SG (*molodyož* 'young people, youth. FEM', *studenčestvo* 'students. NEUT', *krest'yanstvo* 'peasantry. NEUT' etc.). As in the previous type, this group of nouns can have any number in CONC and INDEX. The difference is in specified COUNT number as plural:

(29) a. molodyož (byla) krasiva / horoša
youth.FEM be.SG.FEM nice.SF.SG.FEM
b. molodyož (byla) krasivaya / horošaya
youth.FEM be.SG.FEM nice.LF.SG.FEM
c. *molodyož byli krasivy / krasivye
youth.FEM be.PL Short.PL / Long.PL
'Young people are nice.'

The predicate agreement is still applied in the same way, interacting with the constraints on the specific constraints on number in lexical entries.

7 Conclusion

This paper explored the mixed agreement with the polite pronoun *vy* and *pluralia tantum* nouns in Russian. I propose that all predicates – verbs, SF and LF adjectives – except predicate nominals show CONCORD agreement. The predicate nominals have their own inherited number, triggering agreement to its own arguments. This idiosyncratic property of predicate pronouns leads them to agree with their subject in pure semantic number, which is formalized as COUNT number.

Polite pronoun *vy* referring to one referent has different INDEX number from *pluralia tantum* nouns with a single referent (*sg* vs. *pl* respectively). This is confirmed by relative or regular pronominal agreement.

To explain LF adjective agreement, I adopted the Babby (1973), Siegel (1976), Baylin (1994)'s idea that when a long-form adjective appears in the predicate position, there is always a null head that it modifies. LF adjectives show CONC agreement with the null head they modify, and the null anaphor *'one'* agree with the subject of the sentence semantically in INDEX. Thus, LF adjectives seem to agree with the subject of the trigger in INDEX. This paper follows the HPSG's agreement theory of Wechsler & Zlatič (2003) which divide the grammatical agreement features into index agreement and concord agreement.

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Braucht niemanden zu scheren: A survey of NPI licensing in German

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Abstract

In this contribution we will argue that negative polarity is a collocational phenomenon that does not follow from other properties of the respective lexical elements. With German data as evidence, we will follow a proposal by van der Wouden and treat Negative Polarity Items (NPIs) as collocates which must be licensed by abstract semantic properties of their contexts. Using a collocation module for HPSG, which has been independently motivated for bound words and idioms, we will show how to restrict the occurrence of NPIs to legitimate environments, starting from the negativity hierarchy of licensing environments by Zwarts. Besides a more fine-grained semantic licenser hierarchy, we will establish syntactic licensing domains and general collocational restrictions of NPIs.

1 Introduction

Negative polarity items (NPIs) are words or idiomatic phrases that prototypically occur in an appropriately characterized negative environment. Two classical examples are *any* and *ever*.

(1) I *(**don't**) think we have any French fries.

(2) I **haven't/*have** ever been to Torino.

NPIs have been studied intensely in several linguistic frameworks since Klima (1964). Since they may occur both in the scope of negation as well as in a variety of other semantically or pragmatically related environments, one very active and controversial research area is the detailed description of possible licensing contexts.

The purpose of the present paper is twofold. First, we will present new representative data from German which highlight the kinds of distributional restrictions NPIs exhibit within and beyond the broader range of licensing domains known from the literature, and second, we will propose a multi-dimensional architecture for a lexical NPI licensing theory in HPSG.

2 Characteristics of NPIs

It might be surprising at first that negative polar elements are not a small, negligible class of lexical elements. The number of NPIs is known to be quite large in languages such as Dutch and German. Hoeksema (2005) for instance presents about 700 Dutch NPIs. NPIs occur in any part-of-speech, as we illustrate with the following examples from German.

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- **Adverbs**: *jemals* (‘ever’), *beileibe* (‘by no means’)
- **Nouns**: *Deut* (‘farthing’), *Menschenseele* (‘soul’)
- **Adjectives**: *geheuer* (‘mysterious/scary’), *gefeit* (‘immune’)
- **Verbs**: *brauchen* (‘need’), *ausstehen können* (‘can stand’), *wahrhaben wollen* (‘want to see the truth’)

They even can be syntactically complex and clearly idiomatic:

- *einen Finger rühren* (‘to lift a finger’)
- *seinen Augen trauen* (‘to believe one’s eyes’)
- *(nicht) alle Tassen im Schrank haben* (‘not to have all cups in the cupboard’ - to have lost one’s marbles)

In a similar way, the licensers of NPIs constitute a very broad and seemingly fuzzy class of lexical elements and syntactic constructions. It comprises n-words (negative particles, negative quantifiers), conditionals, questions, the restrictor of universal quantifiers and superlatives, non-affirmative verbs (*doubt*, *be surprised*), neg raising verbs (*believe*), downward-entailing contexts in general (*few, hardly, before, without*, the restrictor of universal quantifiers), comparative *than*-sentences, *too*-comparatives, and negative predicates (*improbable*). This broad variety of NPIs and licensing contexts notwithstanding, there have been several attempts at establishing a unified licensing theory. As we will argue in the next section, the problem with these approaches is that they often focus only on a subset of NPIs and licensers, rather than on the whole range of negative polar elements and licensing contexts.

3 Overview of NPI Licensing Theories

3.1 Licensing in Downward-Entailing Contexts

One of the first steps towards a general NPI licensing theory was taken by Ladusaw (1980), who established that NPIs can only occur in downward-entailing (DE) contexts, building on an idea from Fauconnier (1975). In the face of a number of open questions concerning the standard Fauconnier-Ladusaw theory of NPIs, there has been further elaboration on this theory, as well as alternative analyses.

3.2 Semantic Approaches

According to the theories proposed in (Kadmon and Landman, 1993; Krifka, 1995; Chierchia, 2005), NPIs have the lexical properties of domain widening and strengthening. For example, the use of *any* leads to a stronger utterance and the denotation of the modified NP contains more elements (even marginal or unexpected items):

(3) There are no birds in this zoo, there aren't even penguins.
– No, there aren't any birds in this zoo.

NPIs are banned from semantically non-licensing contexts such as affirmative or upward-entailing contexts. They may introduce alternatives to the foreground information which induce an ordering relation of specificity. The NPI itself denotes the most specific element on this scale. This idea works well for indefinite NPIs and minimizers such as *a drop* or *a wink*, and even for modal verbs such as *brauchen* ('to need') in German. However, it remains unclear how this idea can be applied to NPIs in general, e.g. *sonderlich* ('particularly') or *scheren* ('to care').

Zwarts (1996; 1997) argues for a hierarchy of NPIs in which three classes of NPIs are licensed by certain increasingly restrictive logical properties of their respective contexts. He distinguishes between superstrong NPIs (licensed in anti-morphic contexts), strong NPIs (licensed also in anti-additive contexts), and weak NPIs (licensed in all downward-entailing contexts).[1] This quite fine-grained hierarchy is empirically motivated with Dutch data and works for German as well (strong: *überhaupt* ('at all'), weak: *im entferntesten* ('remotely')). However, the negation occurring with German superstrong NPIs (*nicht jedermanns Sache* ('not everyone's cup of tea')) may be considered idiomatic, i. e. the negative particle is an integral und inalterable part of the expression. Therefore, we assume that there are no NPIs in German which are licensed exclusively by anti-morphic contexts, and we classify German NPIs as either strong or weak for the time being.

Krifka (1995) uses different concepts for a similar distinction between strong and weak NPIs. For example, he restricts strong NPIs to emphatic contexts. It is an open question whether one can mimic a more fine-grained hierarchy such as the one presented by Zwarts using Krifka's analysis.

A further problem for purely semantic characterizations of NPI licensing domains arises from what Linebarger (1987) calls an "immediate scope constraint", forbidding any quantifier to intervene between an NPI and its licensing (negative) quantifier.

(4) Hans gab Wohltätigkeitsorganisationen keinen roten Heller.
Hans gave charity not-a red cent
'John didn't give a red cent to charity.'

(5) * Jeder Wohltätigkeitsorganisation gab Hans keinen roten Heller.
every charity gave Hans not-a red cent
Intended: 'John didn't give a red cent to every charity.'
(This is ungrammatical in English as well.)

