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QUESTIONS

EMPIRIQUES ET FORMALISATION EN SYNTAXE ET SEMANTIQUE 6

Travaux présentés à CSSP 2005

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Les articles regroupés dans ce volume ont tous été présentés au cours de la sixième édition de CSSP, colloque de syntaxe et de sémantique qui s'est tenu à Paris en septembre et octobre 2005. Comme lors des précédentes éditions, le comité scientifique a sélectionné des travaux en syntaxe et en sémantique alliant à la fois le souci des problèmes empiriques et la recherche d'une présentation des données de langue dans un cadre formel et explicite. Les éditeurs souhaitent remercier les membres du comité scientifique de CSSP (en dehors des éditeurs eux-mêmes, Claire Beyssade, Francis Corblin, Danièle Godard et Jean-Marie Marandin) pour leur aide dans la préparation de ce volume, et en particulier pour le travail de relecture auquel ils ont accepté de participer.

The articles collected in this volume have all been presented at the sixth edition of CSSP, the Conference on Syntax and Semantics that was held in Paris in September and October 2005. As for the previous editions, the scientific committee has selected papers on syntax and semantics that combine the study of an empirical problem with a presentation in a formal and explicit framework. The editors wish to thank the members of the CSSP scientific committee (apart from the editors themselves, Claire Beyssade, Francis Corblin, Danièle Godard and Jean-Marie Marandin) for their help in the preparation of this book, and in particular for accepting to participate in the reviewing process.

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In defense of lexical Coordination

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1 Introduction

The existence of lexical coordination has often been challenged, from different theoretical perspectives (e.g. recently Kayne (1994); Beavers and Sag (2004)). Such reductionist approaches argue that putative cases of lexical coordination can be reduced to phrasal coordination with ellipsis. In this perspective, a sentence like (1a) is not analysed as a coordination of two Vs, but as a coordination of two VPs as in (1b) or (1c):

(1) a. Le Président apprécie et approuve votre proposition.
The president appreciates and approves your proposal.
b. Le président [apprécie __ et approuve __]$_{VP}$ [votre proposition].
c. Le président [apprécie __ et approuve votre proposition]$_{VP}$

We do not dispute that an elliptical analysis is possible for (1a), with a marked prosody, but we want to argue that another analysis, with a coordination of Vs is also available, and in fact more natural.
We first examine Kayne's arguments against lexical coordination, and then present some novel arguments in favor of lexical head coordination. We thus propose some empirical criteria for distinguishing lexical coordination from elliptical phrasal coordination or RNR (Right Node raising). We show that certain cases cannot be analysed as elliptical coordination and are thus unambiguous cases of lexical head coordination.
Assuming (as in Abeillé and Godard (2000, 2004)) that certain non head positions can be occupied by X^0 elements, we also present some arguments in favor of lexical (non head) coordinations. We then show how both lexical coordination and Right Node raising can be formalized within Head-driven Phrase structure grammar (HPSG). The coordinate phrase resulting from the coordination of lexical elements is analysed as an instance of "light" phrase, following the WEIGHT theory of (Abeillé and Godard, 2004, 2006).

2 Arguments against X^0 coordination

The mere existence of lexical coordination has been challenged on different grounds. From a theoretical perspective, new approaches to coordinate Phrases as ConjP make

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it difficult to formalize. From an empirical perspective, some lexical items, such as French pronominal clitics, do not easily coordinate. We examine both issues, starting with the theoretical argument.

2.1 Coordinate Phrases as ConjP

Kayne (1994) argues in favor of an X-bar approach to coordination. He proposes that a coordinate phrase is a Conjunction Phrase (ConjP), with an asymmetric structure, and headed by a (possibly null) conjunction, as illustrated in figure 1.

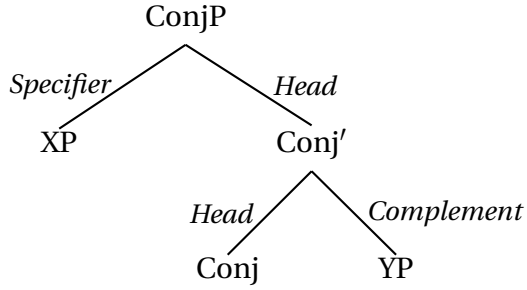

Figure 1: Kayne's (1994) X-bar approach to coordination

In this perspective, the conjunction cannot be followed by a lexical Head, since Antisymmetry forbids two sister heads. More generally, coordination of X^0 elements is impossible, since both specifiers and complements are constrained to be maximal projections.

This approach has been challenged on different grounds (cf. Borsley (2005) for an overview). Assigning all coordinate Phrases a uniform ConjP category fails to capture the similarity between NPs and coordinate NPs, between APs and coordinate APs etc. The schema in figure 1 also cannot account for the ordering of conjuncts in head final languages such as Japanese and Korean, where the specifier normally precedes the Head:

(2) a. John [and Mary]$_{\text{Conj}'}$ English
b. [Robin-to]$_{\text{Conj}'}$ Kim Japanese
'Kim and Robin'

It also makes it difficult to account for 'omnisyndetic' coordinations, with a conjunction on each conjunct, as shown for French by Mouret (2005):

(3) a. Soit Paul viendra soit il appellera.
Either Paul will-come or he will-call.
b. et Paul et Marie
both Paul and Marie

If the schema in figure 1 has to be abandoned, then it cannot be taken as an argument against lexical coordination.

2.2 French clitics and coordination

The only empirical arguments given by Kayne against lexical coordination involve French pronominal clitics: coordination of clitics (which he analyses as syntactic heads) is difficult in French (4), as well as coordination of verbs when they share a clitic (5):[1]

(4) a. * Jean te et me voit souvent.
Jean you and me sees often

b. * Je le et la vois souvent.
I him and her see often

c. ? Je lui et vous ferai un plaisir.
I him/her and you will-give a pleasure

d. ? Pierre le ou les verra au concert.
Pierre will-see him or them at the concert

(5) a. * Jean vous parlera et pardonnera.
Jean will speak to and forgive you

b. Jean les lit et relit sans cesse.
Jean them reads and rereads all the time

The judgments on these examples are in fact variable, and many speakers don't find (4c) any better than (4b). Kayne analyses (4c-d) as RNR, without justification, and notes that such RNR is severely constrained.
However, a different line of explanation is available for the badness of the above examples. If French complement clitics are analysed as verbal affixes (Miller, 1992; Miller and Sag, 1997; Miller and Monachesi, 2003), it is expected that they cannot coordinate nor have scope over a coordinate host. Coordination of prefixes is marginally available in French, but only for prefixes with some phonological autonomy (see Arstein, 2005, for English), such as 'pré' and 'post', or 'sur' and 'sous' but not 're' or 'dé' (=un):

(6) a. une révolution pré ou post-industrielle
a pre or post industrial revolution

b. On risque toujours de sur ou sous-évaluer.
One may always over or under estimate

c. * C'est un travail qu'il ne faut pas re ou défaire.
This is a work that one should not re or undo

Since pronominal clitics are not phonologically autonomous, it is expected that they don't coordinate, except if they receive strong emphatic stress, and in general they don't. The status of example (4d) is unclear and could be analysed as a special case of reformulation (or metalinguistic coordination).

Analysing clitics as verbal prefixes also explains that they do not have wide scope over coordinated Verbs, since prefixes usually don't. If one looks at other prefixes, they cannot have scope over a coordination of hosts (cf (7a) which mirrors (5a)). (7a) cannot mean the same as (7b), and (7c) cannot mean the same as (7d):

[1] We reproduce Kayne's judgements.

(7) a. la période pré-industrielle et capitaliste
the preindustrial and capitalist period
b. la période préindustrielle et précapitaliste
the preindustrial and precapitalist period
c. Il ne faut pas surévaluer et surnoter.
One should not overevaluate and overrate
d. Il ne faut pas surévaluer et noter
One should not overevaluate and rate

(5b) is not productive and occurs only with coordination of the same lexical verbs in French (8a), with speakers' variation (which we note "%"). In Spanish, such examples can be found but only with verbs denoting a complex event as shown in (8b) (Bosque, 1986):

(8) a. % Jean les fait et défait sans cesse.
Jean makes and unmakes them all the time
b. Lo compro y vendio en una sola operacion.
I buy and sell it in one single operation
c. * Lo compro hoy y vendio mañana.
I buy it today and sell it tomorow

Notice that such examples cannot involve RNR, since the shared element is to the left of the conjuncts.
We conclude that Kayne's bad French examples are relevant for the interaction of coordination with morphology, but do not tell us anything about the syntax of coordination. Similarly better Spanish examples (8b) argue in fact in favor of lexical verb coordination (assuming that Spanish clitics are analysed as affixes) since VP coordinations with a shared clitic are ruled out (8c).
Now, we come back to example (1a), and compare an analysis in terms of lexical coordination with an analysis in terms of RNR.

3 Coordination of lexical Heads

There are two possible analyses for (1a), the first one as a coordination of lexical V, as in figure 2, the second as a coordination of VP with ellipsis. As for the second analysis, there are again two possibilities, one with a symmetrical coordination of two elliptical VP with a "raised" shared NP complement , as in figure 3, the other with an asymmetrical coordination of an elliptical VP followed by a complete VP, as in figure 4.

We briefly examine the arguments for prefering the structure in figure 4 over that in figure 3.

3.1 Some syntactic properties of Right Node raising constructions

Elliptical analysis of (1a) involves so-called "right node raising". For this construction, there are a number of arguments for prefering an asymmetric analysis over a symmetric one, or in Hartmann 2002's terms a "deletion" analysis over a "movement" approach.

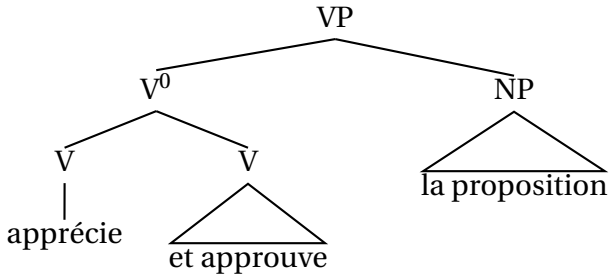

Figure 2: Lexical coordination

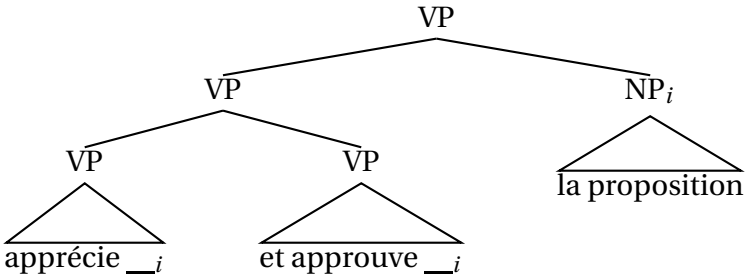

Figure 3: Asymnetric VP coordination, version 1

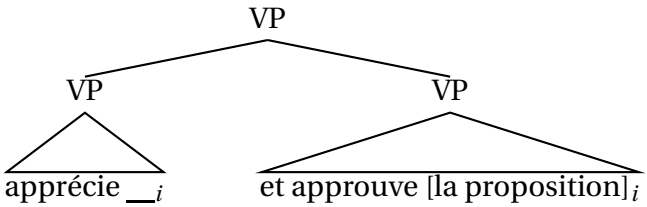

Figure 4: Asymnetric VP coordination, version 2

There are a number of arguments showing that the shared constituent is not extracted out of both conjuncts.[2] There are languages which have RNR and not leftward movement, such as Hausa (Beavers and Sag, 2004). Extracted elements obligatorily occur at the sentence periphery, whereas shared elements can occur at the (right) periphery of any major phrases, such as NP (9) or PP (9b):

(9) a. [Le père et la mère [de Jean]] viendront demain.
The father and the mother [of Jean] will come tomorrow

b. Il faut présenter [aux enseignants et aux étudiants [de notre département]] les nouveaux programmes.
One must present to the teachers and to the students [of our department] the new programs

Moreover, extracted elements must be major constituents (maximal projections) whereas shared elements can be subconstituents as in (10):[3]

[2]There are also arguments showing that the shared element does not undergo extraposition out of both conjuncts (Büring and Hartmann, 1997).

[3]This kind of example also provide an argument against a third type of analysis, namely one with a

(10) a. * [How many] do you want [__ drinks]?
b. Paul wants two, and John wants three, [$_{N'}$alcooholic drinks].

Furthermore, as noticed by Abbott (1976), more than one constituent can be shared, even in languages like English or French where at most one constituent can appear in (left) extracted position (11):

(11) a. Smith loaned, and his widow later donated, a valuable collection of manuscripts to the library.
b. I borrowed, and my sisters stole, large sums of money fom the Chase Manhattan Bank.

As shown by Levine (1984), extraction is possible out of the shared argument, whereas one cannot extract anything out of an extracted constituent (12):

(12) a. Which picture does John like and Mary hate, a copy of __?
b. * Which picture do you know [which copy of __] Mary likes __?

RNR can cross islands, such as relative clauses (Levine, 1984), or PPs in French, which are barriers for extraction (13,14)

(13) a. John gave a briefcase, and Harry knows someone who had given a set of steak knives, to Bill.
b. * To whom do you know someone who gave a set of steak knives?

(14) a. Marie votera pour, et Jean votera contre, votre proposition.
Marie will-vote for and Jean will-vote against, your proposal
b. * Quelle proposition Marie votera-t-elle pour __ ?
Which proposal will Marie vote for?

A further argument in favor of the asymmetric analysis figure 4 is that the two conjuncts can have different polarities and that, in this case, it is the polarity of the second conjunct that licences the shared element, as in the French (attested) example (15a) (see also for English Cann et al., 2005):

(15) a. Il y a des langues qui ont __ et des langues qui n'ont pas [de flexion casuelle].
There are languages which have and languages which don't have case inflection.
b. * Il y a des langues qui ont de flexion casuelle.

---

first conjunct interrupted by an incomplete (parenthetical) conjunct (McCawley, 1988), as in (i). Such elliptical parentheticals do exist (ii) but cannot interrupt a subconstituent (iii):

(i) Paul apprécie [et approuve __] la proposition.

(ii) Paul will go, he said __, to the beach.

(iii) * Paul wants two, he said __, drinks.

In (15a), the shared 'de NP' object is a negative polarity item, and is not licensed by the first conjunct.
So we'll only consider the competition between the lexical coordination analysis in figure 2 and the phrasal analysis in figure 4 in the following discussions. We show that there are a number of differences between lexical head coordination and RNR: prosodic differences, semantic and syntactic differences. Hence a double analysis is not always available: some examples can only be analysed as lexical coordinations, and some only as RNR coordinations. We start with the prosodic differences.

3.2 Some prosodic differences between RNR and lexical Coordination

There is a some prosodic marking for RNR that is not necessarily observed with head coordination. We first look at the first conjunct, and then at the shared element.

According to Hartmann (2002), in German, and in English, there is an obligatory rise at the end of the first conjunct (before the conjunction), and the shared element can be deaccented. The data have not been studied for French, but a completely "flat" prosody does not seem to be possible for RNR.[4] By contrast, lexical head coordinations are compatible with a larger variety of intonation contours, including a completely flat one, in particular in fast speech, or when answering an all focus question as in (16):[5]

(16) A: Qu'est-ce qui se passe ?
What's going on?
B: Jean lit et relit sans cesse le même livre.
Jean reads and rereads all the time the same book

There is no rise before the conjunction in (16b).
It is also clear that in RNR constructions, the first (elliptical) conjunct must be able to form (at least) one prosodic group. As originally proposed by Sag (1976) for English, there is an obligatory prosodic boundary before the conjunction, and an optional one before the shared element. We conclude that the first conjunct cannot end with a phonological weak element, such as a clitic, and that example (4d) above cannot be an instance of RNR. We observe that weak prepositions or weak determiners, which are prosodic "leaners" (in the sense of Zwicky, 1982) in French, are also bad in RNR constructions:

[4]For English and German, the prosody of RNR is often assimilated with that of contrastive FOCUS (Hartmann, 2002; Selkirk, 2002). It is clear that this is not the case in French. In RNR, the first conjunct has a pitch accent at the end of the group, whereas constrative focus in French requires a pitch accent at the beginning of the group (what Marandin et al. (2002) call "c-accent"):

(i) Le président apprécie, et le vice-président approuve, votre proposition — pitch acc. on 'cie'
(ii) C'est Gabriel qui est venu, pas Paul (it is Gabriel who came, not Paul) — pitch acc. on 'Ga'

[5]As observed by Hartmann (2002), such a discourse context is not appropriate for RNR:

(i) A: What's going on?
B: # John hates, and Mary likes, red beans.

(17) a. * Paul cherche le, et Marie connaît la responsable
Paul looks for the-masc and Marie knows the-fem person responsible
b. * Paul parle de, et Marie discute avec Woody Allen
Paul speaks of and Marie talks with Woody Allen

Such a constraint does not hold for lexical coordination. We observe that weak determiners or weak prepositions can be conjoined, with a shared argument:

(18) a. Paul cherche le ou la responsable
Paul looks for the-masc or the-fem person responsible
b. Un film de et avec Woody Allen
A film of and with Woody Allen

Given the constraint above on RNR, a phrasal analysis of (18) is not plausible:

(19) a. * [de __]$_{PP}$ et [avec Woody Allen]$_{PP}$
b. * [le __]$_{NP}$ ou [la responsable]$_{NP}$

We conclude that (18a,b) are unambiguous cases of lexical coordination.

Let us now look at the prosody of the shared element(s). As proposed by Bresnan (1974) for English, the shared constituent must be able to form a prosodic group. This is why personal pronouns are difficult, unless they are heavily stressed:

(20) a. ?? He tried to persuade, but he couldn't convince, him.
b. He tried to persuade, but he couldn't convince, HIM.

As noticed by Borsley (2005), this constraint does not apply to the coordination of verbs which can share a weak personal pronoun:

(21) He tried to persuade and convince him.

In French, a similar contrast can be observed, with bare quantifiers *tout* (everything) and *rien* (nothing). They are difficult in final position in a RNR construction, unless they are heavily stressed (for some speakers) or modified (hence made prosodically heavier):[6]

(22) a. ?? Dans votre proposition, le président apprécie et le vice-président approuve tout.
In your proposal, the president appreciates and the vice-president approves, all

[6]These bare quantifiers are analysed as syntactically "light" by Abeillé and Godard (2004) on the basis of the following properties: they cannot be separated from the main verb by another complement, unless they are modified (hence made heavier):

(i) Le président approuve tout dans votre proposition
the president approves all in your proposal

(ii) ?? Le président approuve dans votre proposition tout
the president approves in your proposal all

(iii) Le président approuve dans votre proposition [quasiment tout]
the president approves in your proposal nearly all

b. % Dans votre proposition, le président apprécie et le vice-président approuve TOUT.

c. Dans votre proposition, le président apprécie, et le vice-président approuve, [presque tout] In your proposal, the president appreciates and the vice-president approves, almost all

The crucial fact is that these bare quantifiers can be shared by two coordinated verbs:

(23) Dans votre proposition, le président apprécie et approuve tout
In your proposal, the president appreciates and approves all

A similar situation is observed with French "light" manner adverbs (Abeillé and Godard, 2004) such as *bien* (well) and *mieux* (better). These monomorphemic adverbs (without the suffix -*ment*) are not mobile and cannot be incidental, unless they are made heavier, by modification:

(24) a. Ce malade mange bien sa soupe.
This sick person eats well his soup
b. * Ce malade mange sa soupe bien.
This sick person eats his soup well
c. Ce malade mange sa soupe [tout à fait bien].
This sick person eats his soup perfectly well

They cannot be shared in RNR constructions unless they are made heavier by modification (25a,b) but can perfectly well be shared in case of Verb coordination (25c):

(25) a. ?? [La femme mange et le mari boit] mieux depuis quelques jours.
The wife eats and the husband drinks better since a few days

b. La femme mange, et le mari boit, [beaucoup mieux] depuis quelques jours.
The wife eats and the husband drinks a lot better since a few days

c. Ce malade [mange et boit] mieux depuis quelques jours.
This sick person eats and drinks better since a few days

We conclude that (23) and (25c) are unambiguous cases of lexical coordination. In what follows, we use this criterion (no prosodic boundary nor rising contour before the conjunction) to exclude an RNR analysis.

3.3 Some semantic differences between RNR and lexical coordination

Several semantic differences can be found between RNR and lexical coordination. A semantic constraint on lexical coordination is that two coordinated Verbs must have the same semantic type and assign the same semantic role to their shared arguments. If this is not the case, the sentences are difficult (26a,c) with an integrated intonation pattern for the two verbs, and a VP coordination is prefered (26b,d):

(26) a. ?? Paul [ressemble et téléphone] à son père.
Paul resembles and calls his father
b. Paul ressemble à son père et lui téléphone souvent.
Paul resembles his father and calls him often
c. ?? Les invités [étaient ou entraient] dans le jardin.
The guests were or entered in the garden
d. Les invités étaient dans le jardin ou y entraient.
the guests were in the garden or were entering there

In (26a), *ressembler* (resemble) is an individual-level predicate whereas *téléphoner* (call) is a stage-level predicate. Furthermore, *ressembler* assigns a Theme role to its NP object, whereas t*éléphoner* assigns a Goal role. In (26c), *être* (be), which is stative, assigns a location role to the PP complement, whether *entrer* (enter) assigns a goal role to it.
Such a constraint does not hold with RNR, where verbs with different semantic types, and with different thematic role assignments, can head conjuncts sharing a complement:

(27) a. Paul ressemble beaucoup, et Marie téléphone souvent, à ce vieux professeur.
Paul resembles a lot, and Marie often calls, this old professor
b. ? Les invités étaient déjà, ou se dépêchaient d'entrer, dans le jardin.
The guests were already, or were hastening to enter, in the garden

Another constraint pointed out by Hartmann (2002) is that relational modifiers are difficult in the shared constituent with RNR (28a). We observe that they are natural with V coordination (28b):

(28) a. * Paul vit, et Marie travaille, dans la même ville.
Paul lives and Marie works, in the same city
b. Paul vit et travaille dans la même ville.
Paul lives and works in the same city

A further difference is that two coordinated verbs necessarily share the same object, whereas with RNR the shared objet can have a different interpretation in each conjunct:

(29) a. Paul [lit et annote] deux livres de linguistique.
Paul reads and annotated two linguistics books
b. Paul lit, et Marie annote, deux livres de linguistique.
Paul reads, and Marie annotates, two linguistics books

In (29b) the books being read and the books being annotated are not necessarily the same and there can be four books altogether, whereas in (29a), with one phrasal group for the two verbs, there are only two books involved. This is unexpected if (29a) had the same elliptical analysis as (29b).

A final difference comes from the specific semantics of RNR. As observed by Hartmann (2002), in RNR, the two verbal (or sentential) conjuncts must stand in contrast with respect to one another:[7]

(30) a. Le président aime, mais le vice-président n'aime pas, votre proposition.
the president likes but the vice-president does not like, your proposal

b. Le président présentera aux actionnaires, et le vice-président présentera aux employés, votre proposition.
the president will-present to the share holders, and the vice president will present to the employes, your proposal

c. ?? Le président aime et il approuve, votre proposition.
the president likes, and he approves, your proposal

d. ?? Paul lit, et il relit, tous vos livres.
Paul reads and he rereads all your books

In (30a), there is a contrast between the two predicates (like and not-like) as two possible attitudes towards the proposal. In (30b), the shareholders are contrasted with the employees, as two possible beneficiaries of the proposal. If there is no such contrast between complements or predicates, as in (30c,d), the construction is not felicitous. With bare V coordination, there is no such semantic constraint. On the contrary, with an additive conjunction, the two coordinated verbs must be understood as forming a natural activity, or a natural class of process, so that they denote one (possibly complex) event:[8,9]

[7] More precisely, each conjunct has a focus value interpreted as a set of alternatives, and contains an element belonging to the other conjunct's set. Hartmann has the additional constraint that in each conjunct the contrasted elements must be in final position (before the shared element).

[8] A specific case of additive V coordination involves repetition of the same V. This construction (studied by Richard (2004) for French) has a durative or iterative interpretation (i–ii); It is not possible with VP coordination (iii–iv):

(i) L'oiseau vole (et) vole dans le ciel.
the bird flies and flies in the sky

(ii) Les enfants sautaient (et) sautaient sur le gazon.
the children were jumping and jumping on the grass

(iii) ?? L'oiseau volait dans le ciel et volait dans le ciel.

(iv) ?? Les enfants sautaient sur le gazon et sautaient sur le gazon.

[9] This condition resembles that of "natural" coordination, independently proposed by Milner (1972); Lambrecht (1984); King and Dalrymple (2004), in the nominal domain. In order to share a common determiner, coordinated Ns, in French or in English, must form a "natural" group (or be explicitly grouped as one discourse entity in the context), hence the following contrast:

(i) cinq voitures et camions
five cars and trucks

(ii) ?? cinq voitures et maisons
five cars and houses

(iii) les cinq voitures et maisons qui ont été saccagées la nuit dernière
the 5 cars and houses which were damaged last night

However, this constraint is not specific to lexical N coordination and applies to N' as well:

(31) a. Le président [approuve et admire] votre proposition.
The president approves and admires your proposal
b. Paul [lit et relit] sans cesse tous vos livres
Paul reads and rereads all the time your books
c. ?? Le président [apprendra et refusera] votre proposition.
The president will-learn and will-refuse your proposal
d. Le président apprendra votre proposition et la refusera.
The president will-learn your proposal and will-refuse it.

In (31c), the two predicates learn and refuse do not make up one single complex event, and the sentence is difficult (with an integrated prosody). In such case, VP coordination, as in (31d), is much better. The same constraint was independently observed by Bosque (1986) for Spanish (cf (8b) above).
These prosodic and semantic differences would be difficult to account for if RNR and lexical V coordination were one and the same process. Let us now look at some syntactic differences.

3.4 Syntactic differences between RNR and lexical coordination

There are a number of syntactic differences between coordinationof lexical heads and coordination of phrases:

- Coordinated phrases can be of different categories, whereas coordinated lexical heads cannot.
- Some syntactic markers can be shared by coordinated heads, and not by coordinated phrases.
- Some conjunctions are appropriate for phrasal coordination only.

We examine them in turn.
Phrasal coordination can involve unlike conjuncts (with different categories, cf Sag et al. (1985)), lexical coordination cannot:

(32) a. Jean est [directeur de cette école]$_{NP}$ et [fier de ses résultats]$_{AP}$.
Jean is director of this school and proud of its results
b. Jean a été [témoin de cette affaire] et [surpris de son retentissement].
Jean was a witness to the case and surprised by its consequences
c. * Jean est [directeur et fier] de cette école.
Jean is director and proud of this school
d. * Jean a été [témoin et surpris] de cette affaire.
Jean was witness and surprised of this case

(iv) ?? cinq voitures rouges et maisons jaunes
five red cars and yellow houses

Sentences (32a,b) show coordination between an NP and an AP. If we try to coordinate a lexical N and a lexical A with a shared complement, as in (32c,d), it is not possible without a strong prosodic marking before the conjunction 'et'. By contrast, the RNR counterparts, with a shared element between an NP and an AP, are much better:

(33) a. ? Jean était témoin et sa mère très surprise [de cette affaire].
Jean was a witness and his mother very surprised, of this case
b. ? Jean est directeur, mais il n'est pas fier, de cette école.
Jean is director, but he is not proud, of this school

Another difference involves the distribution of some syntactic markers. In French, VP markers (or complementizers) such as *à* and *de*, cannot be shared by a coordinate phrase and must be repeated on each conjunct:

(34) a. * Cet emballage permet de [distribuer des produits et vendre des aliments sans réfrigération]$_{VP}$.
this packaging enables to distribute products and sell food without freezing
b. Cet emballage permet de distribuer des produits et de vendre des aliments sans réfrigération.
this packaging enables to distribute products and to sell food without freezing
c. *Il continuait à [lire attentivement le texte et relire sans cesse l'introduction]$_{VP}$.
He continued to read carefully the text and reread all the time the introduction
d. Il continuait à lire attentivement le texte et à relire sans cesse l'introduction.
He continued to read carefully the text and to reread all the time the introduction

Interestingly, these markers can be shared in bare V coordinations (this includes V with a clitic which we analyse as a verbal affix, cf (35c)):

(35) a. Il continuait à [lire et relire] sans cesse le même livre.
He continued to read and reread all the time the same book
b. Cet emballage permet de [distribuer et vendre] les aliments sans réfrigération.
This package enables to distribute and sell food without freezing
c. Il continuait à [le lire et le relire] sans cesse.
He continued to it read and it reread all the time

The explanation is that the examples in (35) do not involve (elliptical) VP coordination but V coordination. If *de* and *à* are VP markers, the V coordination is "hidden" inside VP and they do not "see" it:

(36) a. Structure in (34): * de [VP et VP]
b. Structure in (35): de $_{VP}$[[V et V] NP]

Another difference involves Coordinating Conjunctions. RNR is compatible with most coordinating conjunctions, and even some subordinating ones, while coordination of lexical heads is more restricted. In French, lexical coordination is difficult with

mais (but). If we take previous examples of unambiguous cases of lexical coordination, it is difficult to have *mais* instead of *et.* V coordination with *mais* and a shared bare quantifier is difficult, but improves with a heavier shared complement (which can have an RNR analysis):

(37) a. ?? Dans votre proposition, le président apprécie mais désapprouve tout.
In your proposal, the president appreciates but disapproves all
b. Dans votre proposition, le président apprécie, mais désapprouve, [presque tout].
In your proposal, the president appreciates but disapproves, almost all

Similarly, the coordination of infinitival Vs with *mais* is difficult with a shared marker, and improves if the marker is repeated:

(38) a. * Paul essaie de préserver mais distribuer tous vos produits.
Paul tries to preserve but distribute all your products
b. Paul essaie de préserver, mais de distribuer, tous vos produits.
Paul tries to preserve, but to distribute, all your products.

We thus analyse (37b) and (38b) as cases of RNR coordination. If *mais* has the same meaning as *et* plus an adversative contribution (Anscombre and Ducrot, 1983), it is expected that it conflicts with the semantic constraint on V additive coordination (forming one possibly complex event).

Another difference is that the conjunction *et* can be modified by *puis, alors* (then) with RNR, but not when coordinating lexical heads. Again, we take V coordination with a shared quantifier, or a shared marker, as test examples:

(39) a. Paul lira et traduira tout.
Paul will-read and will-translate all
b. ?? Paul lira et puis traduira tout.
Paul will-read and then will-translate all
c. ?? Paul essaiera de lire et puis traduire ce texte pour demain.
Paul will-try to read and then translate this text for tomorrow
d. Paul essaiera de lire, et puis de traduire, ce texte pour demain.
Paul will-try to read, and then to translate, this text for tomorrow

Again, the difficulty of having *et puis, et alors*, which forces an interpretation with two successive events, comes from the semantic constraint on V additive coordination. We thus conclude that a lexical coordination analysis of (1a) is not superfluous and that a correct grammar of coordination must provide for both lexical and phrasal coordination.

4 Coordination in non Head X^0 positions

Certain constructions involve a bare complement or a bare modifier, that are arguably X^0.[10] That means that the X-bar model of phrase structure is too strong and should be

[10] This section relies on common work with Danièle Godard (Abeillé and Godard, 2004, 2006).

relaxed as to allow X^0 in non head positions (Sells, 1994; Toivonen, 2003; Abeillé and Godard, 2004).