It is not obvious exactly which semantic approach could implement this essentially syntactic constraint. In a similar vein, Sailer (t.a.) argues for a decomposition

[1] For precise definitions of anti-morphic, anti-additive, and downward-entailing contexts, cf. Zwarts 1996.

analysis of *few*. The reading that licenses NPIs is described as $\mathsf{many}'x(\phi)(\neg\psi)$, the idea being that NPIs are licensed if their semantic contribution to an utterance containing *few* ends up as a subterm of ψ. Purely semantic approaches are indifferent concerning the exact syntax of LF structure, which is necessary in both Linebarger's and Sailer's proposals.

3.3 Pragmatic Approaches

Even though Krifka (1995) already takes pragmatic factors into consideration, there are approaches which may be even better relegated to the "pragmatic corner". For example, de Swart (1998) argues that the possibility or impossibility of inverse scope configurations in which an NPI precedes its negative licenser can be explained by taking the pragmatic implicatures triggered by the NPI into account. With this idea she is able to explain the contrast between the impossibility of bare NPI subjects preceding clause-mate negation and legitimate NPIs embedded in indefinite nominal or sentential constituents preceding the negative licenser on pragmatic grounds.

(6) * Auch nur irgendetwas wurde nicht gestohlen.
even only anything was not not stolen
Intended: 'Anything hasn't been stolen.'
(This is ungrammatical in English as well.)

(7) Dass er auch nur irgendetwas gestohlen hat, wurde nie bewiesen.
that he even only anything stolen has, was never proved
'That he has stolen anything was never proved.'
Implies: Some of his deeds could be proved, but not that he had stolen anything.

3.4 Shortcomings

The purely semantic and pragmatic theories of NPIs raise a number of open questions. Firstly, not all licensing contexts have DE properties. Ladusaw's theory cannot be generalized to all licensing environments. Take the following examples (a question, an imperative and a comparative[2]):

(8) Schert sie sich um ihre Angestellten?
cares she herself about her employees
'Does she care about her employees?'

(9) Scheren Sie sich um Ihren eigenen Kram!
care you yourself about your own stuff
'Mind your own business!'

[2]This last example is from Oberösterreichische Nachrichten, 01-11-1996.

(10) Urlauber ändern ihre Ansprüche schneller als jemals zuvor.
vacationers change their demands faster than ever before.
'Vacationers are changing their demands faster than ever before.'

Secondly, a drawback of semantic approaches is that not all NPIs introduce a domain widening (e. g. *scheren*, 'care'). As far as pragmatic implicatures are concerned, it is far from clear which ones are triggered by which NPI. Moreover, the question of how implicatures can be modelled in a comprehensive mathematical theory of grammar has to be answered first in order to integrate this kind of theory into a formal grammar framework.

4 A Collocational Approach

The theory of van der Wouden (1997) conceptualizes the basic property of polarity sensitivity in natural languages differently. In van der Wouden's view, polarity sensitivities are collocational restrictions. He regards NPIs as collocates which have a meaning of their own and exhibit idiosyncratic restrictions on their contexts. Put differently, NPIs must be triggered by an appropriate context – their collocate. This perspective predicts lexical idiosyncrasies in NPIs which are related to those we observe in other lexicalized elements with a varying degree of frozenness, such as idiomatic expressions. We will now investigate four German NPIs which support van der Wouden's assumptions.

4.1 Data from German

The data we will present in this section illustrate NPIs from different syntactic categories, with different kinds of lexical semantics and with different collocational licensing requirements. These requirements are even beyond those that stem directly from those which constitute defining properties of NPIs in the traditional sense of Ladusaw-Fauconnier-type theories.

1. *sich um etw. scheren* ('to care about sth.') is a verbal NPI which is licensed by DE contexts, questions and even imperatives. The example shows a prototypical case, in which *scheren* is licensed by a clause-mate negation:

   Die Helden, wenn man sie denn so nennen will, scheren sich nicht
   the heroes if one them then so call wants, care themselves not
   um Moral - es geht ihnen einfach nur ums Geld.
   about morality - it goes them simply only about money.

   'These heroes, if one might call them that, don't care about morality - it's all about money.' (taken from DEREKO: *taz* 1998/1, s166)

2. *keinen Hehl aus etw. machen* ('to make no secret of sth.') is a nominal NPI, which is licensed by DE contexts and questions. A negation can either occur

in the NP (as in 'make no secret'), in the VP (as in 'without making a secret'), or may be contributed by another argument of the verb (as in 'nobody makes a secret of sth.'). In the following case the negation is contained in *never*. The noun *Hehl* is part of an idiomatic expression, which means that the verb *machen* and the PP must co-occur as well.

Daraus hat er nie einen Hehl gemacht.
Out-of-it has he never a secret made.

'He never made a secret of it.' (taken from DEREKO: *taz* 1998/3, s92921)

3. *von ungefähr* ('by chance') is an adverbial NPI which is licensed in questions, anti-morphic (*not*), anti-additive (*nothing*), and DE contexts. The adverb *nicht*, if present, has strong tendencies to attach to the *von*-PP. This is illustrated by the example below, in which the NPI is topicalized.

Nicht von ungefähr sollen deshalb die neuen Medien eine wichtige Rolle
not by chance shall therefore the new media an important role
spielen.
play.

'For these obvious reasons the new media shall play an important role.' (taken from the *St. Galler Tagblatt*, 04-30-1997)

4. *beileibe* ('really') is an adverbial NPI which is licensed in anti-morphic and anti-additive contexts. It serves to emphasize the negation in a sentence, as illustrated in the following example.

Es geht ihm beileibe nicht schlecht, er hat eine Stereoanlage und einen weit
it goes him really not bad, he has a stereo and a far
größeren Fernseher als ich zu Hause.
bigger TV set than I at home.

'He is really not bad off, he has a stereo and a much bigger TV at home than I have.' (taken from DEREKO: *taz* 1998/2, s7951)

4.2 NPI-hood as Idiosyncrasy

The fact that NPIs are sensitive to negativity does not follow from their grammatical properties. There are (near-)synonyms for the above examples (*kümmern* (1), *Geheimnis* (2), *durch Zufall* (3), *wirklich* (4)) whose distribution does not reveal any idiosyncrasies. Van der Wouden (1997) compares this fact to the case of idioms. For instance, he shows (p. 23) that there are cognate idioms in closely related languages such as Dutch and German, one being an *Affirmative Polarity Item* (API) and the other an NPI:

(11) Met grote heren is het (*niet) kwaad kersen eten. (API)
with big gentlemen is it (*not) bad cherries eat
'It is best not to tangle with the superiors.'

(12) Mit hohen Herren ist *(nicht) gut Kirschen essen. (NPI)
with big gentlemen is *(not) good cherries eat.
'It is best not to tangle with the superiors.'

4.3 Restrictions on Different Levels

Collocations exhibit their idiosyncrasies on different levels. There are morphological anomalies (in the German expression *gehupft wie gesprungen* ('either way') the first participle is anomalous), syntactic anomalies (there are bound words which are only acceptable in specific environments) or semantic restrictions (idiom parts in their idiomatic meaning can only occur together with the "rest" of the idiom). Van der Wouden mentions the Dutch equivalent of the German NPI *jdn. ausstehen können* ('can stand sb.'), which accepts suffixation of *-lich* ('-able') only in its negated form *unausstehlich*. Moreover, the antonym of the Dutch positive-polar adjective *verdienstelijk* ('meritorious') is an NPI.

Idiosyncrasies of collocations are not limited to the co-occurrence of specific lexemes or morphemes. Even their ability to be modified is subject to restrictions. Take, for example, the modifiability of *kick the bucket*. *Kick the proverbial bucket* or *kick the bucket unexpectedly* is impeccable, but one cannot *kick the bucket far away* or *with great determination* and keep the meaning 'to die'. In German something can *fröhliche/heitere Urstände feiern* ('celebrate a merry revival') but not *glückliche Urstände*, even though the semantics of the latter adjective ('happy') is closely related to the former ones. In analogy to these observations about idiomatic phrases, we want to argue with van der Wouden that occurrences of NPIs have abstract restrictions on their contexts as well. They require the presence of specific triggers such as negation, questions, etc. Conversely, some expressions can have more subtle collocation properties in addition to those which come with their status as an NPI: There are adverbs (e. g. Dutch *moeilijk*, 'difficultly') which license only a subset of NPIs (those with a meaning aspect of ability or possibility). Once we accept the fact that NPIs are collocations, it is no longer surprising that a considerable number of idiomatic phrases are NPIs. Their NPI-hood is just another facet of their idiomatic behavior in general.

4.4 Different Licensing Domains

Whereas early research postulated c-command as a necessary condition on the structural relationship between each legitimate NPI and its licenser, subsequent research has shown that the c-command condition cannot be maintained (Hoeksema, 2000). It has been replaced by a number of morpho-syntactic and semantic-pragmatic conditions which have proven very recalcitrant to a unified theory. Here we mention just a few of the most prominent properties involved in NPI licensing.

The licensing conditions of NPIs depend on their lexical category and on whether or not they are scopal elements. Indefinite NPIs are often impossible to topicalize in English (unless they are embedded in a topicalized constituent), which distinguishes English from Dutch. For adverbials such as *for the life of me* topicalization is impeccable even in English. In general, the possibility that an NPI can precede its licenser through topicalization varies widely across as well as within languages.

For example, the German NPI *auch nur* ('not even'), among others, can only be topicalized in embedded position:

(13) Ein rebellischer oder auch nur bemerkenswert undisziplinierter Soldat bin
a rebellious or even notably undisciplined soldier am
ich nie gewesen.
I never been
'A rebellious or even a notably undisciplined soldier I have never been.' cited in Hoeksema and Rullmann (2001)

(14) *Auch nur ein Bier habe ich nicht getrunken.
even one beer have I not drunk
'Even one beer I haven't drunk.'

In constrast, *Hehl* ('secret'), among others, can be topicalized alone:

(15) Einen Hehl hat Hans aber noch nie daraus gemacht, dass er...
a secret has Hans but still never of-it made, that he...
'John never made a secret of the fact that he...'

This variation excludes both simple cross-linguistic semantic generalizations and syntactic generalizations based on properties such as syntactic category or type of quantificational expression. Topicalization can be further differentiated into long and short topicalization, with some NPIs being restricted to short topicalization, while others permit unbounded extraction.

Some idioms reveal similar behavior. For instance, in the following example, the idiom part *Bauklötze* can be topicalized to the Vorfeld (16) but not extracted out of a subordinate clause (17).

(16) Bauklötze staunt man bei Daimler-Chrysler.
building bricks googles one at Daimler-Chrysler
'They are flabbergasted at Daimler-Chrysler.'

(17) *Bauklötze glaube ich, dass Peter gestaunt hat.
building bricks believe I that Peter goggled has
'I believe that Peter was flabbergasted.'

In the case of (18), both idiom parts must be in the Vorfeld. If only *Öl* were extracted, the expression would lose its idiomatic meaning.

(18) [Öl] [ins Feuer] goss gestern die Meldung über das Tankerunglück.
oil in-the fire poured yesterday the news about the tankship disaster.
'The news about the tankship disaster added fuel to the fire yesterday.'

Other well-known facts concern quantificational barriers for the licensing relationship. Many NPIs require licensing in the immediate scope of a negation (or another appropriate) operator such as a negative quantifier ($\neg\exists$), cf. (4) vs. (5). Intervening quantifiers or intervening definiteness may block their licensing, with the ban on intervening definiteness having long been taken for a strict constraint. Unfortunately, there are uncontroversial counterexamples even to the blocking effect of definiteness, and their nature is not at all understood yet (cf. Hoeksema, 2000, p. 136f). Similarly, the felicity of an NPI is determined by semantic and syntactic properties of a predicate whose dependent an NPI is, the type of argument of the NPI or the semantic class of an NPI adjunct. Some authors distinguish strict and weak NPI licensing depending on whether an NPI is licensed by a clause-mate negation or by negation in a superordinate clause. Many NPIs such as temporal perspective adverbs in English require local licensing (modulo licensing in neg raising contexts, see Sailer (t.a.)), whereas others are more liberal and are satisfied with a non-local lexical or non-lexical licenser. Van der Wouden discusses cases of NPIs which require licensing by a negation outside of a more local syntactic domain in which they behave like Affirmative Polarity Items (van der Wouden, 1997, p. 134).

4.5 Summarizing the Facts

In this section we observed a number of properties of NPIs which our theory will need to capture. They can be summarized as follows:

- NPIs are lexicalized and behave idiosyncratically to a certain extent. Showing idiosyncratic behavior means that the context requirements of each NPI cannot be fully predicted from the fact that it is an NPI, the strength of negative environment that it requires, the domain in which the licensing condition must be fulfilled, or its lexical semantics.
- NPIs cannot be reduced to contributing a particular kind of meaning. Languages often have expressions which are semantically equivalent to an NPI but are not NPIs themselves. Moreover, not all NPIs convey a meaning which lies at a bottom of a scale.
- NPIs are not licensed by a uniform type of licensers (cf. section 2).
- The distance between the licenser and the licensee can vary in the same way as do collocates in idiomatic expressions.
- NPIs can have syntactic constraints of the type known from idiomatic expressions on their environments.

In the next section, we will sketch an HPSG analysis of representative data from above (for *scheren*, *beileibe*, and *Hehl*) using the semantic framework of LRS (Lexical Resource Semantics, cf. Richter and Sailer, 2004) and, in addition, a collocation module along the lines of Soehn 2004.

5 Analysis

An analysis of NPI licensing domains minimally presupposes a framework in which negative environments of various strengths (anti-morphic, anti-additive, downward-entailing), the relative scope of quantificational expressions, and other semantically relevant properties such as comparatives or conditionals can be characterized. Moreover, the data indicate that we must minimally be able to refer to the following features of signs: Inherent lexical properties of quantificational expressions; morpho-syntactic properties of lexical and phrasal signs; syntactically determined domains in which NPIs may occur; and idiosyncratic lexical context requirements of the NPIs themselves. These context requirements may in turn be syntactic, semantic or pragmatic in nature. In a fine-grained analysis, we should ultimately be able to capture pragmatic notions such as presuppositions or conversational implicatures and their relationship to the truth conditions of utterances.

In this section we will ignore pragmatics and concentrate on the core syntactic and truth-conditional factors. The conditions on licensing domains will be expressed in terms of Soehn's (2004; 2006) theory of the attribute COLL (Context of Lexical Licensing, defined on signs), which provides the foundations of a theory of syntactic domains while eschewing some of the problems of the unrestricted expressiveness of its precursor, Sailer 2003. Collocationally restricted items have a non-empty COLL value, which contains one or several *barrier* objects indicating the syntactic domain in which their context requirements must be satisfied. Possible barrier objects are *vp* (used for the smallest VP dominating a given element), *complete-clause* (used for the smallest complete clause dominating a given element), *utterance* (the utterance in which an element occurs), and others. Barrier objects have attributes which are used to specify (local) syntactic or semantic properties that the relevant barrier must have. For NPI licensing *per se*, we will exclusively be concerned with the LF-LIC value of barriers. Some NPIs, however, come with orthogonal syntactic restrictions on their contexts which will be imposed through appropriate LOC-LIC specifications of the barrier. These concern the LOCAL value of their licensing domain.

Following Richter and Sailer 2004, our semantic interpretations will be couched in terms of LRS. The crucial property of LRS for us is the fact that it uses expressions of Ty2 for logical representations of the meaning of natural language expressions. In LRS the semantic information of a sign is encoded in its L(OGICAL-) F(ORM) value. The value of this attribute crucially contains the following two attributes:[3] PARTS lists all subexpressions that are contributed by a sign. The

[3]LRS uses additional attributes, which, however, will not be considered in this paper.

EX(TERNAL-)C(ONTENT) is the logical form of a phrase. The combinatoric principles determine that the PARTS list of a phrase is the concatenation of the daughters' PARTS lists. Furthermore, the EXC value of an utterance consists exactly of the expressions on the utterance's PARTS list. The traditional CONTENT attribute of HPSG houses local (or lexical) aspects of the semantic representation of a sign. Among these we will only need the MAIN attribute, whose value is the non-logical constant signalling the nuclear semantic contribution of a lexical sign.

5.1 Structure of the Theory

We assume that the licensing environments of NPIs are essentially semantic in nature. NPIs are lexical elements (in the sense of Sailer 2003, i.e. comprising certain phrasal idioms belonging to the lexicon) which impose collocational conditions on their environments. While the defining property of NPIs is the presence of negation, they exhibit collocation requirements along several dimensions. The simultaneous presence of these dimensions makes NPIs a seemingly heterogeneous collection of items which is recalcitrant to a uniform general theory. Once we distinguish carefully between the different dimensions, each of the independent modules will exhibit a systematic internal behavior.