We show that some of these X^0 can be coordinated, starting with incorporated NP objects in Danish, past participles (after tense auxiliary *haber*) in Spanish, English verb particles, prenominal adjectives in French, and preverbal quantifiers (also in French). Unlike coordinations of lexical heads, which form a lexical phrase, we find that the coordinations of lexical non heads are syntactically ambiguous: they can form a lexical phrase, or a full phrase.

4.1 Syntactic incorporation in Danish

In this construction known as syntactic N incorporation (SNI), a verb followed by a bare N complement loses its stress:[11]

(40) a. Min nabo [kôbte ˈhus] sidste år.
my neighbour buy-past house last year
'My neighbour purchased a/his house last year.'

b. * Min nabo ˈkôbte ˈhus sidste år.

c. Min nabo ˈkôbte [et ˈhus] sidste år
My neighbour purchased a house last year

d. * Min nabo [kôbte et ˈhus] sidste år.

SNI contrasts with (40c), which exemplifies the non incorporated construction, in which the verb is stressed and the N object must have a determiner.
As shown by Asudeh and Mikkelsen (2000), in SNI the bare N cannot have a determiner (40d) but can be (lightly) modified (by a prenominal adjective) or coordinated with another bare N:

(41) a. Min nabo kôbte [ˈhus og ˈbill] sidste år.
My neighbour purchased house and car last year

b. Min nabo kôbte [ˈnyt ˈhus] sidste år.
My neighbour purchased new house last year

c. * Min nabo kôbte [ˈhus som er nyt] (sidste år).
My neighbour purchased house which is new last year

Phrasal modification by a relative clause is also impossible (41c). This shows that the incorporated N is not a full NP (or DP), so that (41a) cannot be analysed as NP (or DP) coordination. An analysis of (41a) as VP coordination with V ellipsis is not possible either, since it would be a case of Left Node raising, and not of RNR. We conclude that it is a case of N coordination and that coordinated Ns can behave as bare Ns. Notice that a (lightly) modified N can also behave like a bare N (41b).

[11] As shown by Asudeh and Mikkelsen (2000), this is syntactic and not morphological incorporation because some adverbs or an inverted subject can appear between the V and the N. Examples (40) and (41) are from them. We follow their notation, with [ ] for prosodic grouping and ˈ for word accent (at the beginning of a stressed word).

4.2 Past participles in Spanish

As noticed by Abeillé and Godard (2002, 2003), Spanish tense auxiliary (*haber*) can be combined with a coordination of bare past participles, but not with a coordination of participle VPs:[12]

(42) a. Juan ha comprado y leído este libro.
b. * Juan ha [comprado este libro] y [leído el primer capítulo]
c. Juan ha comprado este libro y ha leído el primer capítulo.
Juan has bought this book and has read the first chapter

Since, the auxiliary must be repeated on each conjoined VP as shown by (42b), (42a) is not a case of VP coordination, and cannot receive an RNR analysis.
Our explanation of the agrammaticality of (42b) is that the tense auxiliary must combine with the lexical participle (with which it forms a complex V) and does not take a VP complement (contrary to English auxiliaries for instance):

(43) [ha [comprado]$_{V^0}$]$_{V^0}$ [este libro]$_{NP}$

An argument in favor of a V^0 analysis is that no insertion is possible between the auxiliary and the participle (except a few adverbs: *ya, casi, apenas*, and for some speakers a few subject pronouns and a quantifier: *usted, ellos, todos*):

(44) a. * Los niños no habian todavia aprendido a hablar.
the children not have still learnt to speak
b. El tren habia apenas llegado a la estacion.
the train had barely arrived at the station

If this analysis is correct, it predicts that the auxiliary cannot combine with a VP (nor a coordination of VPs) but combines with a V^0 participle, hence the grammaticality of (42a).

This is a case where a coordination of two V^0 forms itself a V^0 complement. Notice that a (lightly) modified V^0 can also form a V^0 complement (as with "apenas llegado" in (44b)).

4.3 English particles

A well known fact about mobile particles in English is that they are more constrained in prenominal position than in postnominal position:

(45) a. Paul turned (*completely) off the radio.
b. Paul turned the radio (completely) off.

[12] Non repetition of the auxiliary is accepted only when the past participle has a bare N complement (Abeillé and Godard, 2003). We analyse such V-N combination as verbal complexes (equivalent to V^0).

(i) Pablo ha comido galletas y (ha) bebido leche
P has eaten cakes and drunk milk

Following Pollard and Sag (1987)'s analysis, we can say that the prenominal particle is a lexical complement (or P^0) whereas it is a phrasal complement (or PP) in post-nominal position, and appeal to a general ordering rule in English which orders lexical elements before phrasal ones.
Although there is some speaker's variation, we find that some coordination is possible for the prenominal particle, as in the following example (contra Toivonen, 2003):

(46) a. Paul was turning [on and off] the radio all the time.
b. * Paul was turning on the radio and off the TV.

Notice that (46a) cannot be analysed as VP coordination with ellipsis since the shared V is on the left, and not on the right, of the coordination.[13] (46b) shows that an alternative RNR analysis involving the coordination of two putative part+NP phrases is also to be ruled out. We are thus left with an analysis of (46a) as involving lexical coordination of two particles, projecting a lexical phrase.

4.4 Prenominal adjectives in French

It is well-known that prenominal adjectives cannot be full APs in French. If we leave aside cases with focalising or incidental prosody, the adjective can have a "light" modifier (a degree adverb) but not a PP or VP complement (Abeillé and Godard, 1999):

(47) a. une (très) longue table
a (very) long table
b. * une [longue de 2 mètres] table
a long of 2 meters table
c. une table longue de 2 mètres
a table long of 2 meters

(48) a. une (trop) facile victoire
a too easy victory
b. * une [facile à remporter] victoire
an easy to obtain victory
c. une victoire facile à remporter
a victory easy to obtain

One cannot just appeal to Williams (1982)' Head-final filter, since not all preadjectival modifiers are allowed:

(49) a. une décision (politiquement) habile
a decision politically wise
b. une (*politiquement) habile décision
a (politically) wise decision

Interestingly, some prenominal adjectives can be coordinated (provided they are of the same semantic type):

[13] Left node raising does exist (Yatabe, 2001) but only in head final languages such as Japanese.

(50) a. une [belle et grande] piscine
a beautiful and big swimming pool
b. les [deux ou trois] premiers volumes
the two or three first volumes
c. * les [deux et grands] volumes
the two and big volumes

Following Abeillé and Godard (1999), we analyse the prenominal adjectives as A^0, while postnominal adjectives project full APs. If this analysis is correct, then (50a) is a case of A^0 coordination. Notice that it cannot be analysed as NP coordination with N ellipsis since it would be a case of left node raising, and not of RNR
Another argument against an elliptical analysis is that, when modifying a plural N, prenominal coordinate As cannot have a distributive interpretation, contrary to postnominal coordinate adjectives:

(51) a. des enfants petits et grands
children small and big
b. * des petits et grands enfants
small and big children
c. des beaux et grands enfants
beautifull and big children

(51a) denotes a group of children where some are small and some are big. This is impossible for (51b) in which the same children should be simultaneously small and big. In (51c), each child has to be both big and beautifull. This is unexpected under an RNR analysis of (51c). On the contrary, it can be easily explained if (51c) is a case of lexical coordination of Adjectives: there is a semantic constraint on lexical additive coordination of As, similar to that on Vs, namely that lexically coordinate adjectives must denote one (possibly complex) property.

Interestingly, when prenominal adjectives are coordinated, they may also appear postnominally:

(52) a. un ancien député
a former MP
b. * un député ancien (with same meaning)
c. les députés [nouveaux et anciens]
the MPs new and former

This shows that coordination of A^0 has a double behaviour, illustrated in figure 5: either as an A^0 (prenominally) or as an AP (postnominally), as in (52c).

4.5 Preverbal quantifiers in French

Quantifiers *tout* (everything) and *rien* (nothing), corresponding to direct objects, can appear in preverbal position in French, with a non finite Verb (Kayne, 1975):

(53) a. Paul essaie de tout comprendre.
Paul tries to all understand

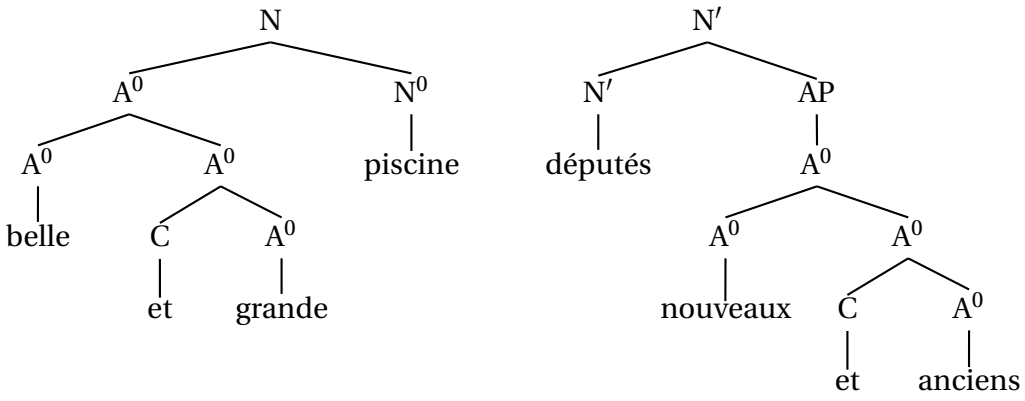

Figure 5: Two structures for A^0 coordination

b. Paul n' a rien oublié.
Paul has nothing forgotten

In these positions, the Quantifier cannot be modified by a PP (54) or a relative clause (55):

(54) a. * Paul essaie de ne [rien d'important] oublier.
Paul tries to nothing important forget
b. Paul essaie de ne rien oublier [d'important].
Paul tries to nothing forget important

(55) a. * Paul a [tout ce qu'il voulait] compris.
Paul has all that he wanted understood
b. Paul a compris [tout ce qu'il voulait].
Paul has understood all that he wanted

The modifying PP must be extraposed as in (54b), and in 55b) the Q with the relative clause must appear postverbally.
A possible analysis is the following (see also Abeillé and Godard, 2006): such bare quantifiers are lexical elements, and cannot project a full QP because they (left) adjoin to a lexical (non finite) V.
Interestingly, the bare quantifiers can be 'lightly' modified or coordinated in these positions:

(56) a. Paul a [presque tout] compris.
Paul has almost all understood
b. Paul a [tout ou presque tout] compris.
Paul has all or almost all understood
c. Paul essaie de ne [vraiment rien] oublier.
Paul tries to really nothing forget
d. Paul essaie de ne [rien ou quasi rien] oublier.
Paul tries to really nothing or almost nothing forget

Notice that (56d) cannot be a case of RNR, since the marker 'de' is not repeated. We thus conclude that (56b,d) are coordinations of bare Qs and that these coordinations

can behave like bare Qs.
As was the case with prenominal Adjectives, these coordinations can also behave as ordinary phrases (=maximal projections), as shown by their mobility ((57) contrast with bare Q in footnote 5):

(57) a. Paul approuve dans votre proposition [tout ou presque tout].
Paul approves in your proposal all or almost all
b. Paul ne pardonne à ses collègues [rien ou quasi rien].
Paul forgives his colleagues nothing or almost nothing

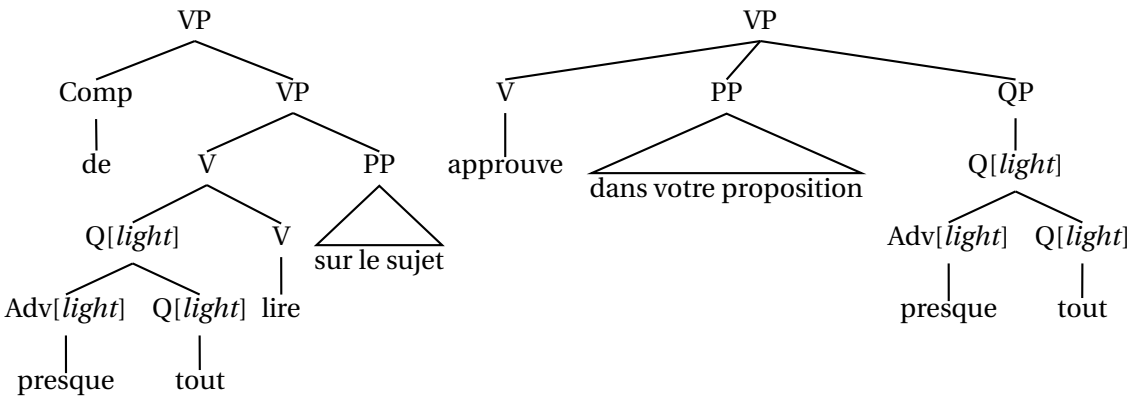

Figure 6: Two structures for Q^0 coordination

We now show how lexical coordination and RNR can be analysed more precisely within HPSG, focusing on the syntactic aspects.

5 Representation in HPSG

We present a formalisation of the syntactic aspects of lexical coordination and RNR within Head-driven Phrase structure grammar (HPSG, cf Sag et al. (2003)). In HPSG, coordinate phrases are analysed as a specific type of phrases which are both n-ary and unheaded (Pollard and Sag, 1994). We rely on previous analyses of constituent coordination (Abeillé, 2003, 2005) and of elliptical coordination (Yatabe, 2001; Beavers and Sag, 2004).
In order to distinguish phrasal from lexical coordination, we use the syntactic feature WEIGHT, as defined in (Abeillé and Godard, 2000, 2004).

5.1 Lexical coordination as "light" coordination

In order to represent our "lexical" phrases, i.e. phrases (built by adjunction or coordination) that behave like words, we use the syntactic feature WEIGHT (as in Abeillé and Godard, 2000, 2004), with two values: light, and non-light.[14] Lexical heads are

[14] Non-light has middle-weight and heavy as subvalues, but we ignore heaviness effects here.

[WEIGHT *light*] (as in the head-complements phrases). Phrases are by default [WEIGHT *non-light*]. Words can be [WEIGHT *light*], [WEIGHT *non-light*] or underspecified for the feature WEIGHT, depending on whether they can project a phrase by themselves or not.
In this theory, the requirements of X-bar models are relaxed in the sense that non heads can be [WEIGHT *light*], as illustrated in the two trees in figure 7, respectively a head-complement phrase with two light complements and two head-adjunct phrases with a light adjunct.[15]

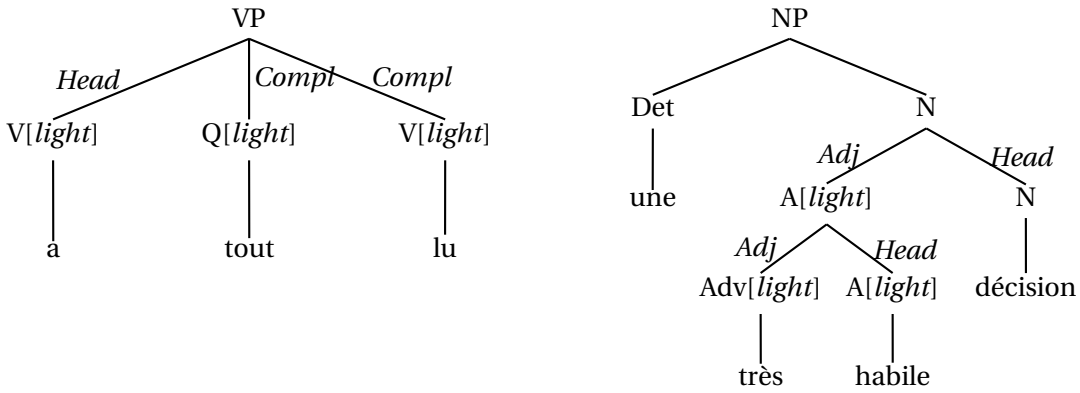

Figure 7: Light nonheads

Lexical assignment of WEIGHT depends on different properties of words: their category, their semantics, their morphology. Proper names are [WEIGHT *non-light*], whereas common nouns (in French) are [WEIGHT *light*]. Strong pronouns are [WEIGHT *non-light*], whether the quantifiers *tout* and *rien* are [WEIGHT *light*].
Syntactic computation of phrasal WEIGHT depends on the type of phrase and on the WEIGHT of the immediate constituents. In French, head-adjunct phrases and coordinate phrases can be [WEIGHT *light*] when they only comprise [WEIGHT *light*] daughters. Thus, WEIGHT is a syntactic feature appropriate for words and phrases, as illustrated in figure 8.

When all daughters are [WEIGHT *light*], the phrase itself can be [WEIGHT *light*], and that is how we analyse lexical coordinations, as shown in figure 9.

We thus have the following WEIGHT constraints on phrases (where the attribute MOTHER means the phrase itself, and DAUGHTERS its immediate constituents; "/" means default value):

(58) a. $\begin{bmatrix} \textit{phrase} \\ \text{WEIGHT} \quad \textit{light} \end{bmatrix} \rightarrow \left[\text{DAUGHTERS} \quad \textit{list}([\text{WEIGHT } \textit{light}]) \right]$

b. $\textit{headed-phrase} \rightarrow \left[\text{MOTHER} \quad \left[\text{WEIGHT} \quad / \ \textit{non-light} \right] \right]$

c. $\textit{head-complement-phrase} \rightarrow \left[\text{HEAD-DTR} \quad \left\langle \left[\text{WEIGHT} \quad \textit{light} \right] \right\rangle \right]$

[15] For other implementations of the same idea, allowing X^0 elements in non head positions, see Sadler and Arnold (1994), using a LEX ± feature in HPSG, and Sells (1994); Toivonen (2003) in LFG.

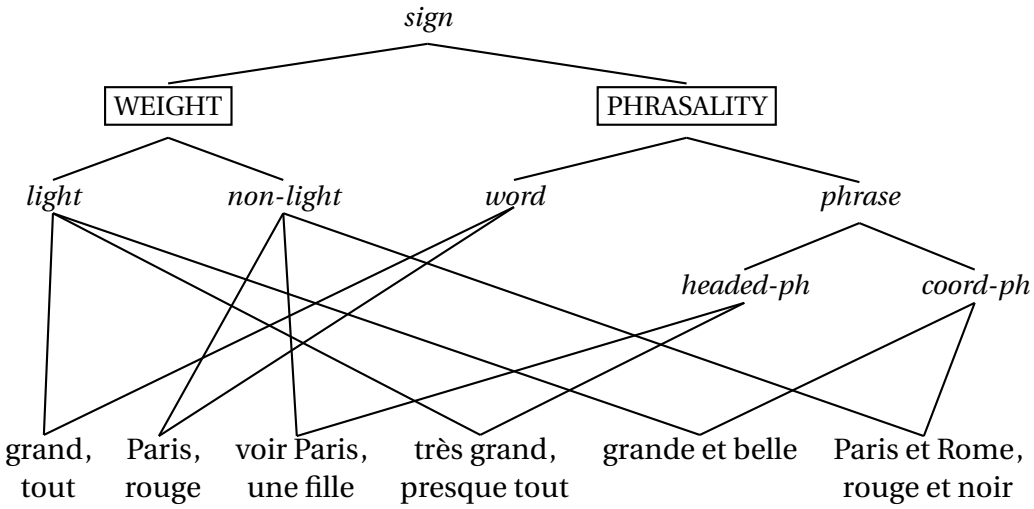

Figure 8: Weight in the sign hierarchy

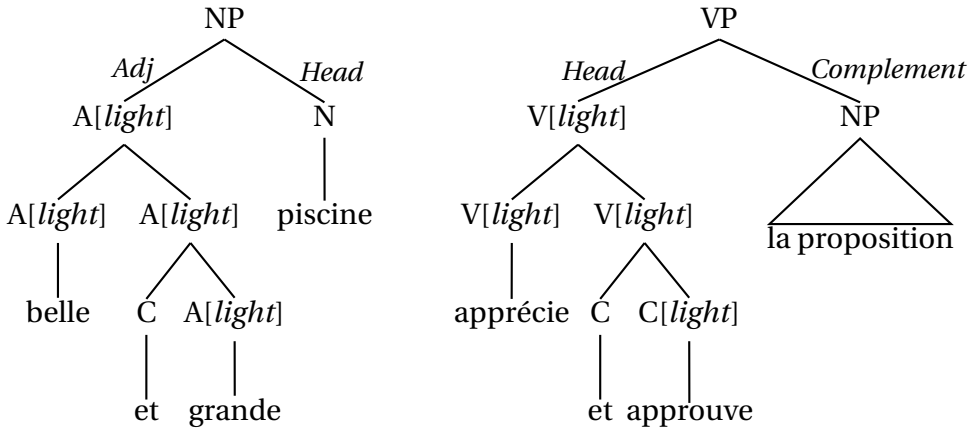

Figure 9: Light coordinations

5.2 Coordinating conjunctions as weak heads

Following Ross (1967), we consider that coordinating conjunctions are syntactically combined with one of the conjuncts. We analyse coordinating conjunctions as 'weak' syntactic heads (Abeillé, 2003, 2005), forming a subconstituent with the following element, and inheriting most of their syntactic features from this complement. The lexical type for coordinating conjunctions is shown in (59), with an example in (60):

(59) *conj-word*→
$$\begin{bmatrix} \text{HEAD} & \boxed{1} \\ \text{CONJ} & \textit{conj} \\ \text{VALENCE} & \begin{bmatrix} \text{SUBJ} & \boxed{2} \\ \text{SPR} & \boxed{4} \\ \text{COMPS} & \left\langle \begin{bmatrix} \text{HEAD} & \boxed{1} \\ \text{CONJ} & \textit{nil} \\ \text{SUBJ} & \boxed{2} \\ \text{SPR} & \boxed{4} \\ \text{COMPS} & \boxed{3} \end{bmatrix} \right\rangle \oplus \boxed{3} \end{bmatrix} \end{bmatrix}$$

(60) Lexical entry for *et* 'and':

conj-word &
$$\begin{bmatrix} \text{CONJ} & \textit{et} \\ \text{VALENCE} & \left[\text{COMPS} \quad \left\langle \left[\text{INDEX} \quad i \right] \right\rangle \oplus \boxed{L} \right] \\ \text{CONT} & \begin{bmatrix} \text{INDEX} & k \\ \text{RELS} & \left\{ \begin{bmatrix} \textit{and-rel} \\ \text{ARGS} \quad \langle \ldots, i \rangle \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}$$

Coordinating conjunctions have a specific CONJ feature, as in Sag et al. (1985). They are underspecified for their category (HEAD feature) and for their subcategorization (VALENCE features). They inherit the subject (variable 2 in (59)) the specifier (variable 4 in (59)) and the complements (variable 3 in (59) and L in (60)) of the item they combine with. They thus project phrases with the same category as the conjunct they combine with, and a specific CONJ feature. They are analysed as semantic heads, with an underspecified number of semantic arguments (attribute ARGS in their CONT feature), one of which is instanciated as the (content of their) complement, the others being instanciated at the level of the coordinate phrase.

The constituent headed by the conjunction is a standard head-complement phrase, except for the following properties:

- It is necessarily binary.
- It can be unsaturated (have a non empty COMPS list).
- It can be [WEIGHT *light*].

We thus define two specific constraints on head-complements-phrases:

(61) Constraints on *Head-complements* phrases

a. $\left[\text{CONJ} \quad \neg \textit{nil} \right] \rightarrow \begin{bmatrix} \text{MOTHER} & \left[\text{WEIGHT} \quad \boxed{1} \right] \\ \text{DAUGHTERS} & \left\langle [\,], \left[\text{WEIGHT} \quad \boxed{1} \right] \right\rangle \end{bmatrix}$

b. $\left[\text{CONJ} \quad \textit{nil} \right] \rightarrow \left[\text{MOTHER} \quad \left[\text{VALENCE} \quad \left[\text{COMPS} \quad \langle\rangle \right] \right] \right]$

Constraint (61a) says that, if the Head is a Conjunction, the WEIGHT of the phrase is that of the complement (since the Head is necessarily *light*). Constraint (61b) says that if the Head is not a conjunction, the phrase must be saturated.[16]

5.3 Non elliptical coordinate phrases

We analyse coordinate phrases as unheaded phrases with an underspecified number of daughters (Sag et al., 2003; Abeillé, 2003): they are n-ary phrases with some syntactic features shared between daughters and mother.

(62) *coordinate-phrase*→

$$\left[\begin{array}{ll} \text{MOTHER} & \left[\begin{array}{ll} \text{CONJ} & \textit{nil} \\ \text{HEAD} & \boxed{0} \\ \text{VALENCE} & \boxed{2} \\ \text{SLASH} & \boxed{3} \end{array}\right] \\ \text{DANGHTERS} & \textit{list}\left(\left[\begin{array}{ll} \text{CONJ} & \textit{nil} \\ \text{HEAD} & \boxed{0} \\ \text{VALENCE} & \boxed{2} \\ \text{SLASH} & \boxed{3} \end{array}\right]\right) \oplus \textit{list}\left(\left[\begin{array}{ll} \text{CONJ} & \boxed{1}\neg\textit{nil} \\ \text{HEAD} & \boxed{0} \\ \text{VALENCE} & \boxed{2} \\ \text{SLASH} & \boxed{3} \end{array}\right]\right) \end{array}\right]$$

We assume that HEAD features, VALENCE features and SLASH features are shared between conjuncts and the coordinate phrase (with the MOTHER attribute in (62)). Sharing can be redefined as allowing underspecification in the case of unlike conjuncts (Sag, 2002).[17] We thus have for the lexical coordinations in (1a) and (50a) the (simplified) representations in figures 10 and 11.

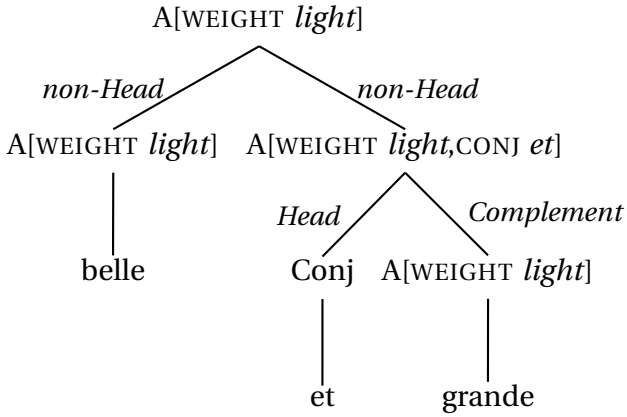

Figure 10: Adjective coordination

[16] This is a simplification since Spanish allows unsaturated head-complement phrases made of a tense auxiliary and a past participle (cf above section 3.2).

[17] Sharing the SLASH features implements the Coordinate Structure Constraints disallowing extraction out of one conjunct only (Ross, 1967). As shown by Kehler (2002), this constraint is too strong and only applies to a semantically defined) subset of coordinate phrases.

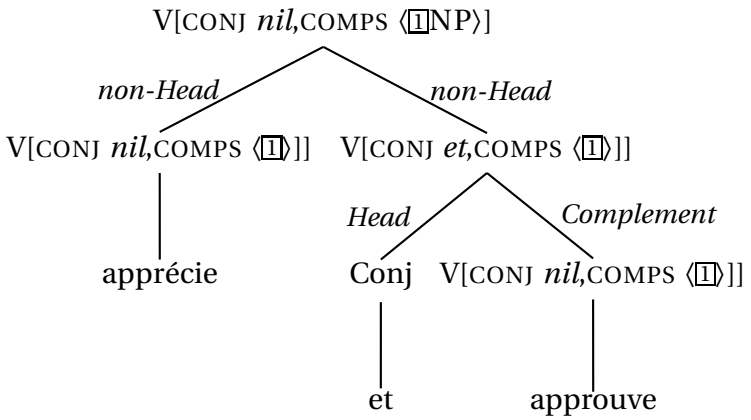

Figure 11: Verb coordination

The adjectival coordinate phrase being *light* in (50a), it can appear as prenominal adjunct. Since the verbal coordinate phrase is *light* in (1a), it can appear as a head in a head-complement phrase, and thus combine with the NP object.[18]
Now let us turn to RNR, which has been analysed in HPSG by Yatabe (2001) and Beavers and Sag (2004).

5.4 An elliptical analysis of RNR

We follow Beavers and Sag (2004)'s analyses of RNR, which we reformulate in order to make it compatible with the previous section. As mentioned above, a movement analysis (in terms of SLASH feature) is to be rejected and a phonological reduction analysis is to be prefered. RNR is thus analysed as the coordination of two syntactically (and semantically) complete phrases, and ellipsis is implemented using the DOM feature, which at the phrase level, encodes the list of elements to be linearized, and which is not limited to the immediate constituents (Kathol, 2000). Let us take the following example:

(63) John likes [~~red beans~~] and Paul dislikes [red beans]

The first conjunct is analysed as an elliptical S, that is as a syntactically (and semantically) complete S with a reduced Phonology. In HPSG terms, this means that its DOM feature inherits less than the concatenation of the DOM features of its daughters.
Considering Right-Node-Raising as a specific subtype of coordinate phrases, we reformulate Beavers and Sag (2004)'s coordination schema as follows:[19]

[18]Such coordinate phrases can also project [WEIGHT *non-light*] phrases, using a head-only phrase (Abeillé and Godard, 2006).

[19]This is a simplification since RNR also applies to some non coordinate cases as well, such as comparatives and adjunct clauses with a contrastive meaning:

(i) John likes, whereas Mary hates, red beans.

(64) *RNR-coord-phrase→coord-phrase* &

$$\left[\begin{array}{ll}\text{DOM} & \boxed{A_1}\oplus\boxed{A_2}\oplus\cdots\oplus\boxed{B_n}\\ \text{DAUGHTERS} & \left\langle\left[\text{DOM}\quad \boxed{A_1}\oplus\boxed{B_1}\right],\left[\text{DOM}\quad \boxed{A_2}\oplus\boxed{B_2}\right],\ldots,\left[\text{DOM}\quad \boxed{A_n}\oplus\boxed{B_n}\right]\right\rangle\end{array}\right],$$

where

$$\boxed{B_1}=\left\langle\left[\begin{array}{ll}\text{FORM} & \boxed{f_1}\\ \text{HEAD} & \boxed{h_1}\end{array}\right],\ldots,\left[\begin{array}{ll}\text{FORM} & \boxed{f_k}\\ \text{HEAD} & \boxed{h_k}\end{array}\right]\right\rangle,$$

$$\boxed{B_2}=\left\langle\left[\begin{array}{ll}\text{FORM} & \boxed{f_1}\\ \text{HEAD} & \boxed{h_1}\end{array}\right],\ldots,\left[\begin{array}{ll}\text{FORM} & \boxed{f_k}\\ \text{HEAD} & \boxed{h_k}\end{array}\right]\right\rangle,$$

$\ldots,$

$$\boxed{B_n}=\left\langle\left[\begin{array}{ll}\text{FORM} & \boxed{f_1}\\ \text{HEAD} & \boxed{h_1}\end{array}\right],\ldots,\left[\begin{array}{ll}\text{FORM} & \boxed{f_k}\\ \text{HEAD} & \boxed{h_k}\end{array}\right]\right\rangle.$$

In (64), $\boxed{A_1}$,...,$\boxed{A_n}$ can be any list of constituents, while $\boxed{B_1}$,...,$\boxed{B_{n-1}}$ correspond to the ellided elements and $\boxed{B_n}$ to the final remnants (which are shared). Deletion (ie non propagation at the mother's level) of the final elements in the non final conjuncts is done under morphological and categorial identity (checking identity of the respective FORM and HEAD features). Of course, the content of the ellided elements can be different from that of the realized ones, as in *Paul sells and Mary buys lots of books*, where the sold books are probably not the same as the ones bought.
The analysis of (63) is thus as in figure 12.

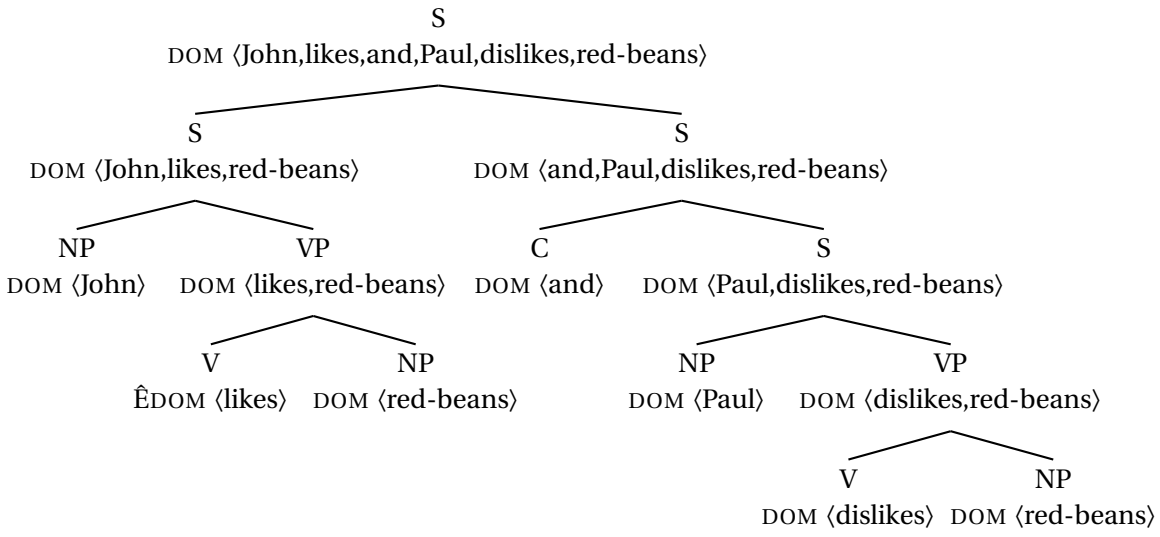

Figure 12: Analysis for (63)

Note that in this approach, the Form of the Sentence is read off the DOM feature, and is not the terminal yield of a phrase structure representation.

6 Conclusion

In this paper, we have shown that lexical head coordination (LHC) cannot be reduced to phrasal coordination with ellipsis or Right Node raising. There are prosodic, semantic and syntactic differences between lexical head coordination and RNR. In particular, if it is true that RNR implies a prosodic boundary and a rising tone before the conjunction, it is not the case for LHC. RNR implies a semantic contrast between the conjuncts which is not necessary with LHC. From the syntactic point of view, LHC can share some weak complements, and some syntactic markers, that phrasal conjuncts in RNR cannot. Finally some conjunctions are appropriate for RNR only and not for LHC.
We then show that coordination with lexical conjuncts is also relevant for certain non Heads, appearing in contexts where only X^0 elements are allowed. We also show that these coordinate phrases can have a double behavior, as X^0 or as XPs.
We finally show how lexical coordination can be represented in HPSG using the syntactic WEIGHTfeature appropriate for both words and phrases. Lexical coordination thus falls into the class of "light" phrases, which also covers some head-adjunct phrases.

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The Speech Act Assignment Problem Revisited: Disentangling Speaker's Commitment from Speaker's Call on Addressee

Claire Beyssade & Jean-Marie Marandin*

1 Introduction

Our goal is to revisit the problem known as the Speech Act Assignment Problem (SAAP) (Gazdar, 1981) taking advantage of a semantics that assumes a rich ontology of semantic content and a pragmatics that allows for a fine-grained modelization of dialogue. The traditional assumption, revived in the early days of the generative program under the name of Literal Force Hypothesis (LFH) (Sadock, 1974; Levinson, 1983), is that the syntactic construal of the sentence plays the crucial role in the SAAP. The LFH posits a restricted set of clause types and a restricted set of illocutionary forces and it claims that there is an one-to-one relationship between them as summarized in (1):

(1) a. The declarative type is associated with asserting.
b. The interrogative type is associated with questioning.
c. The imperative type is associated with requesting.
d. The exclamative type is associated with exclaiming.

Gazdar launched the most forceful criticism of the LFH in a paper published in 1981 and, since then, it is commonly accepted that the LFH is falsified and should be rejected. In this paper, we re-open the case and we argue that there are regularities holding between clause types and some aspects of illocution.

Our proposal crucially relies on two assumptions. The former is that utterances have two types of impact on the dialogical context. On the one hand, they bring about a new commitment for Speaker; on the other hand, they call on Addressee for him to take up the utterance. Traditionally, it is assumed that there is a symmetry between Speaker's commitment and Speaker's call on Addressee. For instance, it is usual practice to consider that statements commit Speaker to their propositional content and that they call on Addressee for him to commit himself to the same content. We claim that this symmetry is not compulsory: Speaker's commitment and Speaker's call on Addressee may be different. Such a configuration is precisely what characterized most of the counterexamples raised against the LFH. For instance, demands for confirmation,

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i.e. questioning declaratives, can be analyzed as committing Speaker to their propositional content on the one hand and, on the other hand, calling on Addressee for him to take up the utterance as a question (equivalent to a polar question). This is the general idea upon which we build our proposal.

The latter assumption pertains to the notion of clause type. There are many criticisms of (1) coming from the pragmatic side, much less from the syntactic side. And yet, the very notion of clause type is far from obvious. For example, from a syntactic point of view, polar questions and variable questions are strikingly different.[1] We will assume a definition of clause types that conjoins a type of semantic content and several syntactic construals, following a route opened by Ginzburg and Sag (2000).

Given these assumptions, we propose a revisited version of the LFH whose core content is the following:

(2) a. Clause types are associated with Speaker's commitment in a one-to-one manner.
    b. Clause types allow for several types of Speaker's call on Addressee.
    c. By default, Speaker's commitment is symmetrical with Speaker's call on Addressee.
    d. Grammar provides interlocutors with a limited set of conversational move types (CMT). A CMT conjoins a type of Speaker's commitment and a type of Speaker's call on Addressee.

The paper proceeds as follows. In section 2, we present the main drawbacks of the traditional theory of illocutionary forces and speech acts as analyzed in Gazdar (1981). In section 3, we redefine the notion of clause type following Ginzburg and Sag (2000). In section 4, we analyze the dialogue change potential of illocutionary forces using the framework proposed by Ginzburg (to appear); we reshape it in order to account for assertions, questions, commands and exclamations. In section 5, we show how to capture the two sides of the dialogue change potential of utterances: we introduce the notion of conversational move type (CMT) and the taxonomy of CMTs. We then conclude by summarizing the aspects of the LFH we have rescued from Gazdar's attacks.

2 The Limits of Speech Act Theory

Gazdar (1981) highlights two problems in the Speech Act Theory that was developed by pragmaticians in the sixties-seventies. The former pertains to the semantic content of utterances: utterances, whatever their clause type, viz. declarative, interrogative, imperative or exclamative, uniformly convey propositions. The latter pertains to the illocutionary potential of utterances: each clause type is associated with a different illocutionary force (assertion, question, directive and exclamation).[2] This is the core

[1] Our terminology is based on Huddleston (2002). From a syntactic point of view, we distinguish open interrogatives (e.g. *Who arrived?*) from closed interrogatives (e.g. *Has he arrived?*) (other labels: *wh*-interrogatives *vs* polar interrogatives); from a semantic point of view, we distinguish variable questions from polar questions.

[2] From now on, we use the term *directive* (instead of *command*) to cover speech act, regardless of their form, by which the speaker's desire or opinion is imposed on the addressee as an order, demand, request, plea, warning or suggestion.

content of the Literal Force Hypothesis.[3] In this section, we reassess Gazdar's criticisms from the vantage point of contemporary semantics and pragmatics.

2.1 Uniformity of content

In the pragmatics of the sixties-seventies, speech acts are decomposed into a content and a force as schematized in (3). Crucially, speech acts differ in force only. The content of speech acts is always a proposition.

(3) Speech act = (ILLOCUTIONARY FORCE, p)

As a consequence, the three utterances in (4) share the same propositional content, p, while they differ in illocutionary force.

(4) a. It is raining. (ASSERT, p)
b. Is it raining? (QUEST, p)
c. Let it rain! (COMM, p)

2.1.1 Gazdar's arguments

Gazdar refutes the analysis in (3) with an argument using *reductio ad absurdum* that he applies to questions. First, he takes a polar question (5a) and a variable question (5b). In order to obtain the propositional content of (5b), he takes it that *who* contributes a free variable and a restriction, which yields '$x \wedge \mathsf{human}(x)$', and then applies existential closure, which gives us (6). As for (5a), he takes it that *somebody* is an existential quantifier, which gives us (6) again. Then, we obtain the same content for both (5a) and (5b), which does not enable one to capture the difference in meaning of the two types of interrogatives.

(5) a. Will somebody eat some cookies?
b. Who will eat some cookies?

(6) a. $(\text{QUEST}, \exists x \exists y(\mathsf{human}(x) \wedge \mathsf{cookies}(y) \wedge \mathsf{will\text{-}eat}(x, y)))$

One could argue that the difference in meaning between (5a) and (5b) does not pertain to propositional content, but to illocutionary force. This would lead us to posit that polar questions and variable questions correspond to two different illocutionary forces. This move, which has a strong *ad hoc* flavor, will not save us since the same problem plagues the analysis of variable questions featuring an existential quantifier such those in (7a) or (7b) and multiple variable questions (7c). All these questions share the same propositional content and the trick which consists in positing different forces to explain their differences would give us no way out.

(7) a. Who ate something?
b. What did someone eat?
c. Who ate what?

[3] Gazdar uses *Literal Meaning Hypothesis*. We take up Sadock's (1974) expression *Literal Force Hypothesis* (LFH).

d. (QUEST-WH, $\exists x \exists y(\mathsf{human}(x) \wedge \mathsf{ate}(x, y))$)

Gazdar concludes that one should give up (3), i.e. the idea that utterances convey a proposition whatever clause type they belong to and that there is only one type of semantic content, viz. propositions. He just suggests to posit several types of semantic contents by alluding to Hamblin's theory of questions (Hamblin, 1973). In a nutshell, declarative sentences express propositions, while interrogative sentences express sets of propositions. He does not touch the problem raised by the semantic analysis of imperative and exclamative sentences.

2.1.2 Types of semantic content

In contemporary semantics, we are more prone to accept that non-declarative sentences convey non-propositional contents. Ginzburg and Sag (2000) propose a rich ontology that enables us to solve the qualms brought about by (4). [4]

Ginzburg & Sag develop their ontology in the framework of situation theory.[5] It comprises, along with basic objects (individuals, times, situations, relations), structured objects whose properties are obtained compositionally. The basic structured object is the SOA; it enters the composition of all other structured objects: Propositions and also Questions (i. e. propositional abstracts), Possibilities (among them Facts) and Outcomes.[6] We refer the reader to Ginzburg and Sag (2000) for a thorough presentation and justification of the proposal.

From this perspective, the semantic content of interrogatives is given the type Question, viz. it is a propositional abstract obtained by abstraction upon a proposition. The idea is to abstract over variables, rather than keep them free or uninstantiated as in open propositions. Ginzburg & Sag resort to simultaneous abstraction which is similar to the lambda-abstraction used in the standard lambda-calculus, except that it operates on a set of parameters whose cardinality is not fixed. Hence, we can abstract 0, 1 or several parameters simultaneously. This makes possible a uniform semantics for both polar and variable questions. The content of polar questions involves an empty abstraction. Accordingly, the content of (5a), (5b), (7b) and (7c) is analyzed as in (8) below.

(8) a. Will somebody eat some cookies? [= (5a)]
$\lambda\{\}.\exists x \exists y(\mathsf{human}(x) \wedge \mathsf{cookies}(y) \wedge \mathsf{will\text{-}eat}(x, y))$

b. Who will eat some cookies? [= (5b)]
$\lambda\{x\}.\exists y(\mathsf{human}(x) \wedge \mathsf{cookies}(y) \wedge \mathsf{will\text{-}eat}(x, y))$

c. What did someone eat? [= (7b)]
$\lambda\{y\}.\exists x(\mathsf{human}(x) \wedge \mathsf{ate}(x, y))$

[4] Truckenbrodt (2004) is another thought-provoking proposal, though less formally elaborated.

[5] As it has been formally redefined in Seligman and Moss (1997). From now on, we write the names of types of semantic content with a capital letter.

[6] SOAs contributes what is common to different structured objects. This is especially important for us, since it enables one to salvage the intuition that utterances belonging to different clause types may share « a common semantic denominator ». For example, utterances in (4) share the same content; this content is not the proposition that it rains but the description of a situation where it rains (see Ginzburg and Sag, 2000, 84).

d. Who ate what? [= (7c)]
$\lambda\{x, y\}.(\mathsf{human}(x) \wedge \mathsf{ate}(x, y))$

Such an analysis says nothing of which illocutionary force is associated with the utterances in (5) and (7). More precisely, it dissociates the analysis of the semantic content from that of the illocutionary force.

The proposal deals with all clause types which are associated in a one-to-one manner with a type of content: imperatives and exclamatives are respectively associated with Outcomes and Facts (Ginzburg and Sag, 2000, 61ff). The proposal is summarized in table 1.

Syntactic types	**Semantic content types**
Declarative	Proposition
Interrogative	Question (Propositional abstract)
Imperative	Outcome
Exclamative	Fact

Table 1: Correspondance between syntactic and semantic types

2.2 The literal force hypothesis (LFH)

The LFH claims that there is a one-to-one relationship between clause types and illocutionary forces (cf. (1)). Gazdar adduces two arguments against the LFH: (i) utterances in a given clause type may give rise to a great number of speech acts and (ii) speech act assignment depends on Addressee's uptake, hence on Addressee's interpretation of the utterance.

2.2.1 Clause types and speech acts

In order to invalidate the relation between clause types and illocutionary forces, Gazdar recycles the observation that a declarative utterance, such as (9), may give rise to a great number of speech acts.

(9) A: You will go home tomorrow.

According to Gazdar, the utterance (9) may achieve an assertion, a question, a prediction, an order or a reply. More exactly, "*the addressee may find* it to be an assertion, a question, a prediction, an order, a reply, *and so on*" (emphasis is ours). The possible interpretations of Addressee are reflected in the gamut of responses Addressee may perform when it becomes his turn to take up (9). Following Gazdar, Addressee is supposed to show that he finds (9) to be an assertion when he uses (10i), a question by using (10ii), a prediction by using (10iii) and an order by using (10iv).

(10) B. i. How do you know?
ii. Yes.
iii. That's what you think.

iv. Okay.

The argument is twofold:

- An utterance gives rise to a great number of speech acts, indeed even to an infinite set of speech acts, as implied by the use of *and so on*.
- The speech act assignment depends on Addressee.

We discuss the former below, and the latter in section 2.2.3

2.2.2 Syntactic type versatility

Gazdar's observation is disputable, in particular the claim that (9) gives rise to (at least) five different speech acts. There are two doubtful candidates: replies and predictions. A reply is nothing else than an assertion which occurs in a specific environment (the second member of a question-answer pair). In the same way, a prediction is also an assertion which describes a future situation.[7] Thus, Gazdar's argument is reducible to the claim that (9) may convey an assertion, a question or a directive.

There is a more general problem in Gazdar's argument: he does not distinguish between speech acts and types of speech acts, what is generally called illocutionary forces. For sure, there are many different speech acts, which are linked to specific contextual conditions, but it seems undisputable that these speech acts fall into a few general types. At least, this is the result of the major part of the literature about illocution, which is precisely devoted to how to classify speech acts. Particular taxonomies have been criticized, but the very idea that Grammar knows of a few types of speech acts is not called into question.

The usual taxonomy (Searle, 1975) claims that there are five and only five classes of speech acts (assertives, directives, commissives, declarations and expressives). This classification has been the object of several criticisms: directives and commissives can be brought together (see among others Pak et al., 2005). Most of the declarations are achieved via assertives, and consequently it has been proposed by Zaefferer (2001) to analyze them as a subclass of assertions.

Zaefferer (2001) proposes a taxonomy that is based on Speaker's attitude rather than on putative basic functions of language ('say how things are', 'try to get other people to do things', 'commit oneself to doing things', etc.). His taxonomy has the structure shown in Figure 1.

Zaefferer's taxonomy has been a direct source of inspiration for our own proposal.[8] The classification of update operations in dialogue that we will propose to analyze the semantic import of illocutionary forces (see Figure 5 below) shows an analogical structure, in particular a sharp divide between exclamations and other types of speech acts.

[7] *That's what you think* in (9c) above is not a specific uptake of a prediction. It could be used to refuse or to deny an assertion, as shown in (i):

(i) A: Mary has just finished her job.
B: That's what you think!

[8] It has been much influential upon Truckenbrodt's (2004) analysis too.

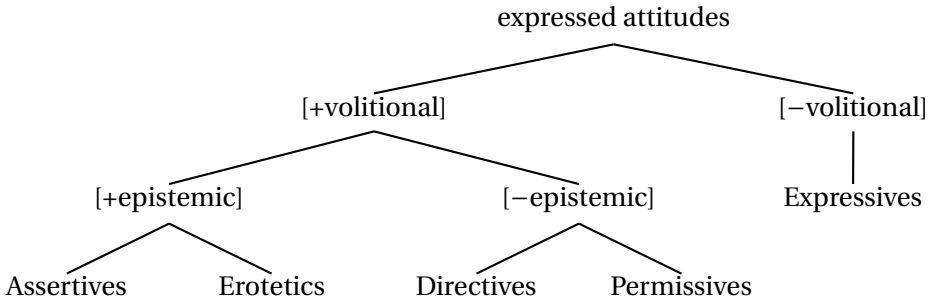

Figure 1: Zaefferer's (2001) taxonomy of speech acts

To sum up, one can leave aside the fact that declarative utterances may give rise to a great number of speech acts. Accordingly, we will only consider the fact that they may convey an assertion, a question or a directive. For sure, this latter observation invalidates the LFH as it is formulated in (1). Now, one should wonder whether the notions of assertion, question, and directive are the adequate analytical categories to capture the illocutionary import of clause types. They might be too coarse, hiding differences between aspects of illocution. This is precisely our point of departure to reconsider the SAAP.

2.2.3 Addressee's assignment

The second argument put forward by Gazdar against the LFH is that the speech act assignment is performed by Addressee. This is commonly accepted nowadays, but this should be made more precise.

For certain, Conversation Analysis has shown that the making of dialogue locally depends on Speaker's interpretation of the turn she takes up. Such an interpretation includes which illocutionary actions she recognizes in her Addressee's utterance. But, a distinction should be crucially drawn between the two types of resource Addressee may use to come up with an illocutionary assignment: (i) either context knowledge bearing on Addressee, Speaker, their relations in the world and the current conversation or (ii) grammaticalized features of the utterance which indicate how it should be taken up. Green (1975) provides us with a clear illustration of the distinction when she discusses the directive use of interrogative utterances. Consider (11):

(11) a. Have you taken away the garbage?
b. Why don't you be quiet!

The closed interrogative (11a) may be used as a directive only in a context where Addressee is expected to take away the garbage at a certain time, whereas the open interrogative (11b) conveys a directive in all contexts. According to Green, a reply to (11b) with *because* or whose content could be interpreted as a reason would not only be non-felicitous, but it would show a poor competence of English. As whimperatives such as (11b) show, there are grammatical resources in the utterance that constrain Addressee's illocutionary assignment.

If one admits that (11b) is an interrogative clause, (11b) does not have the effect on Addressee that interrogatives usually bring about: it has a directive import. The direc-

tive import is brought about by other features than those subsumed in clause type, a construction featuring *why*, inverted *do* in the negative and a verb in the base form. The point here is twofold: (i) the directive call on Addressee is grammaticalized in utterances such as (11b) and (ii), one must recognize that clause type is not the only grammatical resource Speaker have access to when performing an illocutionary assignment.

We will leave aside the illocutionary assignments based on contextual knowledge (how directive import is assigned to an interrogative such as (11a)) to concentrate only on the grammatical resources that are available to Addressee for illocutionary assignment. Here again, the problem is more complex than what was assumed when the LFH was under discussion, since we recognize that the clause type is not the only factor that is relevant for illocutionary assignment. Consequently, it is now necessary to reformulate the question of the relation between clause types and illocution as follows:

(12) a. What type of information does clause type contribute to illocutionary assignment?

b. What are the relations between the information contributed by clause type and that which is conveyed by other features in the utterance, such as the '*why don't you* + *Vinf* construction' in (11b)?

The traditional conception, which has been developed as the theory of indirect speech acts, is that the information contributed by clause types is overwritten by constructional means. This is what is assumed by Green for whimperatives such as (11b), although she recognizes that Addressees do not take up whimperatives as they do with regular imperatives (Green, 1975, 138). Here, we will take another route and argue that there is a 'division of labor' between clause type and other features in the clause: clause type contributes information about Speaker's commitment whereas Speaker's call on Addressee may be specified constructionally (as in whimperatives) or lexically (by tags as we will see).

2.3 Summing up

We cannot keep the LFH as formulated in (1) unchanged. But neither can we conclude that there is no tight relation between clause types and aspects of illocution. To address this issue, one should have a finer understanding of what is called illocutionary force and take into consideration all the grammatical aspects of utterances that may contribute information for illocutionary assignment. Moreover, there is another dimension we have not yet considered, viz. clause types. Is it relevant to keep them in the first place? We devote the next section to this question.

3 The Notion of Clause Type

We have assumed so far that there is a limited number of clause types on an intuitive basis. In fact, this is a thorny issue. Indeed, all attempts at defining clause types end up by resorting to illocutionary forces, hence involving the LFH and, consequently, face the criticisms developed in the preceding section. Huddleston observes when he

discusses interrogatives: "the terms 'closed interrogative' and 'open interrogative' suggest that they are subclasses of 'interrogative'. Yet what they have in common is much more a matter of meaning than of syntax: they both characteristically *express questions*. From a syntactic point of view, they are in fact *strikingly different*" (Huddleston, 2002, 858; we emphasize). In the previous section, we end up concluding that declaratives may convey an assertion, a question or a directive; the observation extends to Huddleston's open interrogatives (e. g. *where does he go?)* and closed interrogatives (e. g. *has he gone away?)*.[9] Hence, if the LFH is given up, the classification of clauses is directly shaken up. We are facing a threefold choice: (i) we accept that clause types are only prototypically associated with illocutionary forces, (ii) we assume that the illocutionary force may be cancelled in context (giving rise to indirect speech acts), (iii) more radically, we break away from the tradition by giving up illocutionary forces as the defining feature of clause types. The question is then whether there is any sound basis to classify clauses.

We have already introduced the means to define clause types while keeping Huddleston's observation: "what they [sentences belonging to the same clause type] have in common is much more a matter of meaning than of syntax". This means, alluded to by Gazdar, has been fully developed by Ginzburg and Sag (2000) thanks to a richer ontology for Semantics.

Ginzburg and Sag propose that clause types are identified by a type of semantic content and that they may feature several types of syntactic construals, hence their semantic unity and their syntactic diversity. We take up Ginzburg and Sag's approach in which clause types inherit their defining features (under the guise of constraints) from two inheritance trees: the former passes on semantic features (CLAUSALITY) and the latter combinatorial features linked to grammatical functions (HEADEDNESS). Thus, clause types abide simultaneously by two types of constraints, i.e. syntactic and semantic; they are essentially form-meaning associations, viz. constructions.

3.1 Dimensions of classification

In the dimension HEADEDNESS, syntactic types of combination are defined, giving rise to types of phrases: (i) phrases may have a head or not, (ii) when they are headed, they may have daughters of distinct kind. In HPSG, the kinds of daughters correspond to grammatical roles, including grammatical functions. We only consider here the subtree that is relevant for our purpose: it describes phrases with a head. There are two main subtypes:

- Phrases whose daughters are identified by a grammatical functions with respect to the head (subject (subj), complement (comp), specifier (spr), adjunct (adj)):

[9] The questioning or directive use of interrogatives was illustrated in (11) above. The assertoric use, known as rhetorical questions, is illustrated in (i) below:

(i) A: Chirac est-il un modèle de vertu ?
'Is Chirac a paragon of virtue?'

B: J'ai jamais dit ça.
'I never said that.'

all are subtypes of the *hd-nexus-ph* type. Moreover, we admit that clauses may be headed either by a verb or by a complementizer.

- Phrases which combine a daughter with a gap and a daughter which discharge this gap (a filler): *hd-filler-ph*.

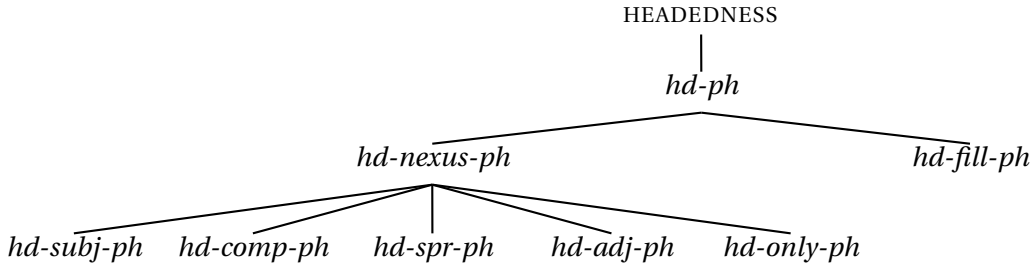

Figure 2: Part of the HEADEDNESS hierarchy

On the other hand, the dimension CLAUSALITY specifies semantic constraints on clauses. Here again, we only consider the subtree in which core clauses are defined.[10] There are four subtypes of clauses identified by a type of content. Here, the ontology we introduced above is crucially put to use. The constraints below capture the unity of each clause type.

(13) a. $\textit{decl-cl} \rightarrow \left[\text{CONT} \quad \textit{Proposition}\right]$

b. $\textit{inter-cl} \rightarrow \left[\text{CONT} \quad \textit{Question}\right]$

c. $\textit{imp-cl} \rightarrow \left[\text{CONT} \quad \textit{Outcome}\right]$

d. $\textit{excl-cl} \rightarrow \left[\text{CONT} \quad \textit{Fact}\right]$

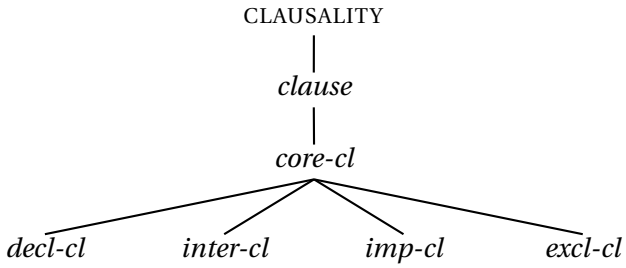

Figure 3: Part of the CLAUSALITY hierarchy

Heads of core clauses are either verbs or complementizers. Verbal heads should be either finite or in the infinifive (Ginzburg and Sag, 2000, 24,41)

[10] Core clauses may be used either as independent clause or main clause or complement clause. They are distinguished from clauses used as modifiers (e.g. relative clauses). In this section, we restrict the presentation to core clauses used as independent clauses since they suffice to make the point we are discussing. In Ginzburg & Sag parlance, they are [IC +] (Ginzburg and Sag, 2000, 45). This section is based on collaborative work on the classification of clauses in French Grammar with Anne Abeillé and Danièle Godard.

Types of sentences inherit constraints in both dimensions. For example, the prototypical declarative sentence (e.g. *Mary loves Paul*) is a subtype of declarative clause and a subtype of headed phrase, a sentence whose content is a proposition and which is made up of two constituents: a verbal head and an XP subject.

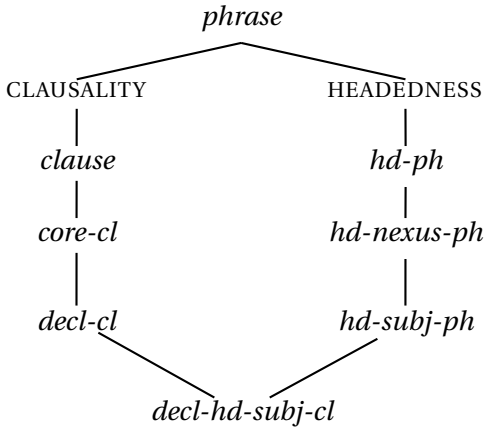

Figure 4: Supertypes of *decl-hd-subj-cl*

3.2 Sentence types

In this section, we present a sample of types of sentences that are instances of the four clause types and that are used as independent clauses. This sample is large enough to enable us to give substance to our revisiting the LFH. From now, we use French as our domain of study.[11]

3.2.1 Types of declarative sentences

Types of declarative sentences are subtypes of the *decl-cl* type (in the CLAUSALITY hierarchy); as such, their content is of type Proposition (cf. (13a)). Simultaneously, they are subtypes of the *hd-nexus-ph* type in the HEADEDNESS dimension whose head is a verb. We get the types illustrated in (14):

(14) a. *decl-hd-subj-cl* based on *hd-subj-ph* (e.g. Marie arrive)
b. *decl-hd-comp-cl* based on *hd-comp-ph* (e.g. elle a lu le livre)
c. *decl-hd-adj-cl* based on *hd-adj-ph* (e.g. elle arrive vite)
d. *decl-hd-only-cl* based on *hd-only-ph* (e.g. elle arrive)[12]

All these subtypes inherit the constraint on core clauses that requires the feature VFORM on the Verb to be of type *clausal*, viz. *finite* or *infinitive*. One should further restrict the finite value of VFORM to be indicative. As to the value *infinitive*, it is restricted to sentences with a canonical subject (hence: *decl-hd-subj-ph*) and requires a marker *de* in front of the VP, which yields a somewhat literary construction with specific discourse felicity conditions:

[11] We refer the reader to Ginzburg and Sag (2000) for English declaratives and interrogatives.
[12] French clitics are treated as verbal affixes (Miller and Sag, 1997).

(15) a. (Et) grenouilles de sauter dans les ondes.
and frogs DE jump into the water
'(And) frogs jumped into the water'

b. * De sauter dans les ondes.

3.2.2 Types of interrogative sentences

The family of interrogative sentence types is semantically homogeneous (they denote a Question, see (13b)) and, syntactically, strikingly diverse. It shows all subtypes of *hd-ph*: types involving the head-filler phrase and types involving a verb or a complementizer as a head.

(16) a. *inter-hd-fill-cl* based on *hd-filler-ph* (e.g. qui Paul a rencontré hier soir ?)

b. *inter-hd-nexus-cl* based on *hd-nexus-ph*

The subtypes based on *hd-fill-ph* should be further constrained: not all *wh*-expressions are licensed in the interrogative type.[13] Here we assume a descriptive classification of *wh*-expressions that we express via a feature [INTERROGATIVE ±]. These sentence types correspond to Huddleston's variable interrogatives.