The main dimensions of lexical variation of German NPIs are, (1) the required minimal strength of a (negative) licenser, (2) the syntactic locality domain in which the licenser must occur, and (3) additional collocational restrictions which may concern extraction, lexical collocates, or scope intervention conditions. Semantic licensing is the defining factor of negative polarity items among these licensing conditions. In other words, a lexical item is a negative polarity item if and only if (1) it has collocation requirements and (2) among these collocation requirements we find that its context of licensing includes anti-morphic contexts. Note that a particular occurrence of an NPI might not be in an anti-morphic context; the realization of the NPI in a given utterance might be licensed by a question context or by an imperative.

The licenser hierarchy With our hierarchy of licensers we extend Zwarts' (1996; 1997) theory of weak, strong, and superstrong NPIs which are licensed in contexts which are at least DE, anti-additive, or anti-morphic. To these we add questions, comparatives and imperative constructions as licensing contexts for even weaker NPIs. Our working hypothesis is that imperatives constitute the weakest possible licensing environment, and any NPI which is licensed (within a given licensing domain) by imperatives, will also be licensed by all other licensing environments. The class of questions, conditionals and comparatives is the second weakest class. This class may include further licensing environments yet to be explored, and it may be possible to establish a more fine-grained hierarchy even between the current members of our second class. Due to the subtleness of the judgements on this

kind of data, we leave this issue to further research.[4]

Fig. 1 schematically illustrates a feature logical characterization of our licenser hierarchy. The figure shows only Zwarts' top elements of the hierarchy, anti-morphic, anti-additive and DE environments. It can easily be extended to cover our two additional classes at the bottom end of the hierarchy.

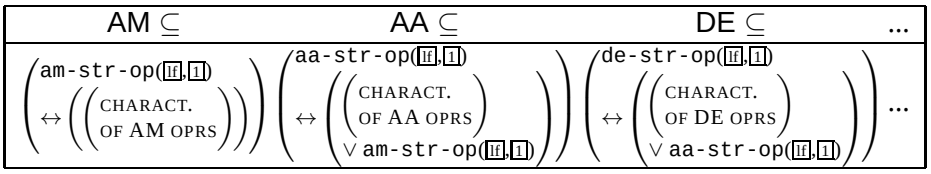

Figure 1: Sketch of a feature logical characterization of the licenser hierarchy

The idea of Fig. 1 is to use HPSG relations to say when a Ty2 expression, 1, is in the scope of a minimally DE, anti-additive or anti-morphic operator within a Ty2 expression lf. Consider the relation `de-str(ength)-op(erator)` as an example. We say that two Ty2 expressions, 1 and lf, are in the `de-str-op` relation if and only if there is a downward entailing operator in lf which scopes over 1 (expressed in CHARACT. OF DE OPRS), or 1 and lf are in the relation `a(nti-)a(dditive)-str(ength)-op(erator)`. In the latter case this means that 1 will be in the scope of an anti-additive operator within lf, or, alternatively, in the scope of an anti-morphic operator (since this is a disjunctive possibility in the definition of the relation `aa-str-op`). It should be clear from this that whenever we will use the relation `de-str-op` to characterize the licensing requirement of an NPI, this will mean that the NPI must be licensed by an operator which is *at least* of the strength of a DE operator. It should also be noted that in light of the syntactic nature of scope intervention conditions imposed by certain NPIs (see the discussion in section 3.2 above), our choice of logical representations as the level of expressing the licenser hierarchy is deliberate. A direct semantic characterization of the relevant operators would not give us a straightforward handle on expressing the immediate scope conditions we observe for certain NPIs. On the other hand, a characterization of logical operators in the feature logic can employ the standard mechanisms of the feature logic for generalizing over entire classes of objects in order to obtain a satisfactory degree of generality of the theory.

Fig. 2 illustrates for the relation `de-str-op` how the characterization of classes of logical operators proceeds in the feature logic. For the sake of simplicity, we do not try to give a compact characterization of entire classes of DE operators here. Instead, we give a transparent description of a few standard DE operators and their relevant scope. Informally speaking, Fig. 2 says the following: Two Ty2 expressions, lf and 1 are in the `de-str-op` relation iff there is an operator 2

[4]The methodological limits of introspective judgements and the sparsity of the relevant data in corpora suggest that psycholinguistic experiments are needed in order to obtain conclusive results.

in [lf] (which, in our small example, is either every, few, at_most_n or hardly) such that the expression [3] is a DE argument slot of the operator and [1] is a subterm of [3]; or, alternatively, [lf] and [1] are in the `aa-str-op` relation. The remaining four relations, including `aa-str-op`, are defined analogously, with one relation, `quest-cond-comp-op`, treating the class of question operators, conditionals and comparatives simultaneously, and `imp-op` defining imperative environments.

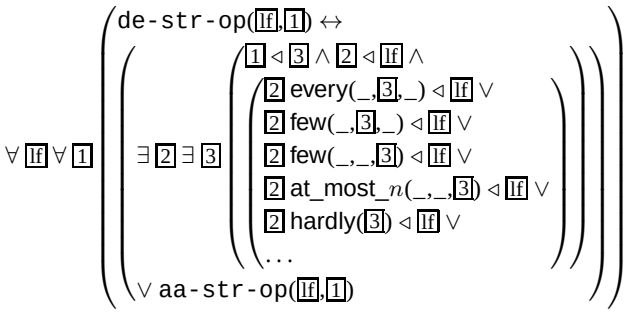

Figure 2: `de-str-op` for *few, at most n, hardly*, restrictor of *every*

In Section 5.2 we will illustrate the use of our hierarchy of relations defining the licensing environments of NPIs.

Licensing domains The second important ingredient of our theory of NPIs are the barriers of the COLL module. Barriers are phrases of a certain kind (*utterance*, *complete-clause*, *np*, ...) which are identified as nodes in the syntactic configuration above the sign in question. The LICENSING PRINCIPLE guarantees that a barrier dominates the sign and meets all the criteria mentioned in the sign's lexical entry.

(19) LICENSING PRINCIPLE:

For each *barrier* object on the COLL list of a sign x and for each phrase z:
the LOCAL *value of* z *is identical to the* LOC-LIC *value and*
the LF *value of* z *is identical to the* LF-LIC *value*
if and only if

1. z dominates x,
2. z can be identified as the barrier specified and
3. z dominates no sign y which in turn dominates x and forms an equivalent barrier.

The conception of barriers provides a "window" in which collocation restrictions must be satisfied. This is necessary in the specification of NPIs, as there are various licensing domains. The licenser of a given NPI must occur within

(20)
- the same AdvP or NP as with *überhaupt*:

  (i) Eine Torchance hatten sie [überhaupt nicht].
  a scoring chance had they at all not

  'They had no scoring chance at all.'

  (ii) Es bot sich ihnen [überhaupt keine Torchance].
  it arose itself them at all not-a scoring chance

  'They had no scoring chance at all.'

- the same clause as with *scheren*:

  Während der WM scherte sich niemand um die
  during the World Cup bothered himself nobody about the
  Reformpläne der Regierung.
  reform plans of-the government.

  'During the world cup nobody bothered about the government's plans for reforms.'

- the same utterance as with *Hehl*:

  Niemand hätte gedacht, dass Hans daraus einen Hehl machen würde.
  nobody had thought that Hans thereof a secret make would

  'Nobody would have suspected that John would make a secret out of this.'

To capture the different licensing domains, we will specify different *barrier*-objects as values for the feature COLL in the lexical entries of NPIs (see the examples in Fig. 3 and 4 below). The relevant feature of the elements on COLL is LOGICAL-FORM-LICENSER, abbreviated as LF-LIC. The values of this attribute will require that the logical form of the barrier above the NPI meet certain semantic criteria.

Idiosyncratic behavior It should be obvious from the architecture of our collocation theory of NPIs that our theory is prepared to integrate the syntactic collocation conditions known from the literature on idiomatic expressions and treated in Soehn 2006. In particular, such conditions subsume restrictions on short or long topicalization of NPIs, the distinction between bare NPI subjects and NPIs embedded in subjects, idiomatic phrases as NPIs, and Linebarger's immediate scope constraint, which forbids the occurrence of another quantifier (of a certain type) between the logical form representing the NPI and its licensing operator. To be more precise, let us look at our example of the licensing relation `de-str-op` in Fig. 2: An immediate scope constraint strengthens the subterm condition between the contribution of the NPI, 1, and the relevant argument slot of the operator, 3, to a subterm configuration in which no other quantificational operator intervenes. The strengthened condition can be added as an idiosyncratic requirement to the

lexical entries of the relevant NPIs.