Among *hd-nexus-ph* based types, there are again two types, which yields Huddleston's closed interrogatives. The former is defined as in (17):

(17) a. Types whose head is a verb (e.g. Marie arrive-t-elle ?)

b. Further constraint : the verb should be marked with an inverted clitic-subject ([INV-CL-SU +]).

The latter as in (18):

(18) a. Types whose head is a complementizer: *inter-cp-cl* (e.g. est-ce que Marie arrive ?)

b. Only two complementizers are legitimate in the interrogative type: *est-ce-que* and *si.*

[13] For example: *comment* or *quel* are grammatical in interrogatives only:

(i) a. Comment est-il ?
'How is he?'

b. * Intelligent, comment il est
clever COMMENT he is

c. Intelligent comme il est
clever COMME he is
'Clever as he is'

(ii) a. Quel est-il ?
'What is he?'

b. * Il est tel quel tu l' imagines
he is TEL QUEL you him imagine

c. Il est tel que tu l' imagines
he is TEL QUE you him imagine
'He is as you imagine him to be.'

Notice that *inter-cp-cl* is necessarily marked with [INV-CL-SU −] in standard French.

(19) a. * Vient ? / Vient-elle ?
comes comes-she
'Is she coming?'

b. * Est-ce que Marie vient-elle ? / Est-ce-que Marie vient ?
EST-CE QUE Marie comes-she EST-CE QUE Marie comes
'Is Marie coming?'

In this perspective, so-called declarative questions (or intonation questions) such as *Marie vient ?* are not interrogative sentences. We come back to them in section 5.2

3.2.3 Types of imperative sentences

The family of imperative sentences denotes an Outcome (see (13c)) and, syntactically, is less diverse. It comprises two subtypes. The former is defined as in (20):

(20) a. i. *imp-hd-only-cl* based on *hd-only-ph* (e.g. ne fume pas, ne pas fumer)
ii. *imp-hd-adj-cl* based on *hd-adj-ph* (e.g. ne fume pas compulsivement, ne pas fumer régulièrement)
iii. *imp-hd-comp-cl* is based on *hd-comp-ph* (e.g. ne fume pas de cigares, ne pas fumer le cigare).

b. Further constraint: the value of VFORM should be *imperative* or *infinitive*.

The latter as in (21):

(21) a. *imp-hd-comp-cl* based on *hd-comp-ph* whose head is a complementizer (e.g. que Pierre fasse la vaiselle).

b. Further constraint: the complementizer should be *que* and selects for a complement clause in the subjunctive.

3.2.4 Types of exclamative sentences

Exclamations are noteworthily diverse. Moreover, the descriptive term *exclamation* covers (i) utterances that give rise to an intensive judgment (usually associated with an emphatic prosody whose realization is quite unconstrained, see Rossi (1999)) and (ii) utterances which are analyzable as instances of a specific exclamative clause type. The former case is illustrated in (22): (22a) may convey a question or an exclamation involving an intensive meaning, (22b) may convey an assertion or an exclamation involving an intensive meaning.

(22) a. Est-il bête
is-he stupid
'How stupid he is!' or 'Is he stupid?'

b. Il est vachement bête
'He is really stupid!' or 'He is really stupid.'

The latter is illustrated in (23): utterances in (23) can only be interpreted as an exclamation.

(23) a. Qu' il est bête !
COMP he is stupid
'How stupid he is!'

b. Il est si bête !
'He is so stupid!'

As a working hypothesis, we keep these two cases apart. Here, we will not account for the exclamation or exclamation-like interpretation of utterances such as (22) above.

The exclamative type is no different from other core types: it shows no specific syntactic construal.[14] Thus, its unity can only be defined semantically. There is a convergence between Milner's (1972) descriptive approach and Ginzburg and Sag's formal treatment of the semantics of exclamatives. According to Milner, the meaning of exclamatives may be described as follows:

(i) Their content involves a degree or quantity judgement that Milner calls 'non-classifiant' (non-classifying), i.e. a degree or quantity beyond the end-points of degree or quantify scales.

(ii) The judgment is not presented as being objective, but rather as Speaker's opinion.

These two generalizations are in keeping with Ginzburg and Sag's proposal: the content of exclamatives is not a proposition (likely to be true or false), rather it is a fact (see (13d) above). Moreover, it involves a specific quantification they call *unusual-rel* .[15] For example, *How tall Kim is!* conveys the fact that Kim is tall to an unusual degree. Hence, the exclamative type should be further constrained:

(24) $\textit{excl-cl} \rightarrow \left[\text{QUANTS} \quad \left\langle \textit{unusual-rel} \right\rangle \right]$

There are two main subtypes of exclamative sentences.[16] The former involves a *wh*-word and the latter crucially requires an exclamatory lexical trigger. The subtype based on *hd-fill-ph* type necessarily involves a *wh*-word which is an adjunct in an AP, AdvP or VP and a degree modifier. Interestingly, *wh* degree modifiers of adjectives or adverbs (*que, comme*) only occur in exclamatives in French:

(25) a. Comme il est beau ! / Qu' il est beau !
COMME he is handsome QUE he is handsome
'How handsome he is!'

b. * Comme est-il beau !/ * Qu' est-il beau !
COMME is-he handsome QUE is-he handsome

[14] Moreover, its lexical markers are often ambiguous.

[15] "*Unusual-rel* is a generalized quantifier, which holds of a fact-abstract and a SOA-abstract. *Unusual-rel* is existential in nature" (Ginzburg and Sag, 2000, 226).

[16] To be exhaustive here would take us too far from our main subject.

The *wh*-items *quel* and *combien* are either interrogative or exclamative; they give rise to ambiguous utterances, as those in (26) below.

(26) a. Quelle idée il a
QUEL idea he has
'What an idia he has!' or 'What is his idea?'

b. Combien de problèmes a-t-il rencontrés
COMBIEN DE problem has-he met
'How many problems he had!' or 'How many problems did he have?'

The exclamatory lexical triggers are diverse: the comparative item (*aussi*), the correlative items (*si, tant, tellement)* used absolutely (i.e. without the correlative *que*-S) (27) or the degree modifier *d'un* (28).

(27) a. Il est si beau ! / Il est tellement beau !
'He is so handsome!'

b. Il travaille tellement ! / Il travaille tant !
'He works so much!'

c. Il a tant de défauts ! / Il a tellement de défauts !
'He has so many failings!'

(28) Il est d'un intelligent !
'How intelligent he is!'

Arguably, exclamatory triggers only occur in sentences based on *hd-nexus-ph* types as is shown in (29). The utterances in (29b-d) are grammatical, but they cannot be interpreted as exclamations: *si* is interpreted as conveying an implicit comparison (*Est-il si lâche que ça / qu'on le dit* 'Is he as cowardly as that / as cowardly as he is said to be').

(29) a. Il est si lâche !
he is so cowardly
'He is such a coward!'

b. Est-il si lâche ?
is-he so cowardly

c. Pourquoi donc est-il si lâche ?
why thus is-he so cowardly

d. Arrête d' être si lâche !
stop DE being so cowardly

Thus, the two main subtypes of exclamatives are:

(30) a. *excl-hd-fill-cl* based on *hd-fill-ph*, where the *wh*-word is exclamative (e.g. comme il est beau)

b. *excl-hd-nexus-cl* based *on hd-nexus-ph* in which an exclamatory trigger occurs (e.g. il est si beau).[17]

[17] Exclamative triggers should ne analyzed analoguously to *wh*-in situ words (see section 5.2), they involve a non-local feature.

3.3 To sum up

We conclude that it is possible to define clause types and account for their syntactic diversity independently of their illocutionary potential. Table 2 summarizes the types of independent sentences that are instances of the four clause types inherited from the grammatical tradition and pragmatics studies.

Clause type [IC +]	**Semantic content**	**Main sutypes**
Declarative	Proposition	*hd-nexus-ph* & verb in the indicative: *Marie aime Paul.* *hd-subj-ph* & verb in the infinitive: *Et Marie de se mettre à crier.*
Interrogative	Question (propositional abtract)	*hd-filler-ph* & filler is interrogative: *Où va Marie ?* / *Où va-t-elle ?* / *Où elle va ?* *hd-nexus-ph* & head is a verb & inverted clitic *Marie part-elle ?* *hd-comp-ph* & head is an interrogative comp. *Est-ce que Marie est arrivée ?*
Imperative	Outcome	*hd-nexus-ph* & head is an imperative or infinitive *Ne fume pas.* / *Ne pas fumer.* *hd-comp-ph* & head is a complementizer with a subjunctive complement *Qu'il vienne me voir.*
Exclamative	Fact	*hd-filler-ph* & filler is exclamative *Comme il est beau !* / *Qu'il pleut !* *hd-nexus-ph* & exclamatory trigger *Il est si beau !* / *Il travaille tellement !*

Table 2: Summary of clause types

4 From Illocutionary Forces to Conversational Moves

We come back to the analysis of illocutionary forces (IF). What are they? To answer this question, we take a dialogical perspective. There are several reasons for such a choice. First, illocutionary forces have a double import, the former pertains to Speaker and the latter to Addressee. In pragmatic analyses, this is often expressed in terms of Speaker's attitude (belief, ignorance, desire, etc) on the one hand and sorts of obligation exerted on Addressee on the other hand. From this perspective, one cannot analyze illocution outside the interaction between dialogue participants (DPs). Secondly, too many difficulties plague the modal definition of the aspect of illocutionary forces related to Speaker. Thus, we propose to give substance to another insight of Gazdar's

paper which has been systematically developed in Ginzburg's Grammar for interaction: illocutionary forces can be analyzed as conversational moves. This is the route we follow in this section. First, we only consider the Speaker-oriented aspect of IFs in sections 4.1 and 4.2. Then we introduce the Addressee-oriented aspect of IFs in sections 4.3 and 4.4. Finally, we consider exclamations in sections 4.5 and 4.6; we analyze them as moves that do not convey any call on Addressee for him to perform an uptake bringing forward the interaction.

4.1 Speaker's commitment

Gazdar proposes a dynamic approach to speech acts. According to him, "an assertion that Φ is a function that changes a context in which the speaker is not committed to justifiable true belief in Φ into a context he is so committed. A promise that Φ is a function that changes a context in which the speaker is not committed to bringing Φ into one in which he is so committed. A permission to Φ is a function that changes a context in which Φ is prohibited into one in which Φ is permisible" (Gazdar, 1981, 69). We stick to the idea that speech acts are particular instances of IFs and, thus, we restrict ourselves to the four IFs that we assume here following Zaefferer (2001). The notion of commitment was restricted to commitment to propositions in Hamblin (1971). Gazdar extends it. We make such an extension explicit. There are four types of commitment which correspond to the four IFs: commitment to a Proposition, a Question, an Outcome and a Fact. We leave commitments to Facts aside until section 4.5.

When Speaker utters an assertion, i.e. makes a statement, she makes a move by which she becomes committed to a propositional content. By saying that Mary has arrived, Speaker presents herself as ready to stand for the truth of the proposition that Mary has arrived. This is a matter of public presentation which does not necessarily correspond to Speaker's private belief.

Now, we extend the notion in order to cater for the two other forces. When Speaker utters a question, she makes a move by which she becomes committed to an issue. By asking whether Mary has arrived, Speaker presents herself as being interested for current purposes in the issue whether Mary has arrived. Once again this is a matter of public presentation and does not correspond to one specific knowledge state.[18] When Speaker utters a directive utterance, she makes a move by which she becomes committed to an outcome. Outcomes correspond to states of affair in the future, actualization of which more or less directly depends on Addressee. Her commitment consists in "the affirmative stance towards the actualization of this potential" (Stefanowitsch, 2003, 2). By ordering Mary to arrive, Speaker presents herself as positively oriented to the realization of Mary's arrival.

4.2 Commitment as a dialogue move

Ginzburg's grammar for interaction relies on the idea that dialogue can be conceived as a game. Each turn brings about a change in the on-going dialogue: the type and content of each change are registered in a dialogue gameboard (DGB). Each dialogue

[18] Hence the use of questions as genuine queries, topic-openers in everyday conversations, rhetorical questions or exam questions, which corresponds to completely different Speaker's knowledge states.

participant keeps her own DGB; the dynamics of dialogue making is reflected in the updates of DGBs that DPs operate at each turn.

Ginzburg's definition of the publicized part of DGB (31) reflects his more general conception of dialogue.

(31)
$$\begin{bmatrix} \text{DGB} & \begin{bmatrix} \text{FACTS} \\ \text{QUD} \\ \text{LATEST-MOVE} \end{bmatrix} \end{bmatrix}$$

He gives much importance to the slot QUESTION UNDER DISCUSSION (QUD) as he assumes that the mechanics of the question-response pair lies at the core of dialogue interaction. The slot labeled FACTS is indeed close to the notion of Common Ground proposed by Stalnaker (1978) as he assumes that dialogue can be modeled as a cooperative process aiming at the extension of the common ground shared by the DPs. We do not keep these two stances and reinterpret the DGB so that we can use it to make explicit our analysis of IFs into dialogue moves.

We propose that the dimensions in the publicized part of the DGB correspond to commitment slates. Hence, we propose three components:

(32)
$$\begin{bmatrix} \text{DGB} & \begin{bmatrix} \text{SHARED-GROUND} & \\ \text{QUD} & \\ \text{TO-DO-LIST} & \begin{bmatrix} \text{SPKR} \\ \text{ADDR}(i) \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

SHARED GROUND (SG) is a partially ordered set of Propositions whose last element is distinguished so that it can be removed easily. A Proposition is removed from SG by Speaker when it is rejected by Addressee; it stays there when it is not rejected (Stalnaker, 1978). Thus, only propositions that have been accepted by both parties sit on SG.

We keep the formal definition of QUD unchanged: QUD is a partially ordered set of Questions. The ordering on QUD roughly corresponds to the conversational precedence, but it also allows one to account for the distinction between questions and subquestions. The last Question also is distinguished (max-QUD). QUD has two functions in Ginzburg's modelization. It registers the questions under discussion and, more generally, it is at the core of the interactive process triggered by questions and assertions, as QUD is incremented both by questions and by assertions. In this last case, it is incremented with the polar question that can be abstracted from the propositional content in order to capture the fact that an assertion goes through only when it is not rejected by Addressee.[19] We part with Ginzburg here. We keep QUD to questions and propose another mechanism and another slot in the DGB to capture the interactive dynamics (see section 4.4).

In order to account for Outcomes conveyed by imperative sentences, we add a specific slot TO-DO-LIST (TDL) in the DGB.[20] TDL is partitionned into TDL(Speaker) and

[19] In other words, Ginzburg equates accepting an assertion with answering a polar question. Notice that, although Ginzburg uses QUD to account for the fact that assertions can be accepted or rejected, he does not account in a similar fashion for the fact that a question can be resolved or unresolved.

[20] We follow here a proposal made by Portner (2005).

TDL(Addressee). TDL(Addressee) is an ordered list of descriptions of situations the actualization of which depends on Addressee and towards which Speaker is positively oriented. It is incremented with the outcomes that Speaker presents as actualizable by Addressee. TDL(Speaker) is incremented with the outcomes that Speaker presents as actualizable by herself: either the outcomes brought about by imperative utterances of interlocutors or those brought about by promissives.[21]

To sum up, we have distinguished three dimensions in the DGB, each of them consisting in a homogeneous set (a set of propositions, a set of questions, or a set of outcomes). Uttering an assertion brings about the incrementation of SG, uttering a question the incrementation of QUD and, finally, uttering a directive utterance the incrementation of TDL(Addressee).

4.3 Speaker's call on Addressee

Pragmaticians have recognized that IFs have an Addressee-oriented aspect. In particular, they touch upon the Addressee-oriented aspects of IFs when they discuss how the various speech acts that are instances of IFs.

Following Stalnaker (1978), a speech act comes through when it corresponds to a pair of turns such that there is no difference between Speaker's commitment and what Speaker calls on Addressee to become committed to by an appropriate uptake of her utterance. For example, a statement is reputed to be achieved if both Speaker and Addressee are committed to the proposition conveyed by the utterance at the end of the interaction. This involves that Speaker calls on Addressee for him to become committed to the Proposition Speaker is committed to. In this case, the content of Speaker's commitment is identical to the content of the commitment Speaker calls on Addressee to endorse.

Speaker's commitment and call on Addressee need not be identical. There are moves where Speaker's commitment and Speaker's call on Addressee do not have the same type, and therefore content. Grammar provides Speaker with means to signal the discrepancy. They come in two main guises: (i) lexico-syntactic constructions and (ii) tags of various categories.

The prototypical examples of constructions which specify a specific call on Addressee are whimperatives, such as (11b) above in English. Here, we give two whimperative constructions in French. Closed interrogatives with *vouloir*, inverted Clitic-subject + *bien* + V (33a) signal that they should be treated as an order (with a nuance of condescension); wh-interrogatives with *pourquoi* + *pas* + V in the infinitive should be treated as an suggestion (another kind of directive).

(33) a. Veux-tu bien te taire !
'Would you be quiet!'

b. Pourquoi pas acheter une voiture ?
'What about buying a car?'

[21] TDL(Speaker) is also involved in the analysis of wishes (such as *Que le meilleur gagne* 'Let the better win! or *Que Dieu écoute ma prière* 'Let God listen to my prayer!'): outcomes toward which Speaker is positively oriented but the realization of which does not depend on Speaker's interlocutors.

There are many tags which specify the call on Addressee (see below section 5.2). For example, *n'est-ce pas* used with a declarative sentence such as (34) conveys a call on Addressee for him to commit himself to the issue whether Marie has arrived.

(34) Marie est arrivée, n'est-ce pas ?
'Marie has arrived, hasn't she?'

Moreover, it follows from the analysis at hand that there are only three types of call on Addressee. Speaker may ask Addressee to take up her utterance as an assertion, as a question or as a directive. This corresponds to the fact that we assume three types of commitment.

4.4 Call on Addressee as a dialogue move

As we have already mentionned, Ginzburg considers the question-response pair as the prototype mechanism of how dialogue interaction works. For example, he models Speaker's call on Addressee that is specific to assertion as a call for updating QUD with a polar question (derived for the proposition conveyed in the declarative). This solution faces several drawbacks. First, it predicts, contrary to facts, that statements and demands for confirmation should trigger the same set of uptakes (see Beyssade and Marandin, 2005). Secondly, it is hard to see how to use such a pair to model the working of directive moves or directive aspects of moves. More generally, it is restricted to the epistemic working of dialogue (the building of a knowledge state shared by both DPs). Finally, from our perspective, it would prevent us from capturing the different types of call on Addressee.

This is the reason why we add in Speaker's DGB a slot which registers the specific call on addressee performed by Speaker.

(35)
$$\left[\begin{array}{l}\text{DGB} \left[\begin{array}{l}\text{SG} \\ \text{QUD} \\ \text{TDL} \\ \text{CALL-ON-ADDRESSEE}\end{array}\right]\end{array}\right]$$

For example, by uttering (34), Speaker signals that she calls on Addressee for him to commit himself to the issue whether Marie has arrived. The move (34) brings the change in Speaker's DGB described as the update of her call on addressee with a polar question.

(36) CALL-ON-ADDRESSEE: *Marie est-elle arrivée ?*

CALL-ON-ADDRESSEE registers the type and content of Speaker's call on Addressee. Like LATEST-MOVE—and contrarily to SG and QUD, which are structured sets—CALL-ON-ADDRESSEE contains one and only one element which is updated utterance by utterance.[22] In the present proposal, it plays the interactive part that was carried out by QUD in Ginzburg's architecture. The main thrust of our proposal is that it provides a

[22] Both are crucially involved in the working of clarification moves, in particular, in reprise questions (see section 5.2.3 below).

general mechanism to deal with the Addressee-oriented aspects of utterances of any illocutionary force. Moreover, it enables one to account for utterances which are analyzed in the literature as a combination of several forces, e.g. demands for confirmation, whimperatives, etc. All illocutionary types of utterance so far considered give rise to two updates of Speaker's DGB contents of which are either identical or distinct.[23]

4.5 Speaker-only commitment

The move types we have considered so far are interactional: Addressee is called on for performing an appropriate uptake in response to the move. Moreover, the whole content conveyed by the utterance feeds the call on Addressee.

It has been observed that part of the content of an utterance can be excluded from the call on Addressee. This is the case, for instance, with the content conveyed by incidental evaluative adverbs. The content that it is unhappy that Paul has already gone in (37) does not enter the content Speaker calls on Addressee to share.

(37) Paul est malheureusement déjà parti.
Paul is unfortunately already gone
'Unfortunately, Paul has already gone.'

Bonami and Godard (in press) propose to analyze such contents as Speaker-only commitment. They propose to analyse it as an ancillary Speaker's commitment which, contrary to the main commitment conveyed by the utterance, does not have to be shared by Addressee.[24] The evaluative judgement commits Speaker and only Speaker. This explains, for example, why it would be odd to deny it via a statement uptake.

(38) A: Paul is unfortunately already gone.
B: i. # No, I think it is very good news.
ii. Yes, but I think it is very good news.

Strikingly, this is how exclamations work: Speaker commits herself to a content, but she does not ask Addressee to commit himself to such a content. Indeed, there may be a demand on Addressee, which is, as Milner puts it, to witness Speaker's opinion: "Affirmative exclamatives leave Addressee in a position of *passive observer* whom Speaker let know about her opinion" (Milner, 1972, 347; we translate and underline).[25]

[23] The present proposal is reminiscent of Ginzburg's analysis of assertions which he analyzes as involving the incrementation of both FACTS and QUD. It shares the same type of insight than Asher and Reese (2005) who introduce a complex type (Question⊗Assertion) to account for biased polar questions. The core of the proposal is that all assertions, questions or directives involve two updates. In this respect, it is a generalization of these proposals.

[24] Beyssade and Marandin (2005) propose a similar hypothesis to analyse the meaning of nuclear contours in French.

[25] Milner notices that negation in exclamatives (e. g. *Si c'est pas mignon, ça !* vs. *Si c'est mignon, ça !* 'How cute it is!') does not reverse the polarity, rather it has the effect of reinforcing the call on Addressee to witness Speaker's opinion.

4.6 Speaker's only commitment as a dialogue move

We propose to recast the DGB as in (39). Two dimensions of commitment are distinguished: INTERACTIVE COMMITMENT and SPEAKER'S ONLY COMMITMENT. INTERACTIVE COMMITMENT registers the contents that Speaker submits to Addressee, whereas SPEAKER-ONLY COMMITMENT registers the contents that Speaker presents as her own opinion.

(39)
$$\begin{bmatrix} \text{DGB} & \begin{bmatrix} \text{INTERACTIVE-CMT} & \begin{bmatrix} \text{SG} \\ \text{QUD} \\ \text{TDL} \end{bmatrix} \\ \text{SPEAKER-ONLY-CMT} & \\ \text{CALL-ON-ADDR} & \\ \text{LATEST-MOVE} & \end{bmatrix} \end{bmatrix}$$

SPEAKER-ONLY COMMITMENT is crucial for the analysis of exclamative utterances. By uttering an exclamative clause, the speaker doesn't call on Addressee to become committed to the evaluation conveyed by the sentence. It is intended as expressing Speaker's own opinion and Addressee is only involved as a witness of such an opinion.[26]

Consequently, contrarily to other conversational move types, the conversation move triggered by an exclamative clause does not require any commitment of Addressee, it does not give rise to an update of CALL-ON-ADDRESSEE.

5 Clause Types and Dialogue Move Types

We are now in a position to revisit the relation between clause types and the update operations into which we have analyzed illocutionary forces. Here, the divide between Speaker's commitment and Speaker's call on Addressee turns out to be crucial. We claim that there is a division of labor: clause type contributes information pertaining to Speaker's commitment, whereas other aspects of the utterances may contribute specifications of the call on Addressee. In section 5.1, we present the claims and in section 5.2, the empirical underpinning.

[26] This is why denying an exclamation is as odd as denying an evaluation conveyed by parenthetical adverbs (see (38) above):

(i) A: Comme il est intelligent !
'How intelligent he is!'
B: # C'est pas vrai !
'It is not true.'

5.1 Clause types, Speaker's commitment and Speaker's call on addressee

Clause types are a source of information relative to the commitment of Speaker. First, we consider the declarative, interrogative and imperative types only. Clause types are in a one-to-one relationship with a type of update in the INTERACTIVE-CMT dimensions of Speaker's DGB. Such an update makes Speaker committed to the move and the content conveyed in her utterance. This is made explicit in table 3.

Clause type	**Speaker's update**	**Commitment to**
Declarative	Add a proposition in SG	a proposition
Interrogative	Add a propositional abstract in QUD	an issue
Imperative	Add an outcome in TDL	the actualization of a future situation

Table 3: Speaker's commitment

On the other hand, clause types do not determine a specific call on Addressee. By default, Speaker's call on Addressee is identical to Speaker's commitment. But, each clause type is compatible with any of the two other types of call. For example, declarative utterances commit Speaker to their content and are compatible with three types of call on Addressee. When Speaker calls for Addressee to take her utterance as an assertion, Addressee is expected to add the propositional content to his own SG, which corresponds to felicitous statements. When she asks him to take her utterance as a question, Addressee is expected to add a Question to his own QUD, which corresponds to demands for confirmation. When she asks him to take her utterance as a directive, Addressee is expected to add an outcome to his own TDL. Table 4 gives the combinations for each clause type in terms of dialogue updates.[27]

Grammar provides speakers with lexical or phrasal means to signal the lack of symmetry and the intented call. For example, take the declarative type and lexical tags again: *tiens* signals an assertoric call, *n'est-ce pas* a questioning one and *s'il te plaît* a directive one.

(40) a. Tiens, tu te tais.
'Hey, you are quiet.'

b. Tu te tais, n'est-ce pas ?
'You are quiet, aren't you?'

c. Tu te tais, s'il te plait !
'You are quiet, please!'

[27] Given a proposition p, we use the following convention: $?p$ represents the polar question associated to p, and $!p$ represents the outcome built from p, i.e. p will be true in the situation in which the outcome $!p$ is fullfilled. For instance, if p corresponds to the sentence 'John is beautiful', then $?p$ correspond to 'Is John beautiful?', and $!p$ to 'Be beautiful, John!'. In this table, q' corresponds to the proposition which resolves q, and o' to the proposition which fullfills o.

In table 4, COA stands for CALL-ON-ADDRESSEE.

Clause type	**Content type**	**Conversational move type**		
		Speaker-oriented impact	**Addressee-oriented impact**	
Declarative	Proposition p	Update(S, SG, p)	Update(S, COA, p) Update(S, COA, ?p) Update(S, COA, !p)	(default)
Interrogative	Propositional abstract q	Update(S, QUD, q)	Update(S, COA, q) Update(S, COA, q') Update(S, COA, !q')	(default)
Imperative	Outcome o	Update(S, TDL$_A$, o)	Update(S, COA, o) Update(S, COA, o') Update(S, COA, ?o')	(default)

Table 4: Distinguishing speaker-oriented and addressee-oriented impacts

Now, we consider the exclamative type. As other types, it commits Speaker to the Fact conveyed by the sentence. Since it is not associated with a call on Addressee, the exclamative type is associated with only one update, viz. an update of the SPEAKER'S ONLY COMMITMENT slot.[28]

Clause type	**Content type**	**Conversational move type**	
		Speaker-oriented impact	**Addressee-oriented impact**
Exclamative	Fact e	Update(S, SP-ONLY-CMT, e)	none

Table 5: The impact of exclamatives

As tables 4 and 5 show, distinguishing Speaker's commitment from Speaker's call on Addressee does not result in untractable diversity of moves. Exclamatives give rise to a type of move characterized by a single update, whereas the other types give rise to moves that conjoin two updates, which fuel the interaction.[29] These interactive moves are either simple (the same content is added to INTERACTIVE-CMT and CALL ON ADDRESSEE) or hybrid (the content added to INTERACTIVE-CMT is different from the content added to CALL ON ADDRESSEE). This is summarized in Figure 5 below.

5.2 Empirical underpinning

Our proposal provides a framework to account for a number of facts or observations that are scattered in the pragmatic literature, in particular in the discussions of the

[28] In table 5, e represents a fact.

[29] We remind the reader that we have postponed the analysis of exclamations such as (22) above. Their analysis either as simple moves (i.e. as utterances belonging to the exclamative type) or hybrid move is still open.

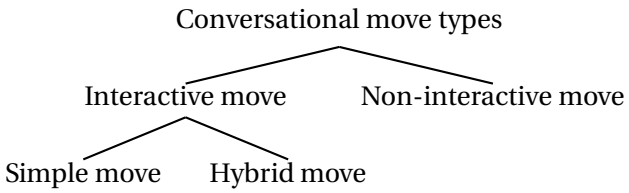

Figure 5: Taxonomy of conversational move types

theory of indirect speech acts.

5.2.1 Commitment marking

The claim that clause type marks Speaker's commitment enables one to explain several pragmatic contrasts in context. We briefly take four of them below.

It has been observed that directives conveyed by interrogative clauses (41a) do not have the same impact in context as directives conveyed by imperative clauses (41b). The use of interrogative clauses is reputed more polite than that of imperatives.

(41) a. Pouvez-vous fermer la porte, s'il vous plaît ?
'Can you close the door, please?'

b. Fermez la porte, s'il vous plaît !
'Close the door, please!'

Then, the question is what makes utterances such as (41a) more polite. From our perspective, it follows from a difference in Speaker's commitment with respect to the closing of the door. In (41a), Speaker is committed to the issue whether Addressee can close the door, whereas in (41b) Speaker is committed to the outcome that the door should be closed. In (41a), she presents herself as interested in the closing of the door, whereas in (41b) she takes an affirmative stance towards its closing. If politeness is linked to a mitigation of the power relation between agents, Speaker's request of closing the door is less insistent when conveyed via an interrogative clause.

The same sort of mitigation effect sheds light on the contrast between directives conveyed by imperatives (42a) or by declaratives (42b). As it has been often observed, utterances in the imperative are open to a large gamut of speech acts ranging from orders, requests, to pleas or suggestions. On the other hand, declarative utterances are more restricted: they convey orders or requests and hardly pleas or suggestions.

(42) a. Viens demain, s'il te plaît !
'Come tomorrow, please!'

b. Tu viendras demain, s'il te plaît !
'You will come tomorrow, please.'

Such a contrast again follows from a difference in Speaker's commitment. By using the imperative, Speaker only commits herself to judging positively the realization of a potential state of affairs, without committing herself to the probability of that realization; whereas a declarative in the future commits Speaker to the future factuality of the state of affairs.

It has been observed that questions conveyed by declaratives (43a) are not felicitous in the same contexts than those conveyed by interrogatives (43b), (43c). Questioning declaratives are much more natural in situations where Speaker has good grounds to know the answer. For example, in a situation where Speaker, upon entering the department office, sees Mary's personal belongings on her desk, (43b) or (43c) would be odd whereas (43a) would be appropriate as a question to Mary's colleague already at work.

(43) a. Marie est arrivée, n'est-ce pas ?
'Marie has arrived, hasn't she?'

b. Est-ce que Marie est arrivée ?
'Has Marie arrived?'

c. Marie est-elle arrivée ?
Marie is-she arrived
'Has Marie arrived?'

By using an interrogative in the situation we have just described, Speaker would present herself as being interested in Mary's arrival and having no cue to resolve the issue, whereas by using a declarative, she signals that she commits herself to the proposition that she has arrived and, consequently, she is just seeking confirmation (usually, to open a discussion topic).