With all components of our theory in place, we can now turn to the analysis of a few exemplary German NPIs in the next section.

5.2 Lexical Specifications

Verbs A lexical entry of a verb such as *scheren* ('to care') is sketched in Fig. 3. The collocational restriction which indicates that it is an NPI, is contained in the value of COLL. The only element on this list is a *barrier*-object which demands the smallest complete clause in which the verb *scheren* occurs as licensing barrier. The LICENSING PRINCIPLE (19) guarantees that this barrier meets all the criteria mentioned in the lexical entry: The value of the feature LF-LICENSER (LF-LIC) is identical to the value of the barrier's LF feature. Here, the EXTERNAL-CONTENT (EXC) of the clause in which *scheren* occurs must be such that the semantic content of *scheren*, i.e. its MAIN value, $\boxed{1}$, is in the scope of an operator defined in the hierarchy of licensing operators. Any licensing operator will do, since the lexical entry demands only the weakest type, an imperative operator. To make our examples more readable, we write the licensing relations from our licenser hierarchy of relations (here `imp-op`) in functional notation behind the attribute whose value they specify. In Fig. 3, the notation `imp-op`($\boxed{1}$) following the EXC attribute means that the implicit first argument of the `imp-op` relation, $\boxed{\text{lf}}$, is the LIF-LIC EXC value of the *complete-clause* object on the COLL list of *scheren*.

$$\left[\begin{array}{l} \textit{word} \\ \text{PHON} \left\langle \textit{scheren} \right\rangle \\ \text{SS} \quad \left[\text{LOCAL} \left[\begin{array}{ll} \text{CAT HEAD} & \textit{verb} \\ \text{CONTENT MAIN} & \boxed{1}\,\text{scheren}' \end{array}\right]\right] \\ \text{COLL} \left\langle \left[\begin{array}{l} \textit{complete-clause} \\ \text{LF-LIC} \left[\text{EXC} \;\; \texttt{imp-op}(\boxed{1})\right] \end{array}\right] \right\rangle \end{array}\right]$$

$$\left[\begin{array}{l} \textit{word} \\ \text{PHON} \left\langle \textit{beileibe} \right\rangle \\ \text{SS} \quad \left[\text{LOCAL} \left[\begin{array}{ll} \text{CAT HEAD} & \textit{adverb} \\ \text{CONTENT MAIN} & \boxed{1}\,\text{beileibe}' \end{array}\right]\right] \\ \text{COLL} \left\langle \left[\begin{array}{l} \textit{complete-clause} \\ \text{LF-LIC} \left[\text{EXC} \;\; \texttt{aa-strength-op}(\boxed{1})\right] \end{array}\right] \right\rangle \end{array}\right]$$

Figure 3: Sketches of the lexical entries of *scheren* and *beileibe*

Particles The lexical entry of *beileibe* ('really') is analogous to the entry of *scheren* in many ways and the mechanism is exactly the same (see again Fig. 3). However, *beileibe* is not licensed by imperatives, DE contexts and questions, which causes the restriction on the EXC value of the licensing barrier to be stronger than

for *scheren*: The entry of *beileibe* demands that anti-additive and anti-morphic operators take scope over it. As the licensing element must occur in the same clause as the particle itself, the barrier is defined accordingly.[5] We consider it an advantage of the collocation module used here that restrictions can be imposed in a scalable way. As the restrictions are again local, there is no need to check the semantic representation of the entire utterance to guarantee that they are met.

Nouns With *Hehl* ('secret', see Fig. 4), we have chosen a final example which illustrates the interaction between polarity-related and idiomatic restrictions. The first *barrier*-object on the COLL list is now of sort *utterance*, restricting the semantic content of *Hehl* to DE environments and to the scope of questions (or stronger licensers). The second element on the COLL list is of sort *complete-clause* and comes with a different kind of restriction: The value of the attribute LOCAL- LICENSER is identical to the LOCAL value of the clause in which *Hehl* appears. The head verb of this clause must be *machen*, which is expressed by means of the attribute LISTEME (cf. Soehn, 2004). In Soehn's analysis, there is a special version of *machen* that subcategorizes for the noun *Hehl*, and a PP, thus ensuring the co-occurrence of all parts of the idiomatic expression *einen Hehl aus etw. machen*.

$$\left[\begin{array}{ll} \textit{word} & \\ \textsc{phon} & \langle \textit{hehl} \rangle \\ \textsc{ss} & \left[\textsc{local} \left[\begin{array}{ll} \textsc{cat head} & \textit{noun} \\ \textsc{content main} & \boxed{1}\ \mathsf{hehl}' \end{array}\right]\right] \\ \textsc{coll} & \left\langle \left[\begin{array}{l} \textit{utterance} \\ \textsc{lf-lic}\left[\textsc{exc}\ \texttt{quest-cond-comp-op}(\boxed{1})\right] \end{array}\right], \left[\begin{array}{l} \textit{complete-clause} \\ \textsc{local-licenser}\left[\textsc{cat head listeme}\ \textit{machen}\right] \end{array}\right] \right\rangle \end{array}\right]$$

Figure 4: A sketch of the lexical entry of *Hehl*

This example also demonstrates that the combinatorial system of LRS alone is not strong enough to handle the context restrictions of NPIs, and a treatment in terms of COLL is called for. An occurrence restriction which is formulated purely in terms of restrictions on the EXCONT of NPIs would not be sufficient for the following reason: With a semantic EXCONT restriction, the noun *Hehl* in *kein Hehl* ('no secret') would only constrain the semantics of its maximal projection to contain a negation. However, if the negation were outside of the NP and inside the VP (as in 'nobody makes a secret of sth.') the maximal projection of the noun would not contain a licensing negation, but that of the verb (of which the NP is an argument) would. Thus, the occurrence restriction of *Hehl* would have to be different in two

[5] In addition, *beileibe* has the syntactic restriction that it always modifies the licensing element (all n-words basically), which we omit in our sketch of the lexical entry. The fact that *beileibe* can be topicalized alone ("Beileibe zahlen nicht alle Konzerne, die in ihrer Bilanz einen Gewinn ausweisen, auch Gewerbesteuer." in *Mannheimer Morgen*, 09-03-2002) is compatible with this analysis.

uses of one and the same expression, semantic for the NP domain and collocational for the VP domain and beyond. This would be conceptually unsatisfying.

6 Open Questions

We showed that our analysis can model complex cases of NPI licensing in German, taking into account inherent lexical properties of quantificational expressions and of NPIs. Morpho-syntactic properties and various syntactic domains in which NPIs may occur were accommodated in the analysis.

However, the analysis of Section 5 left a number of questions open. To begin with, many licensers may not introduce a licensing operator which belongs to the class of operators often discussed in the literature such as negation or certain generalized quantifiers. The question arises whether there is a systematic way to capture *too*-comparatives or licensing predicates such as *be surprised*. At this point it is unclear exactly how their lexical meaning should be specified in a systematic way to account for their licensing property.

Even more challenging are cases of NPIs without a licenser as in (21).

(21) Israel schert sich einen Pfifferling um UNO Resolutionen.
Israel bothers itself a chanterelle about UN resolutions
'Israel doesn't bother at all about UN resolutions.'

We assume that such cases include one expression which is covertly negative (*einen Pfifferling*) which licenses the NPI (*scheren*). This particular expression has a non-negative counterpart, which is a strong NPI (*keinen Pfifferling*), unlike similar cases such as *einen Dreck* or *einen Teufel*, which are covertly negative as well. Thus, there is no "mutual licensing" of NPIs without a licenser.

As pointed out in Section 2, pragmatic effects of presuppositions or conversational implicatures also play a role in NPI licensing, e. g. the licensing of *beileibe* in non-negated phrases which are used to deny their implied negative counterpart:

(22) Es gab beileibe genug Streitpunkte.
It gave certainly enough controversial issues
'There were certainly enough controversial issues.'