Finally, our proposal sheds light on the much discussed difference between utterances featuring a fronted *wh*-expression (44a) and those with *wh*-expressions in situ (44b).

(44) a. A qui Jean a parlé ?
'To whom did Jean speak?'

b. Jean a parlé à qui ?

According to our syntactic analysis, the former (44a) is an instance of the interrogative type (*inter-hd-filler-cl*) while the latter (44b) is an instance of the declarative type (*decl-hd-subj-cl*). The content of (44b) is a proposition and it always conveys a questioning call on Addressee.[30] Thus, Speaker commits herself to an issue when uttering (44a) while she commits herself to a proposition when uttering (44b), viz. the proposition that Jean spoke to *someone*.[31] Thus, we expect that conditions of use of utterances

[30] In this respect, they are like whimperatives: they non-equivocally specify a call on Addressee. By the way, our analysis may explain why negative polarity items (such as *moindre* in (i)) are ungrammatical or, at least, odd for many speakers in such utterances.

(i) a. A qui Jean a-t-il fait le moindre reproche ?
To whom Jean has-he made the slightest reproach
'Who did John blame for anything he did?'

b. ?? Jean a fait le moindre reproche à qui ?

c. ?? Jean a fait à qui le moindre reproche ?

[31] We analyze *wh-* in situ *à la manière de* Farkas (2002). They are particular indefinites, which impose the variable they introduce to take its value in a set including zero (*noboby, nothing, nowhere...*). In other terms, '*someone*' stands here for an indefinite which is not existential; rather, its domain of valuation includes nobody.

featuring *wh*-expressions in situ should be similar to those of questioning declaratives. Indeed, utterances like (44b) sounds odd when used in contexts where Speaker do not have grounds to commit herself to the proposition that John spoke to *someone*. Insofar *someone* includes *nobody* as a possible value, this proposition is underspecified, but not empty. Committing oneself to such a proposition amounts for Speaker to consider the proposition that John spoke to somebody (or to nobody) relevant for the current discourse. This is in keeping with our observation that utterances with *wh* in situ are not used as topic/conversation openers and mostly occur in on-topic talk: the proposition they convey being part of the current Discourse Topic.[32]

5.2.2 Call on Addresse marking

Our proposal gives full grammatical status to lexical items or phrasal constructions that specify Speaker's call on Addressee. In particular, it enables one to state their main properties: (i) the type of clause they are grammatical with and (ii) the type of update they specify.

For example, the tag *sans indiscrétion* is grammatical in two clause types, viz. interrogative and declarative, but specifies only one type of call on Addressee, viz questioning. This is why it sounds odd to take up a turn tagged with *sans indiscrétion* with expressions used for statement uptake (45).

(45) A: Sans indiscrétion, Marie est arrivée.
without indiscretion, Marie has arrived
'Without indiscretion, has Marie arrived'

B: # Ah bon / Je ne le savais pas/ ...
'Oh really' 'I didn't know that'

Tags such as *point final*, *point barre* are also grammatical in two clause types, viz. declarative and imperative (46)—ungrammatical in interrogative sentences (47)—and are underspecified as for the call on Addressee: either asserting or directive.

(46) a. Marie ne sortira pas, point barre.
Marie NE go-out-FUT not POINT BARRE
'Marie won't go out, period!'

b. Ferme ta gueule, point barre !
shut-IMP your mouth, POINT BARRE
'Shut up, period!'

[32] A preliminary survey shows that utterances with *wh*-expressions in situ have the same prosody than questioning declaratives with narrow focus (Beyssade et al., 2004). Thus, (i.a) and (i.b) below show the same prosodic realization: the final contour is anchored on the right edge of *Bernadette* or *secrétaire*.

(i) a. Tu as parlé à Bernadette hier soir ?
you spoke to Bernadette yesterday evening
'Did you speak to Bernadette yesterday evening?'

b. Tu as parlé à quelle secrétaire hier soir ?
you spoke to which secretary yesterday evening
'To which secretary did you speak yesterday evening?'

(47) # Est-ce que tu vas bientôt fermer ta grande gueule, point barre ?
EST-CE QUE you go soon shut your big mouth, POINT BARRE

Finally, there are tags that are grammatical in only one clause type and compatible with one type of call on Addressee. *N'est-ce pas* belongs to this group: it is grammatical only in declarative clauses and only compatible with a questioning call on Addressee.

(48) a. Marie est arrivée, n'est-ce pas ?
Marie is arrived, N'EST-CE PAS
'Marie arrived, didn't she?

b. * Marie est-elle arrivée, n'est-ce pas ?
Marie is-she arrived, N'EST-CE PAS

c. * Est-ce que Marie est arrivée, n'est-ce pas ?
EST-CE QUE Marie is arrived, N'EST-CE PAS

5.2.3 Reprise phenomena

Ginzburg and Sag (2000, 264) draw attention towards reprise phenomena. They observe that the interpretation of the reprise involves the CMT of the utterance that is reprised. For instance, the interpretation of Belula's reprise in (49) cannot involve the speech act conveyed by Stina's declarative, but rather it necessarily involves the illocutionary force associated with it. It cannot be interpreted as 'are you offering a ticket for tonight performance?', but only as 'are you claiming that you have a ticket for tonight performance?'.[33]

(49) Stina: I have a ticket for tonight performance.
Belula: You have a ticket for tonight's performance?

The observation should be made more precise. In fact, the reprise is crucially sensitive to the Addressee-oriented aspect of the turn, i.e. the call on addressee. Compare, for example, the reprise of a declarative with an asserting (50a) or a questioning (50b) call on Addressee.

(50) a. Tiens, Marie est arrivée.
'Hey, Marie has arrived.'

b. Sans indiscrétion, Marie est arrivée?
'Without indiscretion, has Marie arrived?'

The form of the reprise is different in the two cases: a reprise of (50a) is prototypically an utterance with a rising contour (51).[34]

(51) A: Tiens, Marie est arrivée.
B: Marie est arrivée ↑

Such a reprise would be odd with (50b) and requires a reprise with a utterance belonging to the interrogative clause type (52B.ii-iii).[35]

[33] The observation is important, since it supports the idea that particular speech acts can, and should, be distinguished from types of speech acts (i. e. illocutionary forces).

[34] The arrow "↑" represents a rising contour.

[35] Notice that the interrogative subtype with inverted subject-clitic is not felicitous as a reprise.

(52) A: Sans indiscrétion, Marie est arrivée ↑
B: i. # Marie est arrivée ↑
ii. si Marie est arrivée ↑
iii. est-ce que Marie est arivée ↑

In the same way, a declarative with a directive call on Addressee is only felicitously reprised by an utterance in the imperative clause type.

(53) A: Tu me rendras mon vélo demain, s'il te plait !
you me give.back-FUT my bike tomorrow please
'Give me back my bike tomorrow, please!'
B: i. # Je te rendrai ton vélo demain ↑
I you give.back your bike tomorrow
ii. Que je te rende ton vélo demain ↑
QUE I you give.back-SUBJ your bike tomorrow
'I should give you back your bike tomorrow.'

The contrast is also observed when the call on addressee is specified constructionally. For example, the reprise of an interrogative utterance is different from that of a declarative utterance with a *wh*-expression in situ.

(54) A: Tu as parlé à qui hier soir ?
you have spoken to whom yesterday evening
'To whom did you speak yesterday evening?'
B: i. J' ai parlé à qui ?
I have spoken to whom
ii. A qui j'ai parlé ?
to whom I have spoken
'To whom did I speak?'

(55) A: A qui as-tu parlé hier soir ? 'To whom did you speak yesterday evening'
B: i. # J' ai parlé à qui ?
ii. A qui j'ai parlé ?

These contrasts provide one of the most clear evidence that call on addressee should be explicitly taken care of in Grammar. Indeed, if one accepts Ginzburg and Sag's stance that illocutionary content should be taken into account for reprise constructions and, more generally, any type of clause constructions, call on Addressee represents the crucial aspect of such a content.

(i) A: Sans indiscrétion, Marie est arrivée ?
B: # Marie est-elle arrivée ?

6 Conclusion

What about the LFH? The answer has several aspects. First, there is a one-to-one relationship between Clause Type and Speaker's commitment, i. e. from our dialogical perspective, between Clause Type and a type of update in Speaker's Discourse Gameboard. Secondly, the clause type does not deterministically constrain the call on Addressee. By default, the update that is performed in the CALL ON ADDRESSEE is identical with the update performed in one of the slot of INTERACTIVE COMMITMENT. But, it can be different and Grammar provides means, either lexical or constructional, to specify the type of update required of Addressee. Thirdly, there are a small number of conversational move types available to Speakers. They can be simple and then correspond to the default case: Speaker's commitment and Speaker's call on Addressee are identical. And they can be complex (or hybrid): Speaker's commitment and Speaker's call on Addressee are distinct. Even, simple moves (except for exclamative moves) involve a twofold update.

Let us again take Gazdar's example (9) (repeated below in the French version) to sum up and illustrate the claims we developed in this paper.

(56) Tu rentreras à la maison demain.
'You will go home tomorrow.'

Utterance (56) is an instance of declarative clause. It commits Speaker to the proposition that Addressee will go home tomorrow. If the call on Addressee is left unspecified, it calls for Addressee to commit himself to the same proposition. But, Speaker may specify a type of uptake. For example, if Speaker tags her utterance with *s'il te plaît* (57a) or *sans indiscrétion* (57b), the utterances require an uptake as a directive or a question respectively.

(57) a. Tu rentreras à la maison demain, s'il te plaît !
b. Sans indiscrétion, tu rentreras à la maison demain ?

Notice that we have not made any claim about the interpretation of (56) as a hint (Green, 1975), i.e. when Speaker uses situation knowledge and inferences to determine which uptake to perform. In this case, (56) should be taken up as an assertion in order to provide the premise of the inferences. This is a general feature of hint interpretation: it requires that a propositional content be accepted by Speaker, directly when triggered by declaratives or corresponding to the resolving proposition when triggered by interrogatives.

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The Dative-Ergative Connection

Miriam Butt

1 Introduction

The classic division between structural vs. inherent/ lexical case proposed within Government-Binding (Chomsky 1981) remains a very popular one, despite evidence to the contrary that the inner workings of case systems are far more complex than this simple division would suggest and that individual case markers generally make a systematic structural and semantic contribution that interacts in a generalizable manner with the lexical semantics of a predicate (see Butt 2006 for a survey of theories and data, Butt 2006:125 and Woolford 2006 for a proposed disctinction between inherent (generalizable) and lexical (idiosyncratic) case.).[1] That is, the semantic contribution of case cannot (and should not) be relegated to the realm of lexical stipulation because there are systematic semantic generalizations to be captured.

This fact has been recognized in more and more recent work. One prominent example is the work engaged in understanding the semantic generalizations underlying so-called object alternations, perhaps the most famous of which is the Finnish partitive alternation shown in (1)–(2). In Finnish, the accusative alternates with the partitive on objects. This alternation gives rise to readings of partitivity (1) and aspectual (un)boundedness (2).[2]

(1) a. Ostin **leivän**
bought.1.Sg bread.Acc
'I bought the bread.' Finnish

[1] I would like to thank the organizers of the CSSP 2005 for inviting me to participate in the conference. I enjoyed the conference tremendously and the comments I received at the conference were extremely constructive, particularly those by Manfred Krifka. I am very grateful for the comments and have tried to incorporate them where possible. Ingrid Kaufmann engaged in many helpful discussions that have moved this paper along. Ashwini Deo, Scott Grimm, Nigel Vincent and Patricia Cabredo-Hofherr all provided comments on a first draft of this paper. I have tried to answer their insightful questions where possible. However, as this paper very much represents work in progress, some of the comments/questions await further research, which is currently being undertaken as part of the project A24 of the SFB 471 at the University of Konstanz, funded by the Deutsche Forschungsgemeinschaft (DFG).

[2] Glosses used in this paper are as follows: 1, 2, 3 stand for 1st, 2nd and 3rd person, respectively; Acc=Accusative; Aor=Aorist; Caus=Causative; Dat=Dative; Demon=Demonstrative; Erg=Ergative; F=Feminine; Fut=Future; Gd=Gerund; Impf=Imperfective; Inf=Infinitive; Inst=Instrumental; Loc=Locative; M=Masculine; Neg=Negation; Nom=Nominative; Obl=Oblique; Opt=Optative; Part=Partitive; Pass=Passive; Perf=Perfect; Pl=Plural; Pres=Present; Ptcp=Partciple; Q=Question Particle; Redup=Reduplication; Sg=Singular; '-' indicates a morphological boundary; '=' indicates attachment of a clitic.

b. Ostin **leipää**
bought.1.Sg bread.Part
'I bought (some) bread.' Finnish

(2) a. Ammu-i-n **karhu-n**
shoot-Past-1.Sg bear-Acc
'I shot the/a bear.' (Kiparsky 1998:267) Finnish

b. Ammu-i-n **karhu-a**
shoot-Past-1.Sg bear-Part
'I shot at the/a bear (bear is not dead).'
(Kiparsky 1998:267) Finnish

To date, several sophisticated syntax-semantics interface analyses of case marking alternations exist. These analyses take the *aspectual* interpretation and the semantic type of the object in question into account, e.g., Enç (1991) on Turkish, de Hoop (1996) on crosslinguistic phenomena, Ramchand (1997) on Scottish Gaelic and Kiparsky (1998) on the Finnish partitive.

In contrast, the occurrence of non-nominative subjects as in the well-known Icelandic case (Zaenen, Maling and Thráinsson 1985), illustrated in (3), is still most often attributed to factors driven by lexical idiosyncracies. This is despite the fact that there are clear correlations between thematic roles and case realization that are evident in Zaenen, Maling and Thráinsson's (1985) original work and that have been worked out in more detail since (e.g., Jónsson 1997–8). Goals, for example, are always realized by datives, experiencers overwhelmingly so.

(3) Mér batnaði kvefið.
I.Dat recovered the.cold.Nom
'I recovered from the cold.' (Svenonius 2002:205) Icelandic

Some recent work has begun to bring analyses of non-nominative subjects in line with work on non-accusative objects. Pesetsky and Torrego (2001) and Svenonius (2002), for example, suggest that non-nominative subjects can also be understood in terms of an interaction between the verbal lexical semantics and the temporal/aspectual semantics of a clause, thus opening the door for an analysis of non-nominative subjects that would build on the insights gained with respect to non-accusative objects. Within Optimality Theory (OT), recent work has also begun to formulate constraints that deal with the realization of both non-accusative objects and non-nominative subjects (e.g., Aissen 1999, 2003).

This paper is particularly concerned with investigating the semantic factors governing *subject alternations*. Subject alternations in which an ergative alternates with a nominative (unmarked), as in (4) are relatively well known in the literature. Despite the fact that much of the South Asian literature has pointed to semantic factors such as volitionality or control as governing the alternation in (4), formal analyses tend to take only structural constraints into account (e.g., Aissen 1999 uses person, subject and thematic-role hierarchies; Davison 1999 uses structural constraints in combination with lexically stipulated information).

(4) a. **ram** kʰãs-a
Ram.M.Sg.Nom cough-Perf.M.Sg
'Ram coughed.' Urdu

b. **ram=ne** kʰãs-a
Ram.M.Sg=Erg cough-Perf.M.Sg
'Ram coughed **(purposefully)**.' Urdu

Indeed, semantic factors do seem to be at the root of most case alternations. Consider, for example, (5), in which the dative alternates with the ergative. The ergative again seems to signal greater control over the action in the sense that only the *want* modality is expressed with an ergative subject, whereas the dative can express both necessity and desire.

(5) a. **nadya=ko** zu ja-na hɛ
Nadya.F.Sg=Dat zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya has/wants to go to the zoo.' Urdu

b. **nadya=ne** zu ja-na hɛ
Nadya.F.Sg=Erg zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya wants to go to the zoo.' Urdu

In a series of papers, Butt and King (1991, 2003, 2005) discuss and analyze data as in (4) and (5) and develop what we have come to think of as *Differential Case Marking Theory* (DCT). In particular, we have argued that the classic division between structural and inherent/lexical case is not sophisticated enough to be able to account for the complex interactions between morphology, syntax and semantics that case systems usually employ. We have proposed that one needs to look at the case system of a language as whole in order to recognize and understand the uses of differential case marking. This means not defining the case system of a language based solely on the so-called structural cases (nominative, accusative, ergative), as is usually done both within generative and typological approaches (for example, the classification in (6) is fairly standard, see Plank 1995),[3] but by simultaneously also considering the role of datives, genitives, instrumentals, etc.

(6)

Case System	*Agt-Pt-V*	*Agt-V*	*Pt-V*	*Languages*
Accusative	NOM-ACC	NOM	NOM	English, Japanese, etc.
Accusative active	NOM-ACC	NOM	ACC	Acehnese, Eastern Pomo
Ergative	ERG-NOM	NOM	NOM	Dyirbal, Samoan, etc.
Ergative active	ERG-NOM	ERG	NOM	Basque, Georgian
Three-way	ERG-ACC	NOM	NOM	Nez Perce, Pitta-Pitta

In particular, DCT assumes that case always has both a syntactic and a semantic function, but that the nominative (often a phonologically unmarked case) acts as a

[3]Agt=Agent, Pt=Patient. Agt-Pt codes transitive verbs whose subject and object are realized as nominative and accusative, or ergative and nominative, respectively. Agt codes unergative verbs, Pt codes unaccusative verbs.

default.[4] Case markers themselves are analyzed as contributing syntactic and semantic information to the overall clausal analyses (cf. Nordlinger's 1998 *Constructive Case*)—they are not seen as mere spell-outs of feature bundles as is assumed to be the case in much of the work within Minimalism.

In this paper, I continue to pursue the line of research already established by Butt and King in joint work, but try to make the point more clearly by noticing that there seems to be a close relationship between ergatives and datives in both synchronic and diachronic terms, a relationship that any theory of case needs to be able to account for. In sections 2 to 4, I present the relevant synchronic and diachronic data, in section 5 I then try to understand the ergative-dative patterns in terms of two dimensions: space and agency. Theories of case tend to only take one of these dimensions into account and I argue that both spatial semantics and the dimension of agentivity/transitivity (Hopper and Thompson 1980) must be integrated into one formal account. A consequence of such an analysis is then also that the artificial distinction between structural and inherent case disappears.

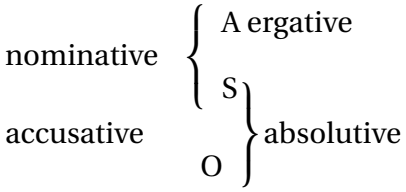
2 The Ergative

2.1 The Structural View

Ergativity as generally defined in the literature (e.g., see Plank 1979 and Manning 1996 for comprehensive discussions) is conceived of as a different way of grouping subjects vs. objects (e.g. Fillmore 1968, Egede 1760, Silverstein 1976, Dixon 1979). Plank (1979:4) concisely summarizes the idea as follows: "A grammatical pattern or process shows ergative alignment if it identifies intransitive subjects (S_i) and transitive direct objects (dO) as opposed to transitive subjects (S_t). It shows accusative alignment if it identifies S_i and S_t as opposed to dO."

This basic idea, along with more standard terminology, is illustrated in (7) (see Dixon 1994:9), whereby nominative and absolutive are the unmarked case and are now often both referred to by just "nominative". A stands for transitive subject (Agent), S for intransitive subject, and O for transitive object.

(7)



Most languages actually display *split-ergative* patterns. One of the most common splits involves aspect. In Urdu, for example, the ergative is generally confined to perfect

[4] Smith (1996) argues for Icelandic that the accusative must be seen as the default case. I do not find his arguments convincing as the nominative is semantically the least restricted case, just as in South Asian languages; however, it is also possible that case defaults may be language specific.

morphology, as shown in (8).[5]

(8) a. **ram** gari(=ko) xɑrid-e-g-a
Ram.M.Sg.Nom car.F.Sg.Nom(=Acc) buy-3.Sg-Fut-M.Sg
'Ram will buy a/(the) car.' Non-Perf→Nom Urdu

b. **ram=ne** gari(=ko) xɑrid-a
Ram.M.Sg=Erg car.F.Sg.Nom(=Acc) buy-Perf.M.Sg
'Ram has bought a/(the) car.' Perf→Erg Urdu

Note that the case marking in (8) does not follow the ergative vs. absolutive/nominative pattern suggested by (7): the object may optionally take accusative case. The accusative functions as a marker of specificity in Urdu (Butt 1993). This example serves to make the point that ergative patterns cannot be understood from a purely morphosyntactic point of view, but need to take semantic parameters into account. This is true not only with respect to object marking, but also with respect to the ergative itself. A purely structural approach conflicts with observations that the ergative tends to mark semantic agentivity of some sort. Children tend to acquire the ergative fairly early on, presumably by picking up on the salient notion of agency (e.g., Fortescue 1985, Narasimhan 2003). Furthermore, ergative alternations such as the one shown in (4), systematically occur in other languages as well, as the example in (10) from Tsova-Tush shows.

(9) a. (as) vuiž-n-**as**
1.Sg.Erg fell-Aor-1.Sg.Erg
'I fell down, on **purpose**.' (Holisky 1987:105) Tsova-Tush

b. (so) vož-en-**sO**
1.Sg.Nom fell-Aor-1.Sg.Nom
'I fell down, by accident.' (Holisky 1987:105) Tsova-Tush

The purely structural view offers no ready explanations for ergative-nominative subject alternations as in (4) and (9). Nor are other types of semantically based subject alternations expected. The next section shows, however, that the ergative-dative alternation already presented in (5) is in fact a fairly typical semantically motivated subject alternation.

2.2 Subject Alternations

The Urdu data presented in (5) are repeated in (10) for convenience. Note that here, the ergative is not restricted to appear with perfect morphology and that the ergative, as well as the dative, are implicated in modal readings (desire and necessity).[6]

[5] A further split, the so-called *NP-split* tends to be between 1st and 2nd person pronouns vs. 3rd person nominals. Urdu does not display such a split, but see Silverstein (1976) for a very detailed discussion of different types of NP-splits.

[6] For a detailed analysis of these data see Butt and King 2005; see Bashir 1999 for in-depth discussion of present day usage.

(10) a. **nadya=ko** zu ja-na hɛ
Nadya.F.Sg=Dat zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya has/wants to go to the zoo.' Urdu

b. **nadya=ne** zu ja-na hɛ
Nadya.F.Sg=Erg zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya wants to go to the zoo.' Urdu

Interestingly, semantically similar subject alternations can be found in other languages as well. Examples are shown in (11) and (12) for Bengali and Malayalam. Neither of these languages are ergative, so an ergative case cannot be involved in the alternation. Bengali uses the genitive case where other languages tend to employ the dative (e.g., pysch verbs).

(11) a. **ami** tomake cai
I.Nom you.Acc wants
'I want you.' (Klaiman 1980:279) Bengali

b. **amar** tomake cai
I.Gen you.Acc wants
'I need you.' (Klaiman 1980:279) Bengali

(12) a. **amma** kuṭṭiye aḍik'k'-aṇam
mother.Nom child.Acc beat-want
'Mother must beat the child.' Malayalam
(Butt, King and Varghese 2004)

b. **ammak'k'**ə kuṭṭiye aḍik'k'-aṇam
mother.Dat child.Acc beat-want
'Mother wants to beat the child.' Malayalam
(Butt, King and Varghese 2004)

These examples establish two points: 1) languages tend to use case alternations (on subjects as well as objects) in order to express semantic contrasts; 2) the precise type of case marker is not rigidly preordained, but depends on how the entire case system of the language functions. That is, non-ergative languages would not use an ergative in case alternations (of course) and in some languages the genitive may take on functions more usually associated with a dative, etc.[7]

The examples in (11) and (12) have an overt modal and the case alternation merely seems to influence the type of modality that is expressed. In (10), in contrast, there is

[7]Note that not all languages necessarily will display case alternations—case alternations are simply one way to express differences in modality, aspect, etc. However, I believe that languages display more case alternations than has been recognized. Consider, for example, Icelandic, where nominatives alternate with datives, as shown in i. and ii., and datives alternate with accusatives, as shown in iii.

i. Leikjunum lyktaði með jafnetefli
the matches.Dat ended.3.Sg with draw
'The matches ended in a draw.' (Eythórsson 2002:196)

ii. Leikirnir lyktaðu með jafnetefli
the matches.Nom ended.3.Pl with draw
'The matches ended in a draw.' (Eythórsson 2002:196)

no overt modal. The expression of modality seems to follow from a combination of the copula 'be' and the non-finite main verb, and the particular case marker of the subject. Similar examples can be found in older stages of Indo-European, as the examples in (13) and (14) show.

(13) haec **caesari** facienda erant
this.Nom.Pl Caesar.Dat do.Gd.Nom.Pl be.Past.3.Pl
'These things had to be done by Caesar.' Latin
'Caesar had to do these things.'

(14) samprati gan-tavyā puri vārāṇasī **mayā**
now go-Gd city.Nom.F.Sg Benares.Nom.F.Sg I.Inst
'Now I want to go to the city of Benares.' Sanskrit

In (13) the dative is associated with necessity, in (14) the instrumental is associated with desire. The Sanskrit example in (14) is particularly interesting in the context of this paper, as Urdu is an Indo-Aryan language that is ultimately descended from a version of Sanskrit. The possibility of expressing modality through a combination of case and a non-finite main verb thus seems to have existed for a long time in the history of the language.

Sanskrit had no ergative, so the Urdu ergative case marker is an innovation. The standard historical analysis is that the modern ergative is a descendant of the old Sanskrit instrumental and that ergative alignment is a direct consequence of the reanalysis of passive clauses as active ones. If this were true, then the use of the Urdu ergative in (10) would seem to be parallel to the Sanskrit use of the instrumental in (14).

However, the situation is more complicated. In the next section, I briefly show that the standard analysis (instrumental ⟶ ergative) cannot be upheld in the face of empirical data. Instead, there are some suggestions that the modern Urdu ergative is connected to a dative form. I explore this possibility, and in exploring it, show how the contrasting modal force of (10) can be understood to have come about. The explanation advanced in section 5 also takes into account the observation that in many languages distinct case functions are expressed by form-identical markers. An example from Urdu is *ko*, which is used for both dative and accusative functions (see Butt

iii. Mennnina/Mönnunum vantar hnífa
the men.Acc/Dat needs.3.Sg knives.Acc
'The men need knives.' (Eythórsson 2002:197)

These alternations have been analyzed as historical processes (known as *Nominative* and *Dative Sickness*, respectively), whereby the nominative is replacing the dative and the dative is replacing accusatives. The motivations for these substitutions are generally sought in structural terms, though Eythórsson (2002) points out that Dative Sickness, at least, must be semantically motivated in that goals and experiencers tend towards datives rather than accusatives.

It seems to me that the Icelandic system as a whole is being regularized according to semantic principles, in that nominatives are now preferentially marking subjects that are themes (as in i. and ii.). However, Eythórsson (2002) points out that some of these alternations are attested as far back as Old Icelandic and thus seem to be quite stable. I take this as an indication that it would be worth investigating whether there might not actually be some subtle semantic factors driving the alternations. However, the tendency in the literature has been the opposite: semantic factors are hardly considered. When they are considered, as in Svenonius' (2002) investigation of object case in Icelandic, interesting and clear generalizations begin to emerge.

and King 2005 for a discussion). In other languages, the markers for instrumentals and ergatives, or instrumentals and genitives, for example, tend to be form-identical.

3 Historical Development of the Ergative

This section first presents an overview of one purported origin of ergative constructions in general and then goes on to show that this story does not hold for Urdu. Section 4 discusses the alternative possibility that datives and ergatives in Indo-Aryan are historically closely related.

3.1 The Passive/Instrumental Hypothesis

The ergative was first noticed in languages like Basque, Greenlandic or Polynesian and was typically called *Nominative of the Agent* (*Nominativ des Handelns*) or simply *Agent* (e.g., Ray 1907, Pott 1873, Kellogg 1883). Some researchers sought to identify the presence of the ergative with a familiar construction: the passive (e.g., Schuchardt 1896, Uhlenbeck 1916). The idea was that in both the ergative and the passive, the agent argument is linked to something other than the nominative (=subject in many theories) and so the constructions are clearly related.

Basic Pattern		Passive		Ergative	
agent	patient	agent	patient	agent	patient
|	|	|	|	|	|
NOM	ACC	INST	NOM	ERG	NOM

The passive=ergative idea received support from the fact that the ergative and instrumental are form-identical in some languages (Australian, Polynesian). However, other researchers managed to establish quite firmly that ergative constructions were *active* rather than *passive* in nature (a.o., Sapir 1917, see Trask 1979:390 for further discussion) and argued that ergative constructions needed to be analyzed in their own right.

While this point has generally been conceded in the literature, the passive idea has not died away completely. In particular, it is assumed that passive constructions historically gave rise to the ergative patterns. Indeed, the path of change in Indo-Aryan is as illustrated in (15), whereby a deverbal adjectival participle was reanalyzed as a finite, active form.

(15) NPinstr NPnom $V_{deverbal\ adjectival\ participle}$ > NPerg NPnom $V_{active(perf)}$
(*der Apfel von Hans gegessen → Hans aß den Apfel* (German))
(*the apple eaten by John → John ate the apple*)

However, although the ancestral form was participial in nature, it was not an actual passive. Furthermore, the modern Urdu ergative cannot be a direct descendant of the old instrumental (e.g., Beames 1872–79, Kellogg 1893, Klaiman 1978, Trask 1979,

Zakharyin 1979, Andersen 1986, Hock 1986, Hook 1999). Despite the empirical evidence, the passive/instrumental analysis has remained popular in modern times (e.g., Pray 1976, Anderson 1977, Pirejko 1979, Bubenik 1989) and indeed is regarded as "standard" textbook knowledge (Dixon 1994, Harris and Campbell 1995). In the next section, I therefore briefly outline the facts at hand.

3.2 Problems with the Passive Hypothesis

3.2.1 The Instrumental

The standard assertion for the origin of the modern Urdu ergative *ne* is that it developed from the Sanskrit inflectional instrumental form *-ina*. This assertion was apparently first proposed by Trumpp (Beames 1987:266) and continues to be given credence despite the fact that his contemporaries immediately denounced this historical reconstruction.

Beames (1872) and Kellogg (1893) point out that the Sanskrit instrumental *-ina* had developed into *ẽ* by Middle Indo-Ayran (MIA, between 600 CE–1000 CE). Indeed, all of the non-nominative case markers in Sanskrit were subject to syncretism in MIA and eventually collapsed down to one form. Vestiges of the original non-nominative inflections can still be found in Urdu as *-e*, an oblique marker of masculine nouns in *-a* (see also Masica 1991).

Modern Urdu *ne*, on the other hand, only appeared in the 17th century (Beames 1872), and, as Butt and King 2005 (and Kellogg 1893) point out, it has the status of a clitic. While not unheard of, it is unlikely that a former case inflection would evolve into a case clitic.[8] So the modern ergative *ne* cannot be a direct descendant of the Sanskrit instrumental.