A possible idea for this kind of construction could be to assume that there is a presupposition in the discourse context which denies the existence of "enough controversial issues". Conversely, *beileibe* may introduce such a presupposition. This idea is expressed in the revised sketch of our lexical entry for *beileibe*, which is shown in Fig. 5. There is a new feature BGR-LIC putting a restriction on the BACKGROUND of the utterance, thus expanding the COLL module: There must be a presupposition (a *psoa*), and what is presupposed is that the (MAIN value of the) modified element is in the scope of an anti-morphic operator. Future research will have to address the question of to what extent the basic HPSG architecture can be revised to accommodate these presupposition phenomena.

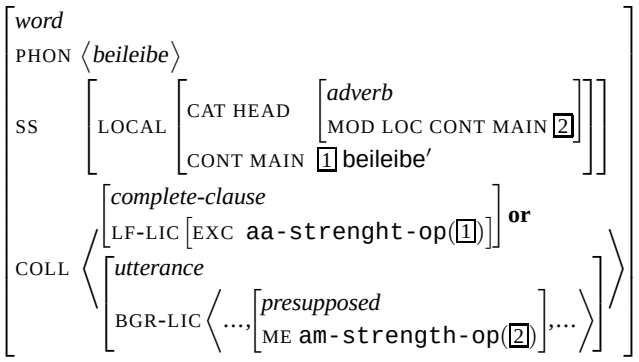

Figure 5: Revised lexical entry of *beileibe*

In general, and most importantly, we believe that much more research is necessary to secure the empirical base of a general theory of NPIs. It is possible that there are many new NPIs yet to be discovered even in well-researched languages such as German. Due to the diverse properties of NPIs and their idiosyncratic behavior, finding them in corpora is tedious and time-consuming work. Attempts at automating the process of finding NPIs have produced promising results (cf. e. g. Lichte, 2005) but are still in need of refinement. With our ongoing research, we aim at improving the empirical base of research on NPIs in German.

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Unexpressed object alternations of Bulgarian verbs in HPSG

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Abstract

This paper proposes a projectionist account of the unexpressed object alternations in HPSG. The approach is based on the two-level mapping mechanism, developed in Manning and Sag (1998) and Sag et al (2003). The proposed analysis keeps identical argument structure values in the lexeme description of both valence alternatives, while different surface valence values are related by a lexical rule.

The HPSG model is applied cross-linguistically to English and Bulgarian. Some Bulgarian-specific traits, such as the limited alternation range and the grammaticalized aspect, related to the formal characteristics of the unexpressed object alternations, are discussed and interpreted within HPSG.

1 Introduction

This paper presents an HPSG account of the *unexpressed object alternation* (UOA) in its cross-linguistic English – Bulgarian aspect. Valence alternations, also known as 'diathesis alternations', or 'multiple complement realizations', are defined by B. Levin as 'alternations in the expressions of verb arguments, sometimes accompanied by changes of meaning', Levin (1993:2). UOA is a valence alternation between two verb projections – one with realized object argument of the verb, and the other – with an unrealized object.

The interplay between the regular complementation patterns according to transitivity classes, on the one hand, and valence alternations, violating this regularity, on the other hand, is a challenge to the HPSG grammar theory.

1.1 Regularity of Complementation Patterns in HPSG

The language regularity of complementation patterns has been formalized in the recent versions of HPSG by a mapping mechanism, distinguishing argument structure (ARG-ST) and surface valence (VAL), presented in Manning & Sag (1998) and Sag et al (2003).

Following the above cited works, each verb is regarded as having a particular set of elements[1] on its ARG-ST list, specified in the lexeme

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description. The values of ARG-ST are not given individually for each lexeme, but lexemes are grouped into transitivity classes, defined as sorts in the sort hierarchy. Thus, the ARG-ST values of transitivity classes are adopted as sort constraints.

For example, the verbs *спя 'sleep'* and *чета 'read'* have descriptions of sorts *intransitive verb lexeme* (*itr-lxm*) and *strict transitive verb lexeme* (*stv-lxm*). Accordingly, the constraint on the sort *itr-lxm* is ARG-ST ⟨NP⟩ and on the sort *stv-lxm* is ARG-ST ⟨NP, NP⟩, *cf.* (1) and (2):

(1) спя – sleep, $\begin{bmatrix} itr\text{-}lxm \\ \text{ARG-STR} \ \langle \ \text{NP} \ \rangle \end{bmatrix}$

(2) чета – read, $\begin{bmatrix} stv\text{-}lxm \\ \text{ARG-STR} \ \langle \ \text{NP} \ , \ \text{NP} \ \rangle \end{bmatrix}$

The surface valence (VAL) is specified in the word description. ARG-ST elements are mapped to VAL elements, and in particular to SPR and COMPS list elements, following the Argument Realization Principle (ARP), as in (3) and (4).

(3) спя –sleep, $\begin{bmatrix} word \\ \text{SYN} \quad \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SPR} \ \langle \ \boxed{1} \ \text{NP} \ \rangle \\ \text{COMPS} \ \langle \ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-STR} \ \langle \ \boxed{1} \ \text{NP} \ \rangle \end{bmatrix}$

(4) чета – read, $\begin{bmatrix} word \\ \text{SYN} \quad \begin{bmatrix} \text{VAL} \begin{bmatrix} \text{SPR} \ \langle \ \boxed{1} \ \text{NP} \ \rangle \\ \text{COMPS} \ \langle \ \boxed{2} \ \text{NP} \ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-STR} \ \langle \ \boxed{1} \ \text{NP} \ , \ \boxed{2} \ \text{NP} \ \rangle \end{bmatrix}$

The HPSG grammar licenses one head-complement projection for each transitivity class and respectively for each verb that belongs to this class. For example, the verbs above project the phrases in brackets in (5) - (6), where the English and Bulgarian examples are given as translation equivalents:

[1] The ARG-ST elements are mapped to semantic roles in the SEM component.

(5) a. John (slept).
b. Иван (спеше).

(6) a. John (read a book).
b. Иван (четеше книга).

1.2 UOA as Irregularity

However, although capturing the difference between projections (5) and (6) as regularity, the mechanism sketched so far does not account for some irregularities concerning this distinction. In particular, one such kind of irregularity are the valence alternations which are a frequent phenomenon of language use, as the corpus data show. Syntactically, it means that one verb can project phrases with different number of arguments. For example the strict transitive verb *чета* - *read* occurs in texts in two realizations, respectively with an NP complement (7)[2] and without a complement (8):

(7) a. John (read a book).
b. Иван (четеше книга).

(8) a. John (read).
b. Иван (четеше).

The irregularity is due to the fact that projection (8) is not licensed by the mechanism described in 1.1. above since that fact that the verb *read* in (7) has no complements contradicts its word description in (3). It practically means that the HPSG grammar, in the version presented above, treats (8) as ungrammatical.

1.3 UOA as Sub-regularity alongside Regularities

How can irregularities such as those in (8) be treated in the HPSG grammar?

In the analysis below, the occurrences of both (8) and (7) are regarded as appropriate for classes of verbs and their alternation - as being of systematic character. Therefore, in regard to (7) and (8), I share the opinion of treating alternations as 'systematically related valence patterns' (Sag et al 2003: 262) rather than as single exceptions within transitivity classes. This

[2] Actually there is one more projection of the transitive verb *read*: *John (read a book to his son),* which is not discussed here since it is related to benefactive or dative alternation types. However, this projection is another instance of irregularity to the strict transitive verb realization pattern.

gives a reason to regard alternations as sub-regularities that can be captured alongside regularities, rather than as irregularities that have to be excluded.

This paper presents an attempt to incorporate valence alternations as sub-regularities in the complementation mechanism of HPSG, thus providing a way to license both (7) and (8) as grammatical in English and Bulgarian.

The proposal is to formalize Levin's approach to unexpressed object alternations within the HPSG framework of Sag et al (2003) and apply it cross-linguistically to English and Bulgarian. Bulgarian data is presented in comparison to English and the cross-linguistic relevance of the English-based alternations typology of Levin (1993) is tested.

The analysis based on lexical rules follows the approach, which Sag et al (2003:263) suggests as a general direction for solving this problem: 'patterns of valence alternations are governed by both semantic and syntactic constraints of the kind that could be described by finely tuned lexical rules'. The analysis below draws on this claim in attempting to develop particular solutions for the UOA, valid for both English and Bulgarian.

2 Previous Research

The basic theoretical source of the research is the HPSG grammar, as presented in Sag et al (2003). The classification of alternations in Levin (1993) has been the starting point of the typological investigation, as well as the recent survey of argument realization research in Levin and Rappaport (2005).