But then, what is the origin of the modern ergative *ne*? Tracing the origin of this case marker is difficult, but I find a suggestion made by Beames (1872:270) very interesting. Beames proposes that the modern ergative *ne* comes from a dative form *nẽ*. This dative form was apparently used for subjects in a dialect of Hindi spoken in provinces adjacent to the Moghul court. His idea is that during the reign of the Moghul Emperor Shah Jehan (1627–1658) a change in administrative policies led to an influx of Hindu administrators, who might have influenced the language of the court. Given that this is not an unlikely scenario, I would like to pursue Beames' hypothesis.

The idea would be that this originally dative *nẽ* would have eventually been used to mark sentences as in (16), which display an "ergative pattern" in the sense that the agent is oblique and does not agree with the verb, whereas the nominative object does. The modern form of the subject in (16) would be *jis=ne*, that of the subject in (17) would be *kabir=ne*.

(16) **jihi** rac-e suraga bhu
who.Obl create-Perf.M.Pl heaven.M.Nom earth.Nom

[8] See Butt 2001, Butt and King 2005 for a more detailed discussion on the history of the Urdu ergative.

satta pātāla
seven.Nom hell.M.Nom
'Who made heaven, earth, the seven hells.' Old Hindi
[He who created heaven, earth and the seven hells.]
(Chand, Prithiraja-Rasau i.11; Beames 1872:267)

(17) masi kāgad chū-yo nahī kalam gahī
ink.Nom paper.M.Nom touch-Perf.M.Sg not **pen.F.Sg take.Perf.F.Sg**

nahi hāth jāro juga māhātma jehi
not hand four.Pl age.Pl glory.Nom who.Sg.Acc

kabir jan-ā-yo nāth
Kabir.Obl know-Caus-Perf.M.Sg lord.Nom
'Kabir touched not ink nor paper, he took not pen in hand; He made known the lord to whom is glory in the four ages.' Old Hindi
(Kabir, Sakhi 183; Beames 1872:269)

There are two immediate questions that arise at this stage in the discussion: 1) where the basic ergative pattern comes from; 2) why a dative form would have been pressed into service to mark agency. The first question will be answered briefly in the next section. The second question is explored in section 4.

3.2.2 Verbal Passive vs. Adjectival Passive

The ancestral construction corresponding to the "ergative pattern" with perfect morphology in (16) and (17) furnished by the *adjectival participle* in *-ta* and its arguments. This participle could already be used as a past tense form in Sanskrit (Speijer 1886:255,294), as illustrated in (18). Note that the agent is instrumental, the theme nominative.

(18) evam-**uk-tā** tu haṃsena damayantī
so-say-Ptcp.Nom.Sg then goose.Inst.Sg Damayanti.Nom.Sg.F
1. 'Then Damayanti was spoken to like that by the goose.'
2. 'Then the goose spoke to Damayanti thus.' Sanskrit
(Nalopākhyāna I,30)

This basic pattern was continued into MIA (see Peterson 1998 for an analysis of MIA as ergative) and New Indo-Aryan. As already mentioned, the ergative *ne* was innovated in the 17th century to mark the oblique (formerly instrumental) agents.

While the adjectival deverbal participle in (18) had some passive force, Sanskrit also had a "standard" verbal passive in *-ya-*, as shown in (19). Note that here the agent is also marked with the instrumental and the theme is nominative.

(19) devadattena kaṭāḥ **kriyante**
Devadatta.Inst.Sg mat.Nom.Pl do.Pass.3.Pl
'by Devadatta mats are made' (adapted from Hock 1986:16) Sanskrit

An immediate question that arises is why this verbal passive did not give rise to the modern perfect morphology and, hence, to the modern ergative pattern. It turns out that instrumental agents of verbal passives (*-ya-*) were rarely expressed in both Sanskrit (Gonda 1951:22) and the later Pāli (Peterson 1998). Instrumental agents of adjectival passive participles (*-ta*), on the other hand, were almost always overtly expressed.

The instrumental agent may therefore have had a very different syntactic status with respect to the passive and the adjectival participle. It could have functioned as a true adjunct in the passive, but as an argument of the participle. It does seem clear that the passive and the adjectival participle served to highlight participants of the event in different ways. The one in which the agent was expressed is the ancestor of the modern transitive perfect morphology (e.g., (8), (16)–(17)).

Interestingly, the agent of the adjectival participle seems to have engaged in a subject alternation as well. Andersen (1986) notes that in Aśokan (MIA) inscriptions the agent of the *-ta* construction can appear either with the genitive or the instrumental. The genitive is rarer and can only be used when the agent is animate. No such restriction applies to the instrumental. One can thus conclude that case marking was sensitive to semantic factors on subjects at least as far back as MIA.

4 The Dative-Ergative Connection

4.1 Case Alternations and Markedness

Sanskrit (Old Indo-Aryan) also employed case alternations to express differences in semantic import. Some of the clearest examples come from object alternations (Jamison 1976) and one of the more interesting ones is found with causees.

Consider the examples in (20), which illustrate an accusative and an instrumental causee, respectively (*queen* and *dogs*). The difference signaled by the instrumental vs. the accusative has been described by Speijer (1886) as cited in (21).

(20) a. mantrapūtam carum **rājñīm** prāśayat
consecrated.Acc porridge.Acc queen.Sg.**Acc** eat.Caus.Impf.3.Sg

munisattamaḥ
best-of-ascetic.Nom
'the best of ascetics made the queen eat a consecrated porridge.'
(Kathaāsaritsāgar 9.10) Sanskrit

b. tām **śvabhiḥ** khādayet rājā
Demon.F.Sg.Acc dog.Pl.**Inst** eat.Caus.Opt.3.Sg king.Nom
'Her the king should order to be devoured by dogs.' Sanskrit
(Mahābhārata 8.371)

(21) If one wants to say *he causes me to do something, it is by his impulse I act*, there is room for the type [accusative causee], but if it be meant *he gets something done by me, I am only the agent or instrument through which he acts*, the instrumental is on its place. [Speijer (1886:§49)]

Now consider the causative pattern in (22). Again, an accusative and an instrumental causee give rise to differences in semantic interpretation. This difference has been analyzed in terms of affectedness in the more recent literature (Saksena 1980). The instrumental causee is incidental to the event, in the sense that it is just the instrument by which the caused event was brought about. The accusative causee, in contrast, is seen as being simultaneously affected by the event (some change takes place in the accusative causee).

(22) a. ɑnjʊm=ne sɑddɑf=**ko** masala cɑkʰ-va-ya
Anjum.F=Erg Saddaf.F=**Acc** spice.M.Nom taste-**Caus**-Perf.M.Sg
'Anjum had Saddaf taste the seasoning.' Urdu

b. ɑnjʊm=ne sɑddɑf=**se** masala cɑkʰ-va-ya
Anjum.F=Erg Saddaf.F=**Inst** spice.M.Nom taste-**Caus**-Perf.M.Sg
'Anjum had the seasoning tasted by Saddaf.' Urdu

These examples are interesting to consider in the context of this paper because they show that even though the case markers of a language may erode away completely and be replaced by innovations relatively late, the basic semantic opposition that is signaled by the case markers can be retained.

The new instrumental *se* comes from a preposition meaning 'with', the *ko* can apparently be traced back to a noun meaning 'side' (or 'armpit', Beames 1872:§56, Kellogg 1893). The accusative *ko* in Urdu/Hindi is form-identical with the dative *ko* that was seen in the ergative-dative alternation in (10). This *ko* was apparently first used to mark goal arguments, then spread later to mark theme/patient arguments as well.

Recall from section 3.2.1 that Beames (1872) suggested that the modern ergative *ne* is also related to an originally dative form. One can thus step back and ask how it is possible that datives can develop both into accusatives and ergatives, two case markers that would seem to be at opposite ends of the agentivity spectrum. In the next section, I examine the likelihood of the ergative-dative connection and then in section 5 move on towards trying to provide an explanation for the diachronic case developments by taking the synchronic case alternations into account.

4.2 The Dative Connection

Beames' (1872) suggestion that the modern ergative *ne* is related to a dative *nẽ* is difficult to substantiate via diachronic data. However, if one takes even a cursory look at dative and ergative forms across some of the modern Indo-Aryan languages, one finds suggestive correlations. Consider the data in (23). In the dative column, there are some *k*- forms, which are all presumably related to the dative/accusative *ko*. None of the *k*-forms appear in the ergative column. However, case markers in *n*- and in *l*- are found across both columns. In particular, within Gujarati and Nepali, the forms for ergative and dative are very similar.

(23)

	Dative (subjects and objects)	**Ergative** (subjects only)
Hindi/Urdu	ko	ne
Punjabi	nũ	ne
Sindhi	kʰe	OBLIQUE INFLECTION
Gujarati	ne/nẽ	-e (old -nē)
Marathi	lā	ne/ni
Bengali	ke	NONE
Oṛiya	ku	NONE
Assamese	ko/no	-e
Nepali	lāī	le

While the historical origin and actual relatedness of these forms needs to be looked at in further work, the available patterns do point to a certain fluidity in form in the sense that the form that is pressed into service as the dative in one language can very well turn up as an ergative in a sister language (or even in the same language). For example, the same *ne* shows up as an ergative in Marathi, but as a dative in Gujarati.

My working hypothesis therefore is to accept Beames' suggestion and to assume that the modern ergative *ne* was first introduced into the language as a non-nominative subject case marker which was used to reinforce semantic contrasts with existing subject markings. The unmarked nominative already existed when the *ne* first entered the language, as did a version of the dative/accusative *ko* (cf. (16)–(17), Beames 1872). Given that *ko* was already used to mark goals, there are two options when *ne* enters the language. Under one scenario this new, fashionable case marker could have been used to ultimately replace the *ko*. Or, the new case marker could be slotted into a system of semantically motivated case oppositions in order to overtly mark a new, or an already existing distinction.

Consider the Urdu data in (24). Here the ergative is associated with control over an action, while the dative expresses typical goal semantics (cf. Verma and Mohanan 1990 on experiencer subjects in South Asian languages). In (24a), the memory is actively recalled, in (24b), the memory comes to the person, unbidden.

(24) a. **nadya=ne** kɑhani yad **k-i**
Nadya.F.Sg=Erg story.F.Sg.Nom memory do-Perf.F.Sg
'Nadya remembered the story (actively).' Urdu

b. **nadya=ko** kɑhani yad **a-yi**
Nadya.F.Sg=Dat story.F.Sg.Nom memory come-Perf.F.Sg
'Nadya remembered the story (memory came to Nadya).' Urdu

Note that in (24) the choice of light verb ('do' vs. 'come') already encodes the control vs. goal distinction. In existing semantic oppositions like this, the new case marker *ne* could have been slotted in neatly to reinforce an already existing distinction. The semantics thus invested in the *ne* case in opposition to the *ko* marker could then be further extended to other constructions in the language, such as the ergative-dative alternation in (10), repeated here in (25).

(25) a. **nadya=ko** zu ja-na hɛ
Nadya.F.Sg=Dat zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya has/wants to go to the zoo.' Urdu

b. **nadya=ne** zu ja-na hɛ
Nadya.F.Sg=Erg zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya wants to go to the zoo.' Urdu

As discussed in section 5, the differing modal interpretations follow directly from the control vs. goal contrast.

4.3 A System of Contrasts

The semantic import of a case marker thus emerges out of a system of contrasts. Manfred Krifka (p.c.) points out that the system of oppositions I propose for case is very reminiscent of what happens with reduplication. The semantics of reduplication are notoriously difficult to define. Consider, for example the Bengali sentence in (26a) along with two different reduplicated versions of the object 'black spiders' in (26b) and (26c).

(26) a. or bari-te kalo makorša dek^{h}-e-č^{h}o, na ki?
his house-Loc black spider(s) see-Perf-Pres-2 Neg Q
'Did you (really) see black spiders at his house?' Bengali
(Fitzpatrick-Cole 1994:162)

b. kalo ṭalo makorša
black Redup spider(s)
'black and other colored spiders' Bengali

c. kalo makorša ṭakorša
black spider(s) Redup
'black spiders and other (not necessarily black) beasties' Bengali

Krifka observes that the precise meaning of the reduplicated part of a phrase cannot be recovered from the reduplicated phrase itself, but crucially seems to constitute itself out of the contrast with the non-reduplicated version. With respect to case semantics, this means that the semantic import of a particular case marker could be rather wide, and that its particular semantics in a given clause must be understood as part of a system of contrasts.

4.4 Dimensions of One Meaning: Agency and Goal

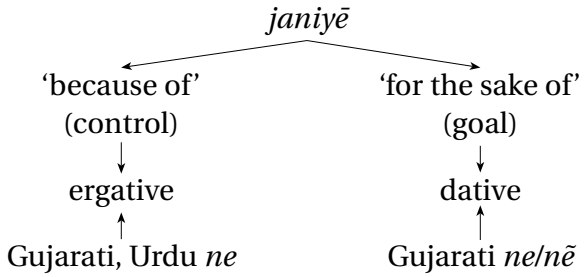
Given the idea that a case marker could encompass a very wide set of meanings that is rendered more precise within a system of case oppositions, this section explores a possible ancestral form that could have given rise to both the dimensions of agency/control (core ergative semantics) and goal (core dative semantics).

Beames and Kellogg propose the participial form *lage* of the verb *lag* 'stick to' as a possible ancestor for the modern ergative *ne*. However, this seems unlikely on both

phonological and semantic grounds. Joint research with Aditi Lahiri has suggested that the ergative *ne* could be related to the Bengali postposition *jonno* 'for', which is derived from the Sanskrit locative *janiyē* of *janiyā* 'for the sake of, because of' (Chatterji 1926).

This postposition is phonologically a much more likely ancestor and, as illustrated in (27), one can also see how the meaning of this postposition could have given rise to both goal (dative) and control (ergative) readings.

(27)



The German preposition *wegen*, derived from the dative plural of *Weg* 'way' shows exactly this range of semantics as well. Example (28) illustrates the 'because of' (agency/control) reading, (29) is an example of the 'for the sake of' (goal) reading.[9]

(28) Wegen ihm zerbrach die Vase.
because he.Dat broke the vase
'Because of him the vase broke.' German

(29) Wegen ihm schaffte ich einen Hund an.
because he.Dat acquired I.Nom a.Acc dog at.Prt
'I got a dog for him.' German

German *Weg* 'way' is a spatial concept. It is well-known that case markers often derive from spatial prepositions, but what is not as clear is how the dimension of agency can be acquired by something that is originally a spatial concept. In the next section, I suggest that case markers and prepositions derived from originally spatial concepts acquire an agency interpretation by virtue of playing a role in marking participants of an event.

5 Space and Agency

It has by now been firmly established in linguistic theory that spatial concepts are fundamental to language and the structuring of events. Localist ideas of case (e.g., Hjelmslev 1935, Anderson 1971, 1977) have found their way into modern ideas on argument linking like Gruber (1965) or Jackendoff's work. Jackendoff (1990) in particular has identified the notions of *place* and *path* as being of particular importance.

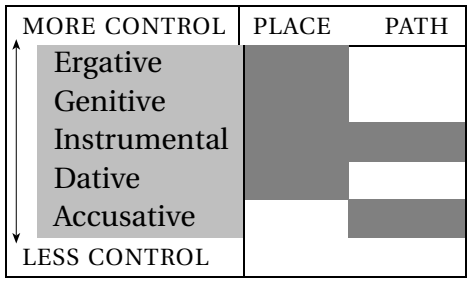
It has also been established that the degree of control over an action is important in argument realization and case marking (e.g., Silverstein's 1976 *NP hierarchy*, Hopper and Thompson's 1980 notion of *Transitivity*, Wierzbicka's 1981 idea that experience/affectedness (lack of control) is central). However, most theories of case (and

[9] Another possible point of comparison might be the Ancient Greek 'dative of agency', which appears in passives with both a benefactive and an agentive meaning (e.g., Green 1966).

argument linking) focus only on either the spatial metaphors or the animacy/control dimensions, but not on both. It is not clear to me why this should be the case, but the data presented in the previous sections provide evidence that spatial concepts and notions of control must be taken into account simultaneously.

In (30), I present a two-dimensional view of case. On one dimension, case markers are placed in a relationship to one another with respect to more or less control. The idea is that if a language has an ergative, it will use that to mark agents. After that genitives make good agentive markers, then instrumentals, then datives. For example, recall the MIA genitive-instrumental alternation based on animacy that was briefly discussed in section 3.2.2. Genitives in that alternation were more marked and only used for animate agents. This is entirely in keeping with the arrangement proposed in (30).

(30)



I consider the spatial dimension to be primary. The control/agency dimension is derivative in that it comes about because the arguments of an event, besides being placed in a spatial relationship to one another, also act upon another. Case markers are therefore generally interpreted simultaneously with respect to both dimensions.

Genitives tend to express possession, which is basically a notion of place: x be at y. Ergatives are also sometimes observed in conjunction with possession, so I assume a place specification for ergatives. Instrumentals can express both place and path because "with x" can be interpreted both as "x be at y" and as "x go along with y". Comitative uses are therefore also included in this use. The dative expresses a place, and the accusative a path.[10]

A dative can therefore be interpreted both as a goal (place), and, in contrast to another case marker, as an agent with reduced control over the action. This latter is what gives rise to experiencer subjects such as the Icelandic example in (3) or the Urdu example in (24). In Urdu, the dative contrasts with the ergative. In Bengali, the genitive contrasts with the nominative. Given that Bengali has no ergative case, the nominative acts as the default marker for agents and the genitive in contrast with the nominative indicates reduced control over the action.

The nominative does not feature in (30). I consider the nominative as a default case and therefore do not rank it within (30). If the nominative is the default agent marker, then the dative is marked in contrast to indicate non-default agents (experiencers).

Form identity of case markers is expected when a case marker spreads over several cells. This is expected as part of language change when new case markers enter the language, or engage in competition in a system of semantic contrasts. For example,

[10]The path component of accusatives serves as a natural semantic basis for expressing telicity. A telic event is one which is completed, i.e., one in which one has arrived at the end of a path (see Ramchand 1997 for some discussion). Indeed, accusatives, but not datives are implicated in expressions of telicity.

if a new case marker enters a language and if this new case marker can express low control(=affectedness) and both the spatial dimensions of place and path, then this case marker could take over the semantic space of the accusative as well as the dative, thus resulting in homophony of the accusative and dative. This is true of Urdu and is observed quite often crosslinguistically.

Overall, the two-dimensional picture in (30) allows quite a few predictions with respect to both synchronic and diachronic data. Whether these predictions are indeed borne out, or whether the picture must potentially be revised remains the subject of further research.

5.1 The Ergative-Dative Alternation Revisited

With respect to the ergative-dative alternation the integration of space and agency/control into one picture, as in (30), does allow for a better understanding of the phenomenon. As already indicated in section 4.2, the use of the dative with a copula and a non-finite main verb, as in (31b), historically precedes the use of the ergative with this construction. In her detailed study of present-day usage of the construction, Bashir (1999) notes that the ergative is slowly encroaching on the domain of the dative. That is, the ergative is being slotted into this construction to provide a sharp semantic contrast with the dative.

(31) a. **nadya=ne** zu ja-na hɛ
Nadya.F.Sg=Erg zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya wants to go to the zoo.' Urdu

b. **nadya=ko** zu ja-na hɛ
Nadya.F.Sg=Dat zoo.M.Sg.Loc go-Inf.M.Sg be.Pres.3.Sg
'Nadya has/wants to go to the zoo.' Urdu

I propose that the differing modal readings in (31a) and (31b) can be accounted for as follows. The copula 'be' places a participant (Nadya) and an event (zoo going) into a relationship with one another. It is not said what this relationship is. In (31b), *Nadya* is marked as a dative, can thus be interpreted as a goal and as "receiving" the *zoo going* event. But since datives can also simultaneously be interpreted on the control dimension, (31b) is also compatible with a control/agentive reading.

The modal semantics of the construction are triggered because a non-finite event is placed in relationship with a subject. The precise nature of the modal semantics is determined by the case marker. With respect to (31b), because of the simultaneous interpretation of the dative on the spatial and the control dimensions, the modal reading could play out to be either one of obligation (goal) or of desire (goal+control). Another way to think about it is that we actually do not know anything about the inner state of goals: nothing is predicated about whether goals want or hate what they get (cf. *I got a cold.* (undesirable) vs. *I got a present.* (possibly desirable)). When a control dimension is added, however reduced that control may be, a desire reading becomes likely.

The Urdu ergative *ne*, in contrast, is only interpreted on the control dimension and signals a very high degree of control. It therefore unambiguously marks the participant Nadya in (31a) as having control. This results in a reading whereby she wants the event

being placed in relationship to her. The ergative thus expresses a marked situation in contrast to the dative, which functions as default marker by allowing for both the desire and the obligation readings. While the modal readings associated with both case markers in (31) are consistent with the very general semantics they encode, the precise semantic interpretation only comes about by understanding the case markers as employed in contrast to one another and as situated within the case system of the language as a whole.

5.2 Control and the Agentivity Lattice

A different way of trying to understand the semantic space occupied by individual case markers within the case system of a language comes from a recent proposal by Grimm (2005). Basing himself mainly on Dowty's (1991) criteria for Proto-Agents and Proto-Patients, Grimm proposes a lattice analysis of case marking. The semantic lattice he designs consists of four privative features that identify agents: *instigation, volition, motion, and sentience*. In addition, prototypical agents are characterized by total persistence for the duration of an event, which sets them apart from prototypical patients (agents do not change during the course of an event, but patients typically do in some way).

In the light of the ideas proposed in this paper, Grimm's approach is interesting because he rejects the notion of *control* as a primitive feature. He sees control as being an amalgamation of the privative features he uses to build the lattice. So, if something has all four of the features *instigation, motion, sentience and volition*, then this entity has the highest control over an action that is possible. If an entity is characterized by just three, two or one of the four features (e.g., *motion, sentience and volition*), then this entity has comparatively less control over an action.

Grimm also proposes that cases be seen as occupying different spaces within the lattice. The dative, for example, is associated with just *sentience*, indicating a weak form of control. The ergative is associated with the range from all four features to just *sentience* and *volition*. The instrumental is associated with the spectrum from *motion* and *instigation* to just *motion* or *instigation*. A comparison of Grimm's division of the available semantic space on the lattice with respect to case and the schema presented in (30) yields the encouraging result that the case markers have been identified in a similar manner in terms of the agency/ control dimension. Grimm's proposal can thus be seen as fleshing the schema in (30) out with a more precise characterization of what the notion "control" actually entails.

Grimm's analysis does not, however, as yet include the spatial dimension. Integrating this dimension and then exploring the predictions of the lattice approach and the schema in (30) with respect to case alternations and case syncretism/homonymy remains the subject of further research.

6 Conclusion

The synchronic and diachronic data presented in this paper suggests that the import of case cannot be seen as a purely structural or lexical/idiosyncratic phenomenon. Rather, the semantics of case play an import part in compositional semantics. The

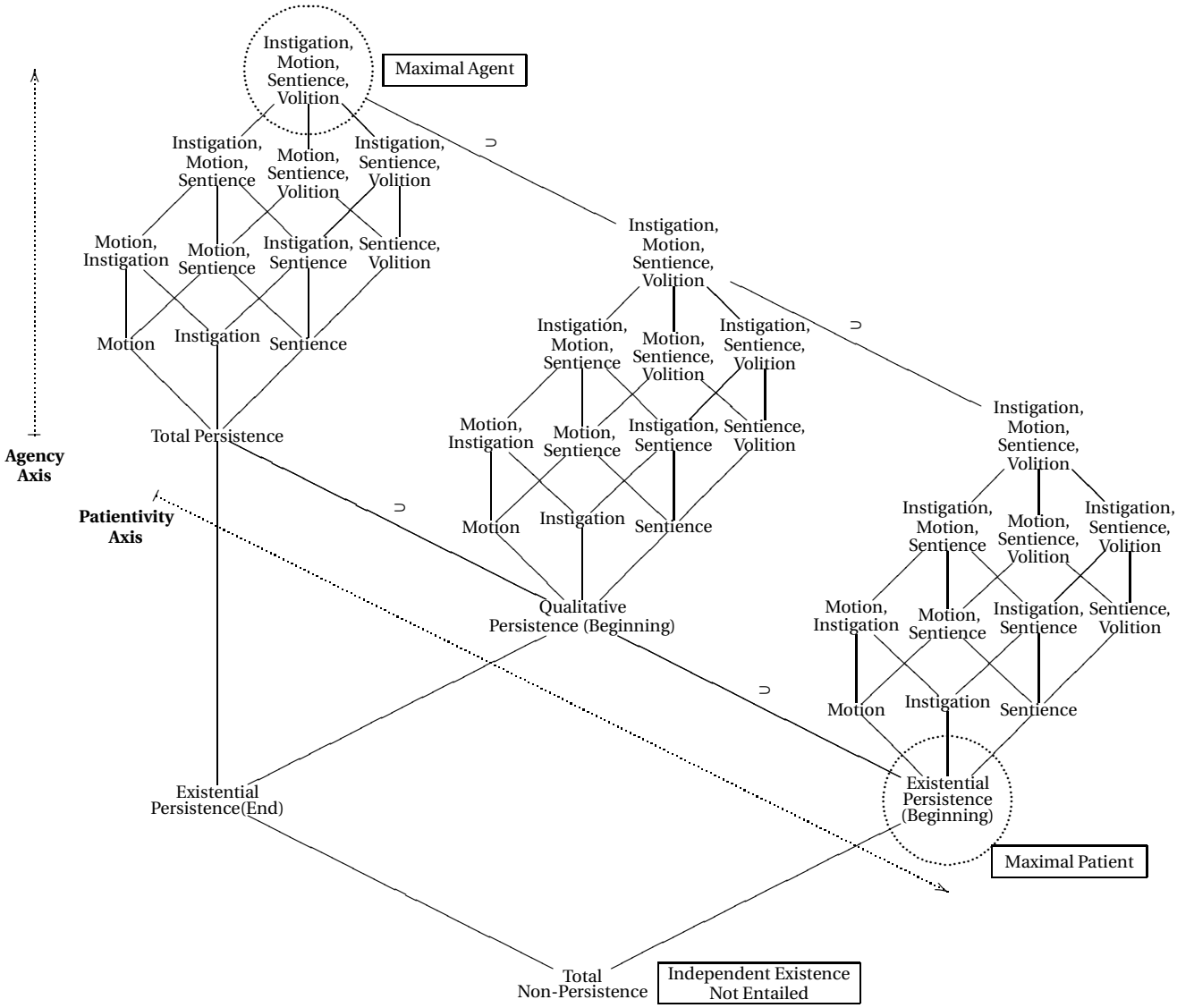


Figure 1: The Agentivity Lattice

data from case alternations has furthermore shown that the precise semantic contribution of each case marker cannot be understood in isolation, but must be analyzed in terms of the entire case system of the language and in terms of the contrasts that are expressed. In particular, case needs to be understood in terms of two dimensions simultaneously: space and control/agency.

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Information packaging in questions

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1 Introduction

Linguists who study information structure often use questions as a way of setting the context so that it elicits a particular focus-ground partitioning in the answer. But few researchers have looked into the way the questions themselves are structured.[1] In this article I will discuss some common ways that questions are realized in spoken interaction in English, French, German and Swedish. It turns out that the way questions are realized is rather systematically correlated with the speaker's view of what the hearer might know and what has happened so far in the conversation.

Let me first establish some terminology. By *information structure* I understand the structuring of utterances into a *focal* (new, informative, rhematic) part and a *ground* (known, contextually bound, thematic) part. This structuring reflects the speaker's view of the hearer's *information state* at the time of the utterance. By *information packaging* I understand the way this structuring is realised by syntactic, morphological, and/or prosodic means (cf Vallduví and Engdahl, 1996).

In section 2, I illustrate how question-answer pairs are commonly used to establish the focus of an utterance. In section 3, I introduce a model of a dialogue participant's information state inspired by Ginzburg (to appear). With this formal apparatus we turn in section 4 to a survey of the information packaging of information questions, i.e. requests for information. In section 5 I look closer at questions that arise when a dialogue participant has failed to understand a previous utterance. Finally, in section 6, I bring up some examples of declaratives used as questions.

2 Using question-answer pairs to establish information structure

It is common to use lead-in questions to establish the expected information structure of the answer. This way we can exploit the fact that speakers have strong and consistent intuitions about the form of congruent answers. For instance, given A's question in (1), in which the object of John's reading is queried, an appropriate answer is normally realised as in B1, with the main accent on the object, which in this context un-

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[1] See e.g. Lambrecht and Michaelis (1998).

questionably is focal. The rest of the utterance is unstressed. A short answer consisting just of the focal part, as in B2, is probably the most common way of answering such a question.

(1) A: What did John read?
B1: He read the NEWSPAPER.
B2: the NEWSPAPER
B3: *He READ the newspaper.

If the answer instead is realised with an accent on the verb, which in this context is ground, as in B3, the effect is one of a non-sequitur. The information packaging of B3 makes *read* be focal and that is not possible given A's question. Similarly in (2), where the lead-in question paves the way for a subject-focus answer, only B1 is a possible answer.

(2) A: Who read the newspaper?
B1: JOHN (did).
B2: *John DID / READ it.

Accenting the verb is of course expected if the lead-in question makes this focal, as in (3).

(3) A: What did John do to the newspaper?
B1: He BURNT it.
B2: *JOHN burnt it.

When an explicit question is raised, as in (1–3), a coherent answer must have a matching focus-ground articulation. The question thus provides a contextual cue to the information structure of the answer. But what about utterances that are not answers to explicit questions? I believe that the most promising approach is to assume that they, too, address an implicit question, an issue that has been raised in the conversation by a previous utterance. Before pursuing this further, we need to consider a way of talking about what the focus-ground articulation is supposed to match.

3 Information states and focus-ground in dialogue

In order to give a satisfactory account of the information structure of an utterance, we need to be able to specify the context in which the utterance is perceived as coherent. By context I mean in particular the mental states of the dialogue participants, i.e. their intentions and beliefs.[2] Of course, we can never have access to the actual, complete content of speakers' and hearers' mental states, but I think it *is* possible to state certain conditions on what these mental states must contain. For this purpose I will talk about *information states*. We can think of an information state as a snapshot of a person's mental state at a given time in a conversation. The idea is that when a speaker

[2]The term mental state is used e.g. by Herbert Clark (1992, 1996).

produces an utterance with a particular focus-ground articulation, this provides information about the speaker's information state , what s/he knows and what s/he wants to achieve at that point in the conversation. Once an utterance has been made, it affects the hearer's information state in ways that are at least partly predictable, given the knowledge of the language and the systematic way focus-ground is realised. I think that the most explicit account of the interaction between information states and utterances is the Dialogue Game Board developed by Jonathan Ginzburg (1996; to appear). A somewhat modified version is used in the GoDis system (Larsson, 2002). In (4), I give a schematic representation of what an information state may contain, following Engdahl (2001) and Larsson (2002).

(4) A dialogue participant's information state:

$$\begin{bmatrix} \text{PRIVATE} & \begin{bmatrix} \text{BELIEFS} & \textit{set of propositions} \\ \text{QUD} & \textit{partially ordered set of questions} \end{bmatrix} \\ \\ \text{SHARED} & \begin{bmatrix} \text{BELIEFS} & \textit{set of propositions} \\ \text{QUD} & \textit{partially ordered set of questions} \\ \text{LATEST-MOVE} & \textit{move} \end{bmatrix} \end{bmatrix}$$

The information state is divided into two parts. PRIVATE contains the dialogue participant's private beliefs, including what the dialogue participant thinks has been achieved so far in the conversation. SHARED corresponds to what is sometimes called the *common ground*, i.e. the information that has been jointly established during the conversation, including any issues that have been raised. Each part contains a set of BELIEFS as well as an ordered set of issues that have been raised and which I will refer to as questions under discussion, QUD, following Ginzburg.[3] A short description of QUD and the relevant operations are given in (5).

(5) **Question under discussion (QUD)** (adapted from Ginzburg, 1996, to appear)):
   a. **QUD**: A partially ordered set that specifies the currently discussable issues. If a question *q* is maximal in QUD, it is permissible to provide any information specific to *q* using (optionally) a short answer.
   b. **QUD update**: Put any question that arises from an utterance on QUD.
   c. **QUD downdate**: When an answer *a* is uttered, remove all questions resolved by *a* from QUD.

In the model in (4), there are two QUDs, one in the part of the information state which reflects the dialogue participant's private understanding of what the conversation is about and one in the part of the information state which reflects the shared picture of what is up for discussion. When the conversation runs smoothly, the contents on these two QUDs will be very similar. If an issue is present only in one dialogue participant's private QUD, this is often noticeable since the participants start making requests for clarification (see the discussion of reprise questions in section 5).

[3] The term 'question under discussion' is also used in Roberts (1996). Ericsson (2005, chapter 3) traces the development of ideas concerning QUD.

Let us see how this approach works. When the English speaking dialogue participant A utters a question as in (6), the shared QUD is updated with a representation of that question. I here use a simplified semantic notation, prefixing the question with '?'. The addressee B might be able to provide a resolving answer, in which case the question can be removed from QUD.

(6) A: Does Mary like Paris?
QUD update: → QUD = ⟨?like(m, p)⟩
B: Yes.
QUD downdate: → QUD = ⟨⟩
A: Uh huh. → BELIEFS = {like(m, p)}

Often the person asking the question confirms that s/he has accepted the information provided by the other dialogue participant, as when A carries on with a short *uh huh* in (6). A thereby indicates that she has accepted the information and added the proposition *Mary likes Paris* to the set of shared beliefs. It then becomes part of the common ground; it becomes *grounded*, to use Clark and Schaefer's (1989) term.[4]

Let us next look at the way an assertion affects the information state. An assertion also introduces an issue on QUD, viz. the corresponding question, as shown in (7).

(7) A: It's cold here.
QUD update: → QUD = ⟨?cold(here)⟩
B1: Yes.
QUD downdate: → QUD = ⟨⟩
B2: Do you think so?
QUD update: → QUD = ⟨?think(you, cold(here)), ?cold(here)⟩

Here B is shown to have a choice between agreeing with A (*Yes*), in which case the issue gets removed from QUD, and pursuing this issue further (*Do you think so?*). The latter option introduces a further issue on QUD, which must be addressed.[5]

An important assumption in Ginzburg's work is that QUD provides the right locus to account for the focus-ground articulation of utterances. In brief, an utterance with a particular focus-ground articulation is appropriate just in case the dialogue participants' shared QUD contains a question, viz. the question you get if you abstract over the focally accented part of the utterance. We can summarize this as in (8).

(8) An utterance with a given focus-ground partition requires for its felicity the maximality in QUD of a certain question, obtained by λ-abstracting over the content corresponding to the focussed constituent(s).

This means that items on QUD are structured propositions.[6] In order for an utterance to be perceived as congruent, its focus-ground realisation must match this structured

[4] See also Clark (1996) and Larsson (2002, chapter 3). Within Conversation Analysis, turns like A's *uh huh* are called *acknowledgment tokens* and indicate receipt of the content of the preceding turn (Jefferson, 1983).

[5] In Ginzburg's terminology, the topmost issue on QUD, takes conversational precedence. For more detailed discussions and examples of QUD operations, see Ginzburg (to appear).

[6] Structured propositions are used by several researchers, e.g. Jackendoff (1972); von Stechow (1981); Krifka (1992).

proposition. An utterance with an accented direct object as in (9) is thus appropriate if the question *What did John read?* is an addressable issue, which in turn means that this question is on the shared QUD of the dialogue participants.

(9) John read the NEWSPAPER.
QUD = $\langle ?\lambda x.\mathsf{read}(\mathsf{j}, x)\rangle$ (*What did John read?*)

Because of so-called focus projection, the utterance in (9) would also be appropriate in a context where the issue is *What did John do?*, i.e. a VP question about John's activities at the relevant time. In that case the question on QUD might be structured as in (10), where P is a variable over properties of individuals.

(10) John read the NEWSPAPER.
QUD = $\langle ?\lambda P.P(\mathsf{j})\rangle$ (*What did John do?*)

The reason we hardly ever perceive the potential ambiguity between the narrow focus interpretation of (9) and the wide focus interpretation of (10) is that normally only one of the questions will be addressable at a given point in a conversation and this then determines the appropriate reading.

In a similar way, an utterance with an accented subject, as in (11) will only be appropriate if the issue *Who read the newspaper?* is addressable at that point in the conversation.

(11) JOHN read the newspaper.
QUD = $\langle ?\lambda x.\mathsf{read}(x, \mathsf{paper})\rangle$ (*Who read the newspaper?*)

Requiring that the focus-ground realization of an utterance correspond to an addressable question on QUD doesn't mean that this question has to have exactly the form of its English paraphrase or involve the lexical items used in the paraphrase. But I do think that the amount of structure that is reflected by the lambda abstraction is available and corresponds to speakers' intuitions about what is a coherent contribution and what is not at a given point in a conversation.

Let us now go one step further and look at how speakers can exploit this correspondence between the form of utterances and the availability of issues on QUD. If a speaker realises an utterance with a clear narrow focus—either by accenting a word or by e.g. using a cleft construction—then s/he talks as if the matching question is addressable, i.e. s/he presupposes that the question is on QUD. We can express this as in (12), and illustrate it by the example in (13).

(12) **Focal question presupposition:**
If an utterance u has narrow focus over x, u (focally) presupposes a question obtained by abstracting x over (the content of) u.

(13) Did JOHN read the newspaper?
QUD = $\langle ?\lambda x.\mathsf{read}(x, \mathsf{paper})\rangle$ (*Who read the newspaper?*)

QUD update: → QUD = $\langle ?\mathsf{read}(j, \mathsf{paper}), ?\lambda x.\mathsf{read}(x, \mathsf{paper})\rangle$
(*Was it John that read the newspaper?*)

Accenting the subject as in (13) conveys the presupposition that there is already a question on QUD, viz. *Who read the newspaper?*. When this is combined with the yes/no-question, the updated shared QUD will contain two questions, as shown above. The effect can also be expressed using an interrogative cleft *Was it John who read the newspaper?*

Presuppositions are useful devices, also for introducing new facts, but doing so in a way so that the hearer takes them to form the ground relative to something else. Marga Reis has captured this succinctly, as in (14) with the illustration in (15).

(14) "A given focus-background-structure does not simply reflect what is ±known or ±given information, but it presents it as such." (Reis, 1999)

(15) Hast DU die Kaffeemaschine angelassen? (Reis, 1999, (24))
have you the coffee machine left-on
'Was it YOU who left the coffee machine on?'

Reis comments that if she were asked the question in (15), upon arrival at work one day, she would be justified in assuming that someone had left the coffee machine on the previous evening. The accented pronoun *du* must be understood as being a narrow focus, and this renders the rest of the question as ground, i.e. as providing information that is, or should be taken as, already known. Presenting new information as if it were already known is very common, both in written and spoken language. In fact, the practice is so common that it deserves a name and I will refer to this as *focal question accommodation* as in (16).[7]

(16) **Focal question accommodation:**
When an utterance u occurs which focally presupposes a question q not topmost on QUD, add q to QUD.

Before hearing the question in (15), Reis presumably had no issue relating to the coffee machine on QUD. But after hearing the question, she updates QUD not only with the yes/no-question but also with the accommodated focal question, as shown in (17).

(17) Hast DU die Kaffeemaschine angelassen?
QUD update: $\rightarrow$ QUD = $\langle ?\mathsf{leave.on}(you, \mathsf{c.machine}), ?\lambda x.\mathsf{leave\text{-}on}(x, \mathsf{c.machine})\rangle$
(*Was it you who left the coffee machine on?*)

We have now introduced enough terminological distinctions and formal apparatus to start looking at the information packaging of different types of questions. I will primarily look at the positioning of interrogative phrases and whether or not they are accented.

4 Information questions

Let us first look at utterances which are formed as requests for information. I will refer to them as *information questions*. Consider the English dialogue in (18).

[7] The term *question accommodation* was used in the TRINDI project, see Cooper et al. (2000); Engdahl et al. (2000); Larsson (2002).

(18) A: Mary is going to PARIS.
B1: Who is she going to VISIT?
B2: # She is going to visit WHO?

After A's initial statement, B might follow up with a question realised as B1 with an initial, unaccented wh-word and where the main accent falls on the verb. The option of leaving the wh-word *in situ*, illustrated by B2, is not appropriate in this context. In French, on the other hand, both options for realising information questions are used.[8]

(19) A: Marie va à PARIS.
Marie goes to Paris
B1: Qui est-ce qu' elle va voir ? *fronting + cleft*
who EST-CE QUE she FUT see
"Who is she going to visit?"
B2: Elle va voir QUI ? *in situ*
she FUT see who

The realisation in B2 involves leaving the wh-word *in situ* where it is accented, as expected at the end of the core clause. The choice between the fronted question B1 and the *in situ* question B2 depends on a variety of factors. In a recent investigation Myers (2005) found 29% *in situ* interrogatives in the Barnes-Blyth corpus of spoken French which represents a variety of registers. The most common ways of asking a direct question with a wh-word and a pronominal subject are illustrated in (20). The three types occurred with equal frequency in the corpus.

(20) a. Où tu VAS ? *fronting*
where you go
"Where are you going?"
b. Où est-ce que tu VAS ? *fronting + cleft*
where EST-CE QUE you go
c. Tu vas OÙ ? *in situ*
you go where

Myers has an interesting discussion of which discourse conditions favour the *in situ* option and proposes that they are used primarily when the dialogue participant uttering the question has strong reasons to believe that the addressee will be able to supply the answer.[9] Mathieu (2004) also concludes that the choice between fronting an interrogative phrase or leaving it *in situ* is determined by discourse factors rather than syntax. Mathieu also claims that *in situ* interrogatives are subject to certain syntactic and semantic constraints. He assumes that *in situ* interrogatives involve a phonologically null operator which raises to a clause initial position. This movement is blocked by

[8] Fronted questions may also be realised with clitic inversion, as in (i) or without inversion as in (ii).

(i) Qui va-t-elle voir?

(ii) Qui elle va voir?

[9] In terms of the information state model in (4), one could say that French speakers choose the *in situ* option when they believe that the answer is in the addressee's set of BELIEFS.

intervening scopal elements such as negation. According to Mathieu, an *in situ* question becomes ungrammatical in the presence of an intervening negation, compare his examples in (21a) and (21b). Moving the interrogative operator together with an overt wh-phrase is, on the contrary, not blocked by the intervening negation as shown by (21c).

(21) a. Tu vois qui ce soir ? (Mathieu's (1a))
you see who this evening
"Who are you seing tonight?"

b. * Il ne voit pas qui ? (Mathieu's (4a))
he NE sees not who

c. Qui est-ce qu' il ne voit pas ? (Mathieu's (4a))
who is-this that he NE sees not
"Who doesn't he see?"

Admittedly (21b) is a pretty strange question. However, I think the reason that it sounds strange is primarily due to the fact that negative questions require special discourse conditions.[10] A positive question like in (22a) can be used on many occasions, but the negated versions in (22b,c) seem to require that there is an addressable issue concerning the non-seeing of certain people, i.e. the negative proposition has to be part of the dialogue participants' ground.

(22) a. Who are you seeing tonight?
b. Who aren't you seeing tonight?
c. Who are you not seeing tonight?

If this is correct, we would expect negated *in situ* questions in French to sound more natural if the context makes the negative form appropriate and this seems indeed to be the case. Consider the following exchange. A has just complained that her children are rather picky about what they eat.

(23) A: Mon fils ne mange pas de POISSON.
my son NE eats not fish
"My son doesn't eat fish."

B: Et ta fille, elle ne mange pas QUOI ?
and your daughter, she NE eats not what
"What about your daughter? What doesn't she eat?"

As we have seen, information questions in French can be realised both with fronting of the wh-phrase and without. Contrary to English, French uses *in situ* questions as

[10] Negative yes/no-questions, on the other hand, are very common and are often used as a way of facilitating a negative reply (cf. Brown and Levinson, 1987). (i) is considered a polite way of asking a question to which the asker expects a negative reply.

(i) Don't you want to come? –No.

In Conversation Analysis, it is generally assumed that *no* is a disprefered response. By forming the question negatively, a negative response will align with the polarity of the question and thus be perceived as partly agreeing with the asker.

regular information questions, albeit under certain discourse conditions, as Mathieu (2004) and Myers (2005) have suggested. Further research is needed in order to pinpoint these discourse conditions.

I mentioned in connection with example (18) that initial wh-phrases in English are normally not accented. However, it is possible to accent an initial wh-phrase, but only in certain uses. Consider the dialogue in (24). A, B and C have been discussing a possible trip to Edinburgh. B and C are side tracked.

(24) A: So WHEN are we going to Edinburgh?
A1: # So, when are we going to EDINBURGH?

When A stresses the initial *when*, she conveys that the issue she is introducing is one that has already been raised in the conversation, but not been resolved. Accenting an initial wh-phrase in English thus may have the effect of making an issue prominent on QUD in a way that simultaneously signals that the issue is not altogether new to the dialogue participants. If A had realised the question as A1 in the same context, her utterance would have been perceived as incoherent. B and C might have concluded that A had not been paying attention to the previous conversation.

The example in (24) shows that speakers may modify the realisation of questions in subtle ways to make them fit in with the current stage of the conversation and the information states of the dialogue participants. Furthermore it seems clear that dialogue participants keep track of previous issues. We will now look at another example showing that the way a question is realised may exploit the previous turns of the conversation. Ericsson (2005) carried out a corpus study of elliptical utterances in English, French and Swedish. She found a number of instances of very short questions, as in (25).[11]

(25) A: Ta mère va bien ?
your mother is fine
B: Oui.
Yes
A1: Et ton père ?
And your father
A2: # Ton père ?

A starts off the conversation by asking if B's mother is fine (using a declarative question, see section 6). After B's positive reply, A asks the same question, as it were, about B's father. But she manages to ask this question without uttering it. Instead it seems that she reuses the previously raised question, replacing B's mother with B's father. Notice that the follow-on question in A1 is introduced by the conjunction *et*. A2 without *et* is less natural. Let us follow what happens to A and B's shared QUD.

[11] (25) is a simplified version of one of Ericsson's examples (Ericsson, 2005, 232). My analysis differs slightly form hers.

(26) A: Ta mère va bien ?
QUD update: → QUD = ⟨?be-fine(mother-of-b)⟩
B: Oui.
QUD downdate: → QUD = ⟨⟩
A1: Et ton père ?
A's LATEST MOVE: QUEST[QUD = ⟨?be-fine(x) ∧ x = mother-of-b⟩]
QUD update: → QUD = ⟨?be-fine(x) ∧ x = father-of-b⟩

After A's first question, QUD is updated with the issue under discussion. We have previously assumed that an affirmative reply leads to a downdate of QUD, and the removal of the issue. However, as we saw in the previous example, issues on QUD seem to remain available to the dialogue participants for a longer time. In (26), both A and B presumably have access to the previous utterances, e.g. A's LATEST-MOVE, as shown under A1. The minimal QUD update prompted by A1 is then the same question as in the previous move, replacing 'mother' with 'father' (I have structured the content of the issue so as to bring out the parallelism between the two questions). I take the existence and context dependent resolution of short questions as in (25) as further evidence that we need to refer to something like information states with shared QUDs in order to account for the ways questions are framed and interpreted in actual conversations.

5 Reprise questions

Although questions with the wh-phrase left *in situ* are not normally used as information questions in English, such questions frequently occur, for instance in contexts such as the one given in (27).

(27) A: Mary is going to visit [*inaudible*] tomorrow.
B: Mary is going to visit WHO?

B did not catch part of A's utterance and rephrases it with an accented wh-phrase in place of the unintelligible part. Such questions are often referred to as *echo questions*. However, they are also used when a dialogue participant requests more information about a previously introduced referent whose identity has not been sufficiently established.

(28) A: Mary is going to visit them.
B: Mary is going to visit WHO?

Bolinger (1978) suggests the term *reprise question* for both these uses and I will adopt this term here (see also Ginzburg and Sag, 2000). A reprise question is a 'replay' of (part of) a previous utterance. The reference to the previous utterance in fact is an essential ingredient in the analysis developed in Ginzburg and Sag (2000, 256ff), which I here follow. Let us look closer at what is going on in A's and B's information states when they carry out the exchange in (27). Let us assume that A knows that Mary is going to visit Sally.

(29) A: Mary is going to visit [*inaudible*] tomorrow.
A's QUD update: → QUD = ⟨?visit(m, s)⟩
B's QUD update: fails
B: Mary is going to visit WHO?
Shared QUD update: → QUD = ⟨?λx.assert(a, visit(m, x)⟩
≈ "Who did you assert (just now) that Mary is going to visit?"

When A makes her statement about Mary's impending visit, she puts this issue on her QUD, awaiting some kind for acceptance from B. B, who did not catch the name, cannot update her QUD, or can only do so in an incomplete way. Recognizing that she is unable to update QUD, B utters her reprise question, which then becomes the topmost issue on QUD. Note that this issue contains a direct referenced to the previous assertion by A, as shown also in the paraphrase in (29). The previous move need not be an assertion. It could be a command as in the following example from Ginzburg and Sag (2000, 259).

(30) A: Go home, Bob!
B: Go WHERE?
QUD update: → QUD = ⟨?λx.order(a, b, go(b, x)⟩
≈ "Where did you order me (just now) to go?"

A reprise question thus differs from an information question in always containing a reference to the previous move. In English, reprise questions normally involve accented wh-phrases *in situ* with a noticeable rising intonation.

It is instructive to look at how reprise questions are realised in German, in particular questions involving bimorphemic wh-words such as *wohin* (whereto) and *warum* (why).[12] When such a wh-word is used in an information question, the word accent always falls on the adverbial, non-wh part of the word, marked here with ´ before the accented syllable.

(31) a. Wo´hin ist KARL gefahren? *information question*
where did Karl go
b. # ´Wohin is KARL gefahren?

In a context where (31) is used as an information question, only *wo´hin* as in (31a) is possible. The realisation in (31b), *´wohin*, is inappropriate. On the other hand, in a context which calls for a reprise question, only *´wohin* is appropriate. Just as in English reprise questions, the main accent falls on the wh-word *in situ*.

(32) A: Karl ist eben nach [*inaudible*] gefahren.
"Karl has just gone to…"
B1: Er ist ´WOhin gefahren? *in situ reprise question*
B2: *Er ist wo´HIN gefahren?
B3: ´WOhin ist er gefahren? *fronted reprise question*
≈ "Where did you assert (just now) that Karl was going?"

Assuming that B did not catch all of A's statement, B1 is an appropriate utterance. B2, with the ordinary accenting pattern *wo´hin*, would not be not appropriate here. In German the distinction between information questions and reprise questions is reflected

[12] Most of the German examples in this article are taken from Reis (1992, 1999).

in the word accenting patterns and this is probably a stronger diagnostic than the positioning of the wh-phrase. In German, reprise questions optionally involve fronting of the wh-phrase, shown as B3, with the reprise accent. Fronting is also possible in Swedish reprise questions (see Engdahl, 2001, for additional discussion).

In French, as we have seen, the *in situ* strategy can be used to express information questions. But *wh in situ* is used in reprise questions as well, as shown below.

(33) A: Ton fils, il lit QUOI ? *information question*
your son he reads what
B: Des bandes dessinées.
comics

(34) A: Mon fils, il lit [*inaudible*]
your son he reads
B: Il lit QUOI ? *reprise question*
he reads what

Almost always the context will determine whether a particular utterance is an information question or a reprise. But there is probably a small difference in the way the two types are realised as well. To my ears, there is a perceptible difference in the ways the information question in (33) and the reprise question in (34) are realised. In both utterances, the wh-phrase is accented but the reprise use tends to be somewhat lengthened, with a clearly noticeable rising intonation.

Interestingly if you add a focalising adverb, as in (35a), only the reprise interpretation is available. In order to express this as an information question, you have to resort to a different construction, for instance as in (35b).

(35) a. Il lit seulement QUOI ? *only reprise*
he reads only what
b. La seule chose qu'il lise, c' est QUOI ?
the only thing he reads it is what
"What is the only thing that he reads?"

The observation that focus sensitive adverbs don't modify wh-phrases in information questions applies to English as well. Whereas *only* can associate with an accented direct object as shown in (36a), it is not possible to get the corresponding interpretation for the question in (36b)

(36) a. John only read WAR AND PEACE, not ANNA KARENINA.
b. Which book did John only read?
c. Which is the only book that John read?

Instead (36b) tends to be interpreted with narrow focus on the verb, *Which book did John only READ, as opposed to REVIEW?* In order to convey the reading where *only* associates with the questioned object, you have to use a cleft construction, just like in French. I will not pursue this topic further here, since it applies not only to questions but to relative clauses and topicalised sentences as well, i.e. constructions that involve syntactic fronting (Engdahl, 2006). The French example in (35a) is particularly interesting in that it shows that the restriction that focus sensitive adverbs don't modify wh-phrases applies also to information questions where the wh-phrase is left *in situ*.

Literal reprises and reprises of questions

After having looked at reprise questions with wh-words *in situ*, we now turn to other kinds of reprises. It is in fact quite common for dialogue participants to repeat all or part of a previous utterance. By doing so, the speaker can express incredulity and/or request confirmation that s/he has correctly understood the intended meaning. I here adopt Ginzburg & Sag's term *literal reprise* for such repetitive utterances.

(37) A: We had snow in October. (\)
B: You had snow in October? (/) *literal reprise*
≈ "Did you assert (just now) that you had snow in October?"

Notice that whereas A's utterance is rendered with a falling intonation (here indicated by \), B's reprise has rising intonation (/). Despite the name, literal reprises involve a certain amount of adaptation. For instance, deictic pronouns are shifted; 'we' in A's utterance becomes 'you' in B's reprise. Just as in the case of the reprise questions discussed above, the analysis refers to the previous utterance. Additional evidence that this is a correct analysis comes from looking at literal reprises of questions in Germanic languages.

(38) A: Hat Karl Peter gekündigt? (German, Reis, 1992)
has Karl fired Peter
B: Ob er Peter gekündigt hat? *reprise of y/n question*
if he Peter fired has
≈ "Did you just ask if he has fired Peter?"

In (38), A utters a yes/no question. B wants to make sure that she has understood the question correctly. Note the presence of the complementizer *ob* (if) and the verb final word order which is characteristic of subordinate clauses in German. These two properties strongly suggest that B is repeating the question as an embedded structure. The embedding clause is not realised, but it seems plausible that the issue that B brings up corresponds closely to the paraphrase. In Swedish, sentential adverbs are placed after the finite verb in main clauses but preceding the finite verb in subordinate clauses.

(39) A: När är du säkrast hemma? (Swedish)
when are you most-likely at-home
B: När jag säkrast är hemma? *reprise of wh-question*
when I most-likely am at-home
≈ "Did you just ask when I am most likely to be at home?"

In A's direct question, the finite verb *är* precedes the adverb *säkrast*. In B's reprise, the adverb precedes the verb, which is a strong indication that B is using a subordinate structure, motivated by the implicit reference to the preceding speech act.

The Romance languages display a more mixed pattern. French reprises of yes/no-questions require the complementizer *si* (if), as shown in (40), whereas reprises of wh-questions can be realised either as embedded questions (41:B1) or direct questions (41:B2).[13]

[13]These examples come from Claire Beyssade. More research is needed in order to find out whether the choice between direct and subordinate clause word order correlates with a difference in informa-

(40) A: As- tu vu Marie ? (French)
have you seen Marie
B: Si j'ai vu Marie ? *reprise of yes/no q.*
if I have seen Marie

(41) A: Quand vas- tu partir ?
when will you leave
B1: Quand je vais partir ? *reprise of wh-question*
when I will leave
B2: Quand vais-je partir ?
when will-I leave

In English, reprises of questions are typically formed as direct questions. This goes for both yes/no-questions, as in (42), and wh-questions, as in (43).

(42) A: Have you seen Mary?
B1: Have I seen Mary? *reprise of yes/no q.*
B2: # If I have seen Mary?

(43) A: When are you leaving?
B1: When am I leaving? *reprise of wh-question*
B2: # When I am leaving?

Using a subordinate structure, as in B2's utterances, is not standard. It appears that the way reprise questions are realised is conventionalised in different ways in different languages.

In this section we have seen that whereas information questions introduce issues on QUD, reprise questions raise questions about a preceding utterance. They typically involve an accented wh-phrase *in situ*. This realization may also be used in special circumstances such as quiz shows.[14]

6 Declarative questions

So far we have mainly looked at questions which are formally recognizable as questions. By this I mean that they contain a wh-phrase, an interrogative complementizer or are verb initial (cf (38)). We have also come across one example of a declarative utterance which is interpreted as a question, *Ta mère va bien ?* in (26). In fact, it is quite common that utterances that look, and sound, like declaratives are understood as questions. In this section I will look closer at some Swedish examples.

tion states. See Beyssade and Marandin (this volume) for additional examples and discussion of French reprise questions.

[14] Ginzburg and Sag (2000, 280ff) also recognize a type of *in situ* wh-question which differs from reprise questions in that it does not literally repeat a previous utterance. Their example (63) is given in (i).

(i) A: Well, anyway, I'm leaving.
B: OK, so you'll be leaving WHEN exactly?

Reis (1999) provides similar German examples and suggests that the effect of the *in situ* wh-phrase is to connect the question to a previous discourse on the same topic, often by asking the hearer to clarify some fact that the speaker already has, or should have, in his/her BELIEFS.

(44) a. Är du hungrig? *Y/N question*
are you hungry
QUD update: → QUD = ⟨?hungry(you)⟩

b. Du är hungrig. *assertion or question*
you are hungry
QUD update: → QUD = ⟨?hungry(you)⟩

(44a) with its verb initial word order is a typical yes/no question and can only be interpreted as such. The effect of uttering (44a) is that the issue *Are you hungry?* is put on QUD. (44b) can be understood as an assertion whereby the speaker claims that the addressee is hungry, maybe because of the way s/he behaves or looks. But it can also be understood as a question whereby the speaker requests confirmation whether or not the addressee is hungry. Just as in (44a), the effect of uttering (44b) makes the issue *Are you hungry?* available for discussion. From the perspective of what are available issues on QUD, (44a) and (44b) appear to be indistinguishable (a somewhat surprising consequence which I will discuss below). Nevertheless they need to be distinguished formally. Beyssade et al. (2004) point out that while question-formed questions license polarity sensitive items, declarative questions don't. We can provide some further evidence for maintaining a distinction between formal questions and declarative questions by looking at the Swedish modal particle *ju*. The presence of *ju* conveys that (part of) the utterance is known to the addressee, or should be taken as such.[15]

(45) Du är ju hungrig. *assertion or question*
you are PRT hungry
"You are hungry, of course." / "You are hungry, aren't you?"

If A utters (45) to B, it might mean that A realises that B is hungry, and that A had better start cooking. A might also utter (quarante-cinq) if A knows that B is hungry, maybe because of the way B is behaving, and tries to get B to realise that this is the case. (45) can also be understood as a request for confirmation, which in English often is expressed using a tag question. This shows that *ju* is compatible with a questioning illocutionary force. However, *ju* cannot be used in an overt question like in (46).

(46) * Är du ju hungrig?
are you PRT hungry

Consequently, we need to restrict the distribution of *ju* so that it occurs in declarative assertions and questions, but not in overt questions. It is often claimed that declarative questions are formally recognizable as questions because of the presence of rising intonation. However, when we look closer at the prosody, it turns out that it is quite common for declaratives to be interpreted as questions without any rising prosodic gesture. For instance, Gustafson-Čapková (2005), investigating to what extent ordinary speakers of Swedish make use of prosodic cues when structuring and interpreting spoken discourse, found that speakers will mark utterances as questions without any prosodic evidence. She let naïve subjects listen to recordings of dialogues and monologues, both planned and unplanned at the same time as they annotated transcripts. In one task,

[15]The particle *ju* is cognate with German *ja* which has similar, but not identical, uses.

the subjects had to insert punctuation marks, e.g. period and question mark, to indicate units of discourse. She was surprised at the large number of declarative utterances which were marked with a question mark even in the absence of articles like *ju* or *väl*, and without rising intonation. This was particularly common in the section of her materials which was taken from a Swedish Map Task recording where one person, called the instruction giver, tells the other person, the receiver, how to draw a path on a map with landmarks.[16] In (47) I provide an excerpt from a transcript.

(47) From Swedish Map Task (Helgason, 2004)
G= Instruction giver, R= Instruction receiver

```
1. G: och sen  fortsätter det i   en mjuk   eee   liten buktning
      and then it continues         in a soft eeh   small bend
2.    uppåt   eee  åt åt  höger  innan  jag  fortsätter  mellan
      upwards eeh  to to  right  before I    continue    between
3.    dom   här  palmdungarna
      these here palm groves
4. R: du   går  emellan  dom /?/
      you  walk between  them
5. G: ja
      yes
6. R: eee
      eh
7. G: och fortsätter norrut
      and continue   north
```

On lines 1–3, the Giver is describing the way the path takes through some groves of palm trees. On line 4, the Receiver utters *du går emellan dom* (you walk between them). This seems to be a statement about what the Giver is doing, and a prosodic analysis showed falling intonation. Still many subjects took it to be a question and inserted a question mark (/?/) after line 4. The Receiver's utterance on line 4 cannot plausibly be understood as an instruction, nor is it likely that it is a description of what the Giver is doing since the Receiver can't see his map. Statements about the addressee's activities are seldom statements. Instead they serve as check questions. Is this what you are doing or intending to do? The effect of uttering line 4 might be something along the lines of (48).

(48)
```
4. R: du   går  emellan  dom /?/
      you  walk between  them
```
QUD update: → QUD = ⟨?walk-between-them(you)⟩

The Receiver's statement gives rise to an issue on QUD, viz. the issue whether the Giver is walking between the palm trees. The Giver interprets this as a request for confirmation that the path indeed runs between the palm groves, as shown by his positive reply on line 5.

On the approach outlined in this paper, both overt questions and overt declaratives give rise to questions on QUD, questions that need to be resolved in the ensuing

[16] The Map Task experimental design was developed at the Human Communication Research Centre, Edinburgh. See Anderson et al. (1991).

conversation. It may at first seem surprising that declarative utterances should give rise to questions on QUD in the same way as questions do. But this way of looking at the dialogue participants' contributions provides a consistent account both of the dialogue participants' next turns and of the information packaging of these turns.[17] As we have seen, statements about the addressee are commonly understood as requests for confirmation. Statements about the speaker, as in (49), are often followed by a further exchange before the issue is closed.

(49) A: I'm going home now.
B: Are you?
A1: Yes.
B1: Oh, I see.