The formal aspects of alternations in languages other than English have been taken into account, among which are the works of Frense and Benett (1996) - an English-German account of the conative, middle and locative alternations; Kordoni (2004) - the locative and dative alternations in Modern Greek; and Gupta (2003) on *spray/load* alternation of *be*-verbs in German.

In particular, some Bulgarian-oriented works on valence alternations have been considered. Among them are those of Dimitrova-Vulchanova (1999), treating the aspectual and semantic characteristics of the verb within the Sign Model; the shared-grammar HPSG accounts of Avgustinova et al (1999) and Avgustinova (2001); and the semantic-syntactic study of Koeva (2004).

3 Re-analyzing Verb Attributes due to UOA

Verb's attributes are reanalyzed in two aspects. Firstly, the range of the notion UOA, in regard to verb classes, associated with it, is compared cross-linguistically, since it is important to know if the generalizations are made over analogous language phenomena. It has been checked whether all subtypes of UOA with the corresponding verb classes, defined for English in Levin (2003), are relevant for Bulgarian, *cf.* Section 3.1. Secondly, a specific aspectual constraint on Bulgarian verbs, exhibiting UOA, is discussed, *cf.* Section 3.2.

3.1 Cross-Linguistic Range of UOA (English –Bulgarian)

Levin (1993) distinguishes eight subtypes of unexpressed object alternations with one or more verb classes that exhibit each of them for English. These subtypes have been tested empirically on Bulgarian data and a number of differences have been noted.

Only four out of eight subtypes of the English-based classification of B. Levine have full structural correspondences in Bulgarian: *Unspecified object alternation, PRO-arb object alternation, Instructional imperative,* and *Characteristic property alternation*. They correspond to the same relation of verb projections in English and Bulgarian:

(9) (Engl) (Bulg) V NP_j - V

This structural correspondence is shown in (10) - (13) below:

(10) *unspecified object alternation*

a. My mother is **cooking a soup**. - My mother is **cooking**.
b. Майка ми **готви супа**. - Майка ми **готви**.

(11) *PRO-arb object alternation*

a. His voice **annoys people**. - His voice **annoys**.
b. Гласът му **дразни хората**. - Гласът му **дразни**.

(12) *instructional imperative*

a. **Beat the mixture** for 10 min - **Beat** for 10 min.
b. **Разбивайте сместа** 10 мин. - **Разбивайте** 10 мин.

(13) *characteristic property alternation*

- characteristic property of agent:

a. Our cat **scratches people**. - Our cat **scratches**.

б. Нашата котка **драска хората**. - Нашата котка **драска**.

- characteristic property of instrument

a. These scissors **cut metal**. - These scissors **cut**.

b. Тая ножица **реже метал**. - Тая ножица **реже**.

Two English UOA subtypes – *the understood reflexive object alternation* and *the way-object alternation* - have no counterparts in Bulgarian:

(14) (Engl) V NP_j - V
(Bulg) - no alternative

It is seen in the examples below:

(15) *Understood reflexive object alternation*

a. John **washed himself**. - John **washed**.

б. Джон **се изми**. - no alternative

(16) *Way object alternation*

a. He **pushed his way** through the crowd. -
He **pushed** through the crowd.

b. Той **си проби път** през тълпата. - no alternative

Two subtypes – *Understood body-part object* and *Understood reciprocal object* are exhibited in both languages but one of the Bulgarian alternatives has a different structure – namely a PP complement versus an NP complement in English. Actually, in this case, the alternation is of different type in Bulgarian.

(17)

(Engl)	V	NP_j	-	V
(Bulg)	V	PP_j		

For example:

(18) *Understood body-part object alternation*

a. The man **nodded his head**. - The man **nodded**.
b. Човекът **кимна с глава**. - Човекът **кимна**.

(19) *Understood reciprocal object alternation*

a. John **divorced Jane**. - John and Jane **divorced**.
b. Джон **се разведе с Джейн**. -Джон и Джейн **се разведоха**.

Therefore, it should be noted that the range of UOA is much more limited in Bulgarian - it comprises only subtypes (10) - (13) above. Such narrowing of UOA range relates to the HPSG account, namely to the lists of verbs that are marked as alternating. This narrower range, which is relevant for both languages, is taken in the formal analysis below.

Practically, some semantic verb classes, included in the UOA subtypes of Levin (1993), are considered irrelevant for the lexical rule, proposed in the last section of the paper, since they are not alternating in Bulgarian. In particular, these are verbs belonging to classes (39), (42), (47), (54), (56), (58), (62), (73), (78)[3], e.g. *verbs of gestures/signs involving body parts*, *load* verbs, *push/pull* verbs etc.

In contrast to them, the verbs belonging to classes (37), (67), (69), (80), e.g. verbs of *cooking*, *performance*, *eating*, etc., are regarded as alternating in both English and Bulgarian and are the ones whose lexical entries are marked by a particular attribute value, as stipulated in the analysis below.

3.2 Defining Alternating Properties of Verbs in Their Lexical Entries

Since the UOA is sub-regularity, it is valid only for particular verbs, pertaining to the lists, specified above. I propose an attribute ALT

[3] The numbering of verb classes is given according to examples numbering in Levin 1993: pp.33-40, Part One.

(alternation) of *val-cat* sort, which is to show the alternating properties of these verbs. The values of the ALT attribute are chosen among a list, indicating the possible verb alternations, based on Levin's classification. Such a list is quite long, having in mind the number of alternations, defined in (Levin 1993:25-109). Syntactically, the main groups of alternations in her classification can be taken as ALT values in HPSG, e.g. *unexpressed object* or *preposition drop alternations*. Therefore, a list of ALT values can start for example like that: {*non-alt, otsi, uo, conative, pd, dative, benefactive, locative, ct* …}[4]. The ALT value, I propose here, for non-alternating verbs is *non-alt*.

(20) $\begin{bmatrix} \text{verb} \\ \text{SYN} \left[\text{VAL} \left[\text{ALT} \{\text{non-alt, otsi, uo, conative, ... }\}\right]\right] \end{bmatrix}$

3.3 Aspectuality as a Bulgarian-specific Constraint

The HPSG representation of verb-complement projections in Bulgarian and, in particular of those of alternating verbs, has to account for some aspectual properties, which are related to the mechanism of object realization.

It is important to note that the English verbs in the lists of Levin (1993) have two semantic equivalents in Bulgarian – one of imperfective and one of perfective aspect, e.g. *eat – ям, изям*, *cook – готвя*, *сготвям*, etc[5]. What is crucial for the analysis of these verbs in regard to UOA is that only one element of the pair exhibits UOA in Bulgarian, namely, it is only the imperfective verbs that can be realized both with and without an object. The perfective transitive verbs always have an object.

For example, only the imperfective verb *рисувам 'paint'* has two projections (21) - (22), while its perfective counterpart *нарисувам 'paint'* has only one projection: (23).

(21) Детето **рисува картина**. - рисувам – Imperfective Aspect
The child **draws a picture**.

(22) Детето **рисува**. - рисувам – Imperfective Aspect
The child **draws**.

[4] otsi (Object-of Transitive=Subject of Intransitive), uo (Unexpressed Object), pd (Preposition Drop), ct (Creation and Transformation).

[5] There is also a limited number of Bulgarian verbs, which are 'defective' in this respect, i.e. they have no aspectual counterpart, e.g. *мога, знача, нуждая се* etc.

(23) Детето **нарисува карина**. - нарисувам – Perfective Aspect
The child **drew** a **picture**.

(24)*Детето **нарисува**. - нарисувам – Perfective Aspect

Therefore Bulgarian aspectuality determines additional constraints to the HPSG analysis. How can this relation between complementation and aspectuality be reflected in the HPSG analysis?

Firstly, it should be made clear whether the verbs in the aspectual pair are treated as two forms of the same verb or as two distinct verbs. What I follow in this paper is the latter hypothesis, supported in Rå Hauge (1999:85-89), among others. Such an approach is straightforward in comparison to morphological derivation of perfective from imperfective verb forms, which has to deal with many verb idiosyncrasies, as well as with the fact that very often these are not pairs but triples because of the secondary aspect derivation. But a more important argument against a derivational treatment is that affixation often leads to change of meaning and then it is often arbitrary to judge whether an affix is an aspectual formant or a word formant.

Accordingly, the members of the aspectual pair are described in the HPSG grammar as two distinct lexical items of sort *lexeme*. Each of them has a particular aspect value, which is independent of the value of the other element in the pair.

Secondly, the above shown aspect distinction motivates the need of an attribute, representing the aspectual characteristics of each Bulgarian verb. Our proposal is to define the aspect of the verb as an *agr-pos* feature IMPERF with a Boolean value. Respectively, the verbs of imperfective aspect are [IMPERF +], and those of perfective aspect: [IMPERF -].

(25) $\begin{bmatrix} verb \\ \text{SYN} \left[\text{HEAD} \left[\text{IMPERF} \ \{+ \ , \ -\}\right]\right] \end{bmatrix}$

As to the aspectuality of a verb exhibiting the UOA, it can only be [IMPERF +], that is, every verb with [ALT *uoa*] is also [IMPERF +].

(26) $\begin{bmatrix} verb \\ \text{SYN} \begin{bmatrix} \text{HEAD} & [\text{IMPERF} \ +] \\ \text{VAL} & [\text{ALT} \ uo] \end{bmatrix} \end{bmatrix}$

However, the opposite is not true – not every [IMPERF +] is [ALT *uoa*]. In other words, the class of Bulgarian verbs, which are [HEAD [IMPERF +]], subsumes the class of verbs [VAL[ALT *uoa*]].

4 Integrating Alternations into the Grammar

The integration of UOAs in the HPSG grammar depends on the hypothesis concerning the nature of alternations. The analysis I propose here assumes that the verb keeps its object argument on its ARG-ST in both alternative projections and it is the surface realization of this argument that is to be constrained.

The grounds for such interpretation can be shown by a *what*-question test. The presence of an unrealized ARG-ST argument, mapped to a thematic role in the SEM component of the verb *draw*, can be proven by the fact that the information about the missing object can additionally be retrieved by a *what*-question test.

(27) A. The child is drawing.

B. What is the child drawing?

A. A picture / a portrait / something/ I don't know what.

In contrast to it, such a question makes no sense and gets no answer when asked about the object of bare head phrases which are projections of intransitive verbs, i.e. of verbs whose ARG-ST list contains no such argument, *cf.* (28).

(28) A. The child is sleeping.

*B What is the child sleeping?

A. ???.

The recent HPSG conception of separating argument structure from surface valence, discussed in Section 1 above, provides a suitable mechanism for supporting such an analysis. According to my proposal, in both projections the mapping from ARG-ST values to SPR and COMPS values is kept unchanged. It is a lexical rule that maps a word description with COMPS ⟨NP⟩ to a word description with COMPS ⟨ ⟩. The lexical rule is *post-inflectional*, i.e., it maps words to words.

The following UOA (unexpressed object alternation) rule is proposed:

(29) *UOA-rule:*

$$\begin{bmatrix} \textit{pi-rule} & \\ \text{INPUT} & \langle\ \text{X}\ ,\ \begin{bmatrix} \textit{word} & \\ \text{VAL} & \begin{bmatrix} \text{COMPS} & \langle\ \text{NP}\ \rangle \\ \text{ALT} & \textit{uo} \end{bmatrix} \end{bmatrix}\ \rangle \\ \text{OUTPUT} & \langle\ \text{X}\ ,\ \begin{bmatrix} \textit{word} & \\ \text{VAL} & \begin{bmatrix} \text{COMPS} & \langle\ \rangle \\ \text{ALT} & \textit{uo} \end{bmatrix} \end{bmatrix}\ \rangle \end{bmatrix}$$

The phonetic form of the related words is unchanged – X. The ALT value *uo* ensures that the rule operates only on words, satisfying this constraint.

Thus, both alternative projections of read in (7) - (8) above can be licensed in the HPSG grammar as shown in (30) - (32)(31).

For example, the lexeme description of *чета 'read'* has the following constraints:

(30) чета-read,

$$\begin{bmatrix} \textit{stv-lxm} & \\ \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{ALT} & \textit{uo} \\ \text{SPR} & \textit{list}(\text{expressions}) \\ \text{COMPS} & \textit{list}(\text{expressions}) \end{bmatrix} \end{bmatrix} \\ \text{ARG-STR} & \langle\ \text{NP}\ ,\ \text{NP}\ \rangle \end{bmatrix}$$

The word description of *чета 'read'*, projecting a head-complement phrase, is constrained by the Argument Realization Principle, *cf.* (31):

(31) $\text{чета}_1\text{-read}_1$,

$$\begin{bmatrix} \textit{word} & \\ \text{SYN} & \begin{bmatrix} \text{VAL} & \begin{bmatrix} \text{ALT} & \textit{uo} \\ \text{SPR} & \langle\ \boxed{1}\ \text{NP}\ \rangle \\ \text{COMPS} & \langle\ \boxed{2}\ \text{NP}\ \rangle \end{bmatrix} \end{bmatrix} \\ \text{ARG-STR} & \langle\ \boxed{1}\ \text{NP}\ ,\ \boxed{2}\ \text{NP}\ \rangle \end{bmatrix}$$

The word description of *чета 'read'*, projecting a bare head phrase is constrained by the UOA-lexical rule:

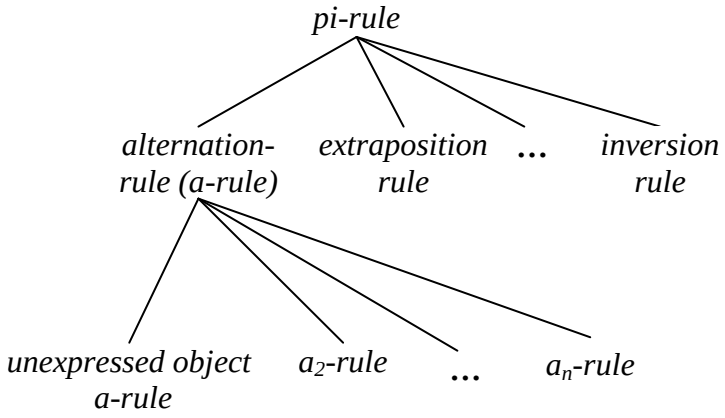
(32) чета$_2$-read$_2$,

$$\begin{bmatrix} word & & \\ \text{SYN} & \text{VAL} & \begin{bmatrix} \text{ALT} & uo \\ \text{SPR} & \langle\ \boxed{1}\ \text{NP}\ \rangle \\ \text{COMPS} & \langle\ \rangle \end{bmatrix} \\ \text{ARG-STR} & \langle\ \boxed{1}\ \text{NP}\ ,\ \text{NP}\ \rangle & \end{bmatrix}$$

The UOA in both English and Bulgarian is licensed in this way, having in mind the narrowed range of the alternation in Bulgarian, as well as the connection between aspect and UOA. However, the Bulgarian-specific constraint [IMPERF +] need not be stipulated in the lexical rule, since it subsumes [ALT uo], as shown above.

As to the place of the *UOA-rule* in the sort hierarchy of lexical rules, asgiven in Sag et al (2003:251, 492), I propose that it is inserted under a supersort *alternation rule* in the *pi-rule* branch:

(33)



The sort *alternation rule* is proposed as a mother node, under which more alternation rules alongside UOA-rule can be inserted, e.g. *a_3-rule* for the dative alternation, *a_4-rule* for *preposition drop* etc., so as to achieve a more precise licensing of verb projections in HPSG.

5 Conclusions

This paper has shown that the model of HPSG, based on the distinction of argument structure and surface valence, can account for unexpressed object alternations as well. The proposed analysis keeps one lexeme description for the two valence alternation variants of a verb and relates their word descriptions by a lexical rule. Such a solution captures the idea of preserving an object argument, although not realized, in the argument structure of the verb.

Levin's theory-neutral investigation of verb alternations, due to its comprehensive survey of verb classes and detailed typology of alternations, has proved to be a good source for the HPSG model. Moreover, it can be applied cross-linguistically, and the variations of its validity in regard to particular verb classes reveal some language-specific aspects of complementation in particular languages. In the paper it has been applied to English and Bulgarian.

Since the UOA is a sub-regularity of language, concerning particular verb classes, an additional argument ALT whose values constrain the application of the rule has been introduced. In regard to Bulgarian, this attribute has been shown as related to the IMPERF + attribute, which accounts for a particular aspect of the complex interplay of verb aspectuality and complementation in Slavic languages.

Since the analysis is considered as one step into the overall description of alternations mechanism, it can be easily extended by inserting new sorts under the *alternation rule* sort and by extending the list of values for the ALT attribute.

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