7 Concluding remarks

The information packaging of questions, just like any other utterances, reflects the information state of the speaker. We have seen that different contexts require different realizations of questions. By shifting the main accent or the position of the wh-phrase, the speaker puts different questions up for discussion. We have also seen that languages differ in what linguistic realization is used for which information state. *In situ* questions in French can be used for information questions but not so in English, German or Swedish. Reprises of questions in German and Swedish require subordinate clause word order but not so in English. I have here limited my investigation to some well-known and well-described European languages. In order to broaden the investigation, we need to look at different types of languages. But we need to be quite careful about the way we elicit the data and establish the facts. In order to be able to say that two linguistic realizations in two different languages are used to the same effect, we need to be able to correlate the utterances with types of contexts of use, and for this we need a model of the dialogue participants' information states. The model I have outlined and used in this article is in many respects too rudimentary, but it does bring out certain basic correspondences between information states and information structure which I think hold in all human languages.

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[17] But see Beyssade and Marandin (this volume) who argue that it is necessary to have a double update mechanism.

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Lexically modifying binding restrictions: Case for a variable-free binding theory

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1 Introduction: the form of the binding theory

All binding theories are developed with a relatively simple and more or less practical aim — to account for the distribution of anaphoric pronouns in natural languages. However, if we want to achieve this goal, that is, to set up a binding theory, we must implement several different (and possibly complicated) components. Of course, in any theory we must have lexical entries for pronouns themselves. We must also have some apparatus for describing restrictions on pronoun distribution: if there were no such restrictions, we would not need a binding theory. Just some means for describing restrictions is not enough, however, because we need also to connect our formulated restrictions with the specific pronouns of some language. Thus, we need to implement some mechanism that would allow to impose our restrictions on the actual pronouns.

Consider the most standard variant of the Binding Theory by Chomsky (1981) and Reinhart (1983)[1]. Under this variant (henceforth, "the standard theory"), lexical items are divided into several classes. One class is formed by "normal" lexemes, and several other classes contain only anaphoric pronouns. The membership in an anaphoric class may be implemented via the use of features like [+reflexive] and [+pronominal]. The restrictions on pronoun interpretation are implemented through filters ("principles of the binding theory"). The general form of a filter is "an expression from class A is subject to restrictions l, m, n". The actual restrictions are formulated using the c-command relation, the coindexing relation, and the set of "distance" relations (for instance, we may use such relations as "to be together in a minimal finite clause" or "to be together in a minimal non-finite clause"). In such a system we may express, for instance, a filter forbidding members of some referential class when there is an expression that is in the coindexing relation with the expression in question, and also in the

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[1]Though it is now clear that these theories need serious amendments to account for the actual natural language data, they will do as an example of the binding theory of a certain form. Since it is the form of possible binding theories that we are interested in, we are not concerned with with the specific properties of specific implementations.

c-command relation and in some distance relation with it — that would be a prototypical filter for a natural language pronominal.

Thus, lexical items for pronouns contain the information about their class, and restrictions on binding are directly assigned to pronoun classes. What will be of main concern for us in this paper is that there is an important consequence of choosing this form for our binding theory: because binding restrictions are imposed on pronoun classes, and the membership in these pronoun classes is assigned to lexical items, nothing that happens after we insert the needed lexical items into numeration (as we would say under the descendants of the framework in which the standard theory was formulated) may change the binding restrictions of a pronoun. Or, to put it differently, the binding restrictions of a pronoun embedded in a constituent A cannot differ from the binding restrictions of the same pronoun embedded in a constituent B that includes the constituent A. Under the standard theory, a lexical item in a structure may never affect the binding restrictions of another lexical item.

The structure of this paper is as follows. Our Section 2 first reviews Russian anaphoric system and Russian *sam* 'himself' intensifier system, and then presents new data on pronoun complexes of the form [pronoun + *sam*]. Such complexes are analogous to the complex pronouns of, e.g., Norwegian, but are closer to free word combinations than those. The problem with these complexes is that the binding restrictions of pronouns in them are different from the binding restrictions of 'bare' pronouns. Thus, it is a counterexample to the theories like the standard Binding Theory, in which lexical items may never affect binding restrictions of other lexical items, and therefore we are in need of some other binding theory that can account for the Russian pronoun complexes (and, desirably, for complex pronouns of other languages as well).

However, in Section 3 we do not immediately depart for the journey of finding such a theory, but take a different perspective. Namely, we describe a major problem of the variable-free binding theory of Jacobson (1999): this theory nicely accounts for much problematic binding data in natural language, but does not provide an account for restrictions that are imposed on individual pronouns and not on binding as such (in other words, those restrictions that are captured by the binding principles of the standard theory)[2].

Then in Section 4 we start to build a foundation on which our proposal about pronouns will rest: we argue that intensifiers denote predicates of a specific kind — dynamic predicates. We then propose a rough sketch of a variant of D(iscourse) R(epresentation) T(heory) with dynamic predicates accommodated into it.

Finally, in Section 5, we propose that pronoun meanings contain dynamic predicates just as intensifiers do. An important difference between the two types of linguistic expressions is that while intensifiers use purely "discourse" dynamic predicates, anaphoric dynamic predicates usually use certain syntactic relations in their update rules. This proposal can account for the problematic Russian pronoun complexes de-

[2]Recently, Jacobson herself put forward a proposal to this aim in Jacobson (2005). The main idea of Jacobson's proposal is that a pronoun that is subject to the principle B constraint shifts the usual denotation of the verb it combines with. While the normal denotation of a transitive verb is a set of pairs that contain some pairs of the form A×A, the shifted denotation will preserve all pairs where the arguments are not equal, but will not include any A×A pairs. Of course, it may be easily extended to a more general case. We leave an accurate comparison of our account and Jacobson (2005)'s account for future work.

scribed in Section 2, and provides a possible extension to the variable-free theory of Jacobson (1999) allowing it to maintain its main achievements while accounting for the binding restrictions on specific pronouns.

Section 6 concludes the paper.

2 Pronoun complexes in Russian

2.1 Russian anaphoric pronouns

Russian has two (main) anaphoric pronouns[3]: an anaphor *sebja* 'himself' and a pronominal *on* 'he'. The binding domain for the reflexive *sebja* 'himself' is the minimal finite clause. *sebja* 'himself', like the English reflexive *himself*, must have a c-commanding antecedent[4] DP inside of *sebja* 'himself' binding domain, but, unlike *himself*, it has strict subject orientation: *sebja* 'himself' may be bound only by regular (Nominative) subjects, and not just by any commanding DP in the domain, (1b)[5]. The fact that the binding domain for *sebja* 'himself' is the minimal *finite* clause ensures that when a reflexive is embedded in a non-finite clause, it may be bound both by the non-finite clause subject (the closest subject to it) or by the subject of the finite clause in which the non-finite clause of the reflexive is embedded, (1c).

(1) a. Petja$_i$ skazal, što Vasja$_j$ uvidel sebja$_{*i/j}$.
Petja told that Vasja saw himself.

b. Petja$_i$ pokazal Vasje$_j$ sebja$_{i/*j}$.
Petja showed Vasja himself.

c. Petja$_i$ poprosil Vasju$_j$ [PRO$_j$ nalit' sebe$_{i/j}$ čaju].
Petja asked Vasja PRO to-pour himself tea.

The binding domain for the Russian pronominal *on* 'he' is different from the binding domain of *sebja* 'himself' — it is the minimal clause, not the minimal finite clause. *on* 'he', as pronominals always do, must be free in its binding domain — that is, its antecedent cannot be a c-commanding DP that is inside of its binding domain. However, since the binding domain of *on* 'he' is its minimal clause, it may be bound by the subject of the matrix clause in examples like (2c).

(2) a. Petja$_i$ skazal, što Vasja$_j$ uvidel ego$_{i/*j}$.
Petja told that Vasja saw him.

b. Petja$_i$ pokazal Vasje$_j$ ego$_{*i/*j}$.
Petja showed Vasja him.

[3]There are several other anaphoric pronouns in Russian, but they will not be relevant for our discussion.

[4]We use "to have an antecedent" as a cover term for the terms "to be bound" and "to be coreferent". Sometimes we also loosely use "to be bound by A" as a synonym for "to have an antecedent A", when the difference between binding and coreference is not relevant.

[5]The actual data is a bit more complicated, since there is a number of constructions with non-canonical subjects in Russian. For instance, *nužno* 'need' has a "Dative subject", which may bind reflexives. The questions of what is the subject in Russian and what properties of subjects and almost-subjects make them relevant for binding are intriguing, but are definitely beyond the scope of this paper.

c. Petja$_i$ poprosil Vasju$_j$ [PRO$_j$ nalit' emu$_{i/*j}$ čaju].
Petja asked Vasja PRO to-pour him tea.

Since the antecedent of *on* 'he' cannot be in the same minimal clause with it, it is impossible to directly test whether this pronoun has anti-subject orientation or not. However, there is a class of sentences where the pronoun is contrastively focused (here and below we indicate focusing by the use of SMALL CAPITALS), and there is an antecedent for it in a higher clause, while there is also a definite description that is anaphoric to the same antecedent. In this case the pronoun and the c-commanding DP in its clause may end up coreferent, though it happens not because the DP binds the pronoun, but because they are co-bound by the same DP. Of course, such configuration, in the general case, must be forbidden by the binding theory, not only because it violates Principle C, but also due to the fact that if such configuration would be allowed, we would have to accept as grammatical many sentences that are actually illicit, see, e.g., Reinhart (2000) for discussion. Regarding the data in (3), we do not want to say that this restriction on covaluation should be dispensed with; moreover, both examples in (3) are not perfect, so we assume that this restriction actually works. However, while it is somehow possible to get the relevant reading when the direct object and the pronoun are co-bound, (3b), it is absolutely impossible, despite heavy stressing, when it is intended that the subject and the pronoun are co-bound, (3a). It would be possible only if there was some other constraint, besides the constraint on covaluation, that makes (3a) worse than (3b). We conclude that *on* 'he' indeed has antisubject orientation.

(3) Vasja$_i$ prišel k Petje$_j$, i...
Vasja came to Petja, and...

a. * ...Petja$_j$ pokazal Vasje$_i$ EGO$_j$.
...Petja showed Vasja him.

b. ? ...Petja$_j$ pokazal Vasje$_i$ EGO$_i$.
...Petja showed Vasja him.

2.2 Russian intensifier *sam* 'himself'

There are several lexical variants of intensifier *sam* 'himself' in Russian; each variant modifies DPs, but their meanings and their syntactic and phonological properties are different (see Kibrik (2003), Ljutikova (2002), a.o.). For instance, (4) contains one of prenominal *sam*'s that may modify non-pronominal DPs; its interpretational import, in the informal setting in which all studies of Russian intensifiers proceeded, would be something like this (a modified definition from (Kibrik, 2003, p. 321)): "the referent of the modified DP may be found at the end of the scale supported by some contextually salient ranking".

(4) Sam general priexal.
Himself general came.
[The] general himself came.

On the other hand, one of the postnominal *sam*'s, cf. (5), according to (Kibrik, 2003, p. 322), has the following import: "the speaker thinks that there are several potential participants of the situation P [described by the clause in which *sam* 'himself' is present] for some [thematic] role *i*, and the hearer's knowledge allows her to infer that X [the referent of the DP modified by *sam* 'himself'] is not among these potential participants, but the speaker wants to say that X is the actual participant of P [with the role *i*]".

(5) Petja udaril sebja samogo.
Petja hit himself(pronoun) himself(intensifier).
Petja hit himSELF.

In this paper, we will not be concerned with the exact formulation of the meanings of different *sam*'s. It will suffice for our purposes to note that all such meanings are highly contextualized — the *sam* 'himself' exemplified in (4) makes reference to a certain ranking, but the most salient ranking picked up by it may be different even in two neighbour sentences: the *sam* 'himself' in (6a) uses the ranking of importance in the military hierarchy, while the *sam* 'himself' in (6b) makes reference to the local hierarchy of the rare-shavers.

(6) Today soldiers are waiting for a visit of some officers, and they know that the local officers do not shave too much, and that the captain is the champion: he shaves as frequently as once in a week. The soldiers also know that the captain shaved just two days ago, so he is not expected to shave in the following five days. After one of the soldiers sees the local officers meeting the officers who just arrived, he shares what he has seen with the others:

a. Sam general priexal, ...
Himself [the-]general came, ...
[The] general himself came...

b. ... i (daže) sam kapitan pobrilsja.
... and (even) himself [the-]captain shaved.
... and (even) the captain himself shaved.

The *sam* from (5) is dependent of the similarly subtle changes of the context, cf. (7) and repeated (8), now put in an appropriate context. Though all events of hitting are more or less uniform, in (7) Vasja is unexpected to be the hit person, while in (8) it is Petja who is unexpected to be hit:

(7) Vasja wanted Petja to hit Petja himself, but ...

... naoborot, Petja udaril Vasju samogo.
... vice versa, Petja hit Vasja himself.

... #Petja udaril sebja samogo.
... Petja hit himself(pronoun) himself(intensifier).

(8) Petja actually wanted to hit Vasja for what he did, but Vasja evaded, and surprisingly...

... #Petja udaril Vasju samogo.
... Petja hit Vasja himself.

... Petja udaril sebja samogo.
... Petja hit himself(pronoun) himself(intensifier).

So (for each version of *sam*) there is always a set of referents such that if a DP denotes such a referent, than it may be modified by (this version of) *sam*. Then the meaning of *sam* may be viewed as a predicate, though the set of individuals of which it is true constantly changes. We call this kind of meanings **dynamic predicates**, and will return in section 4 to the discussion of how one can formally describe it, and what consequences the existence of such words as *sam* 'himself' has for the semantic theory.

2.3 [pronoun + *sam*] complexes

Now we are ready to turn to the main empirical point of the paper. While there are several different *sam* 'himself' intensifiers in Russian, one of them is particularly interesting for us, because it shrinks binding domains of the pronouns it modifies. This variant of *sam* 'himself' has a specific intonation pattern distinct from those of other *sam*'s, and may be used only in cases when the whole DP it modifies is contrastively focused. But the most striking evidence that renders it different from other *sam*'s is that the binding domain of the pronoun it modifies gets narrowed to the minimal clause — other lexical variants of *sam*, associated with different intonation and, possibly, linearization restrictions, may never affect the binding possibilities of pronouns.

As was noted in Section 2.1, the Russian pronominal *on* 'he' cannot stay with a c-commanding "coindexed" DP in the same minimal clause, except for very special contexts as in (3b). However, when it is modified with this variety of *sam* 'himself', it *must* find an antecedent inside its minimal clause[6]:

(9) Lena$_k$ ... .
Lena ... .

a. Anja$_i$ pokazala Maše$_j$ [EJO SAMU]$_{*i/j/*k}$.
Anja showed Masha [her herself].

b. Anja$_i$ pokazala Mašu$_j$ [EJ SAMOJ]$_{*i/j/*k}$.
Anja showed Masha [to-her herself].

c. Brat Anji$_i$ pokazal Mašu$_j$ [EJ SAMOJ]$_{*i/j/*k}$.
Anja showed Masha [to-her herself].

d. * Anja$_i$ poprosila Mašu$_j$ [PRO$_j$ nalit' [EJ SAMOJ]$_{i/j}$ čaju].
Anja asked Masha [PRO to-pour [her herself] tea].

The unmodified *on* 'he' in (2) could not accept the ancedent in the same clause, yet the same pronoun modified with *sam* 'himself' in (9) must find its antecedent exactly in the same domain where the unmodified *on* 'he' could not — its (minimal) clause,

[6]The order of the two non-subject DPs in examples like (9a) and (9b) may vary without affecting the acceptability, as long as the pronominal DP is contrastively stressed. Russian is a scrambling language, and many kinds of intraclausal movement affecting the linearization is allowed. Throughout this paper, we just try to use the most neutral linear order.

(9a) and (9b). Moreover, the antecedent must c-command the pronoun, as shown in (9c). That the domain in which the modified *on* must find its antecedent is the minimal clause and not the finite clause is shown by (9d): in the analogous (2c), the pronoun may be bound by the finite clause subject, and in (9d) it may not[7]. The unmodified *on* bears two binding constraints: first, it must not be in the same minimal clause with its antecedent, and secondly, it must not be bound by the subject. However, when *on* 'he' modified by *sam*, an additional constraint is added, namely, that the pronoun must have a c-commanding antecedent in its minimal clause (which overrides the first of the two original constraints, but preserves the second).

As for *sebja* 'himself', a similar change in binding restrictions occurs when it is modified by this version of *sam*: the binding domain, which is the minimal finite clause for the unmodified *sebja*, gets narrowed to the minimal clause. When in a finite clause, (10a), [*sebja* + *sam*] has the same binding restrictions as the bare *sebja*, cf. (1b). However, when embedded into a non-finite clause, (10b), *sebja* in the [*sebja* + *sam*] complex cannot be bound by the subject of the matrix clause, unlike the bare *sebja* in (1c).

(10) a. Petja$_i$ pokazal Vasje$_j$ [SEBJA SAMOGO]$_{i/*j}$.
Petja showed Vasja [himself himself].

b. Petja$_i$ poprosil Vasju$_j$ PRO$_j$ nalit' [SEBE SAMOMU]$_{*i/j}$ čaju].
Petja asked Vasja PRO to-pour [himself himself] tea.

To sum up, when the specific variant of the intensifier *sam* 'himself' adjoins to an anaphoric pronoun, it poses an additional constraint on the pronoun interpretation, in addition to the original constraints: namely, the pronoun modified by *sam* must have a c-commanding antecedent in its minimal clause. This constraint may in principle override those of the pronoun original constraints (as in the [*on* + *sam*] case) that are incompatible with it, but preserves all other constraints. Thus, the contribution of *sam* is compositional[8].

Pronoun systems containing complex pronouns formed by a basic pronoun and some element more or less compositionally adding a new binding constraint are not rare in natural languages. To name a few, even the English anaphor *himself* has emerged as a result of the development of the pronoun-intensifier [*he* + *self*] complex; Hellan (1988) extensively discusses the Norwegian anaphoric system that is very alike to the Russian system described above — the Norwegian anaphoric system is formed by

[7] It may not be bound by the finite clause object *Maša* either, because *Maša* binds the subject of the minimal clause of *on* 'he', so under this construal the pronoun would be "coindexed" with the PRO subject of its minimal clause which is impossible.

[8] The non-compositional part of the story about one constraint overriding another may be easily explained via Gricean reasoning. If the pronoun bears the constraint K and *sam* — the constraint L that is not compatible with K, if the speaker would want to use K, she should not add *sam* that bears a contradictory constraint. Hence, if she used *sam*, she wanted to use the constraint L and not K.

This story by itself, however, does not justify the use of *sam* when it is incompatible with the original restrictions of the pronoun it modifies. But there is another story doing that job: Russian does not have a pronoun (or pronoun complex) that may be bound by a c-commanding non-subject DP in its minimal clause, since *sebja* 'himself' cannot be bound by non-subjects, and *on* 'he' cannot be bound by an antecedent in the same minimal clause. It is only natural then to assume that this situation is serious enough to force speakers to use constraint overriding, because it will help them to fill the gap in the anaphoric system.

two basic pronouns, corresponding to Russian *sebja* and *on*, and two complex pronouns formed with a former intensifier (historically related to the Old English *self*). The basic pronouns are just the regular anaphor and pronominal, and the complex pronouns have an additional constraint narrowing the domain in which they must have an antecedent, just as in the Russian case. The classical work of Reinhart and Reuland (1993) (among other works on the same subject) relates the distribution of the complex [anaphor + intensifier] in Dutch with the lexical properties of the verb: intransitive verbs allow bare anaphors, and transitive ones allow complex anaphors. On the other hand, there is a number of studies of fine semantic distinctions between the simplex and the complex anaphors, such as Pica and Snyder (1997), who argue that complex reflexives, unlike simplex reflexives, denote "the same individual in some different aspect"; Rooryck and Wyngaerd (1998), who argue that full DPs denote sets of time-slices, and that bare anaphors require identification with a single time-slice in the denotation of the antecedent while complex anaphor require identification with the whole set of the antecedent time-slices; Lidz (2001), who, basing on the Madame Tussaud contexts, proposes that there are two kinds of reflexives, Pure-Reflexives and Near-Reflexives, which in Dutch correspond to the simplex and the complex reflexives respectively. While investigating such fine meaning distinctions is a valuable task, we have little to say on the subject in this paper, and concentrate on the binding domain changes and not on the other semantic effects distinguishing simplex and complex pronouns.

The important point here is that Russian is different from the mentioned above languages because of the special status of the [pronoun + intensifier] complexes. While in other languages investigated to date such complexes are treated as complete lexical entries, we argue that Russian complexes are constructed in syntax, not in lexicon. This fact is of great importance, since the classical form of the binding theory, as we noted above, bears a serious limitation: it cannot allow one lexical item to change the binding constraints of some other lexical item in a structure, and that is exactly what happens in the Russian case.

What evidence there is in favor of the view that the Russian pronoun complexes are free word combinations? Well, frankly speaking, one can hardly find a sufficient set of data to convince everyone, not only in our case, but in each case when the subtle question of what exactly should count as a lexical entry is involved. But here are several arguments in favor of our claim: *sam* carries an independent stress; *sam* is inflected; other lexical variants of *sam* are clearly words and not morphemes; *sam* bears specific information-structural restrictions (the contrastive focus requirement) and the specific intonation pattern, which is hardly possible for a morpheme, but is normal for a word. Last, but not least, the marginality of the construction in question speaks for our point too: only about a half of our informants accept such complexes, while the others reject them. It is understandable if we assume that those speakers who do not accept the pronoun complexes do not have this specific *sam* and therefore cannot combine it with the pronouns — a viable hypothesis in view of the fact that there is a lot of different *sam*-lexemes in Russian; but it is unlikely that a half of the speakers have novel complex one-word pronouns while the other half does not.

While none of these arguments is decisive on its own, we suppose that when they all are put together, they present sufficient evidence for our claim that the Russian com-

plexes are two-word combinations, and not one-word complex pronouns. However, if you are not convinced by those, here is another argument: Suppose that the Russian complexes are actually one-word. Be that as it may, we know that in many languages there are anaphors emerged from [pronoun + intensifier] combinations. It cannot be that such complexes were one-word from the very beginning: first, they needed to be free combinations of pronouns and intensifiers, and only after that the single pronoun word may have been formed. Even if you do not believe that the Russian case represents such two-word stage, you nevertheless need to accept that there is such a stage in the anaphor development process. And if you do, then all consequences for the form of the binding theory survive, even if not on the basis of the Russian data, but on purely theoretical grounds.

3 Variable-free binding theory: how to account for the binding principles?

The previous section has revealed (as we hope) one of the empirical constraints on the form of a viable binding theory: such a theory must be formulated in a way that allows one lexical item to modify the binding restrictions of another lexical item (in certain structural configurations). In this section we will consider a different, purely theoretical, problem relevant for a particular formulation of the binding theory by Jacobson (1999), and then in subsequent sections we will provide a single solution for the problems discussed in these two different lines of the paper.

The binding theory of Jacobson (1999) has been shown to be superior to the more "classical" generative versions of the binding theory based on Chomsky (1981) and Reinhart (1983). But the first and foremost, Jacobson's theory involves an even more drastical change in the perspective than just the change of such module of the grammar as the binding theory, because it eliminites assignment functions from our semantics.

In classical Montagovian semantics, meanings of all natural language expressions are functions from assignment functions to something else. It is a consequence of the fact that this semantics makes use of variables. If we allow variable use, then we must provide some means of determining the values of free variables in a sentence in order to get its truth value. Otherwise, we will not be able to interpret a sentence with unbound variables. Assignment functions are what does this job: they supply values for the free variables. To add an example, the meaning of a sentence "A man walks" is a function from assignment functions to truth values. One needs to supply some "contextually salient" assignment function to obtain an actual truth value for this sentence. In this specific case, the function is a constant one, as it would be just for every other sentence without free variables. The fact that the function from assignment functions to truth values denoted by this sentence is constant means that its truth value is not dependent on the choice of a particular assignment function. We could just have omitted the assignment function layer for such sentences. But the function denoted by "He walks", in contrast with the previous case, will be a non-constant function, since different assignment functions may pick up different actual referents for the pronoun *he* that denotes a variable and (this variable) is unbound.

What if we would want to throw away assignment functions while preserving the standard variable-containing semantics? Nothing good, of course, because those sentences that contain free variables will not be able to get a truth value. It is exactly the existence of variables that may be unbound that forces us to add the assignment function layer to our semantics.

Jacobson in a series of papers argues that we can safely eliminate variables from our semantics and thus also eliminate the need for the assignment functions layer, which in turn will make our semantic theory much easier — the meanings of natural language expressions will not have to be functions from assignment functions to something else, and will become just this "something else".

There are several steps that will allow us to do this move. First, we change the denotations of the pronouns. Under the classical semantics, pronouns' meanings are variables, possibly accompanied with some sortal restrictions (e.g., the male and atom restrictions on *he*). Under the Jacobson system, these become identity functions[9]:

(11) a. The standard view:
$[\![he]\!]^g = \lambda$g.if male(g(x)) & ATOM(g(x)), then g(x);
undefined otherwise.

b. The variable-free view:
$[\![he]\!] = \lambda$x.if male(x) & ATOM(x), then x;
undefined otherwise.

Thus the semantic type of a pronoun under Jacobson's variable-free theory is not the individual type e (or, rather, ⟨a,e⟩, where a is the type of assignment functions), as in the standard semantics, but ⟨e,e⟩, the type of functions from individuals to individuals.

Having changed the meanings of some DPs that way, we have to change our view of semantic composition accordingly: if we leave things as they are, no pronoun will be able to occur in an argument position designated for individual-denoting arguments because of the type mismatch. To fix that, we introduce the **g** rule ("Geach rule") that allows us to combine a pronoun with some other expression while passing up the information that there is some unbound pronoun left inside the resulting meaning[10]:

(12) If there is a meaning α, then there is $\mathbf{g}(\alpha) \stackrel{\text{def}}{=} \lambda$f.$\lambda$x.$\alpha$(f(x)).

Informally, this rule says that if some expression accepts simple arguments, then its **g**-ed version accepts functional arguments, and may then combine with an argument for the function it has combined with to produce a regular meaning. In other words, **g** allows to pass functionality up. (In fact, **g** is just a Curried version of functional composition: $\mathbf{g}(\text{f})(\text{h}) = f \circ h$.) If we want to compute the meaning of a sentence like "He walks", we first have to apply **g** to the verb *walks*. That will turn λy.walk(y) into λf.λx.walk(f(x)).

[9]Throughout this paper, we use lambda notation for variable-free denotations just as a convenient means to express functional terms, without assuming actual variable use and lambda abstraction. All variables in such formulas are bound, and thus their meanings would be constant functions from assignment functions under the standard semantics. They need a model to be interpreted, but they do not need an assignment function.

[10]Actually, in the complete system of Jacobson (1999) we would need a rule that modifies not only the semantic type, but also the syntactic category — which would be a combinator of Combinatory Categorial Grammar. Here we omit the syntactic side of the theory to keep the things simple.

Now we combine this with the meaning for *he*, λz.z, and the result is λx.walk((λz.z)(x)) = λx.walk(x). Note that this meaning is not a truth value. Instead, it is a function from individuals to truth values that should be applied to some individual picked up from the context to return a truth value. The sentence inherits the properties of the pronoun it contains: the pronoun wants to be bound, but if it cannot be, it passes the binding requirement along the semantic composition, until there is a binder. This is essentially Jacobson's answer to the question of what should become of sentences "with free variables" under the variable-free semantics — such sentences denote functions from individuals or something else to truth values.

Now we know how to treat pronouns and pass an unbound pronoun up. What is left is to introduce a rule that will allow us to bind a pronoun. Jacobson (1999) defines a type-shift rule **z** to that purpose:

(13) If there is a meaning α, then there is $\mathbf{z}(\alpha) \stackrel{\text{def}}{=} \lambda$f.$\lambda$x.$\alpha$(f(x))(x).

Informally, the rule says that if some expression has two argument slots, then its **z**-ed version combines with a functional argument, which in turn has an unfilled argument, and binds the argument of the function to its own second argument. We can demonstrate how z works on the following example:

(14) Bill hates himself.
⌈himself⌉ = λx.x.
⌈hates⌉ = λz.λy.hate(z)(y).
z(⌈hates⌉) = λf.λx.hate(f(x))(x).
z(⌈hates⌉)(⌈himself⌉) = λx.hate((λy.y)(x))(x) = λx.hate(x)(x).
z(⌈hates⌉)(⌈himself⌉)(Bill) = λx.hate(x)(x)(Bill) = hate(Bill)(Bill).

It is easy to see that the more complex structures would require application of both **g** and **z**, as well as the fact that **z** may be generalized. The interested reader may find the details of such refined implementation in Jacobson (1999), but here we need only the basic understanding of how the variable-free works.

There are various nice empirical payoffs for choosing Jacobson's theory, see, e.g., Jacobson (1994) on "i-within-i" effects, Jacobson (1996) on binding into conjuncts, Breheny (2003) on implicit argument binding, Shan (2004) on the need for variable-free binding for any semantics with alternatives, and Russell (2005) on functional parasitic gaps. However, the system as it is suffers from one serious problem: it does not have means for incorporating pronoun binding restrictions. We cannot use anything similar to the classical binding principles that are implemented as filters on representations, because there are no representations rich enough to apply such filters to under the specific Combinatory Categorial Grammar view of syntax and semantics adopted in Jacobson (1999). But even if we switch from the categorial-grammar syntax of Jacobson to a richer syntax, thus losing many of the strong points of Jacobson's proposal such as direct compositionality and the non-existence of intermediate levels of syntactic representation, be it LF or anything else, we will simply inherit the problems of the standard binding theory (like the problem discussed in the previous section) and will still need the most complicated rules of it, such as Rule I of Grodzinsky and Reinhart (1993), involving trans-derivational computation, for computing grammaticality of coreference construals of pronouns. Here we will not discuss this way out, mainly

because we strongly believe that one should not reject simpler grammars just because someone has already implemented a solution for some problem in a more complex framework when no one has tried to provide a solution for the same problem in a simpler framework.

The simplest approach (apparently) preserving direct compositionality was implemented by Szabolcsi (1992) and Dowty (1999), among others. The idea is that we can build the binding restrictions into the syntactic category of the pronoun. This, however, presupposes that binding is built into pronoun syntactic categories and meanings, and not into type-shift rules like Jacobson's **z**. Under this kind of approach, the pronoun first combines with the predicate of the type ⟨e,t⟩, and then with the binder. In other words, the pronoun is a function of type ⟨⟨e,t⟩,⟨e,t⟩⟩. After combining with the predicate, it merges the argument slots of the binder and of itself, and then it combines with the binder filling both slots with the same meaning, that of the binder.

For instance, *hates himself* will have the reflexive meaning λx.hates(x)(x), and when we combine it with *Bill*, we get hates(Bill)(Bill).

To implement Principle B in this theory, we make the meaning and category for *he* such that the pronoun could not be bound before it meets the first S category expression on its way. For instance, the pronoun may take not two, but three arguments, the first one being the verb of its own clause, the second — the verb of the higher clause, and the third — the binder. After combining with the first two, the pronoun will merge an argument slot of the former with an argument slot of the latter, and then will fill the both with the binder's meaning. So the meaning for *he left* in the sentence *Bill says that he leaves* will be λf.λx.f(leave(x))(x). The meaning of *says that he leaves* will be, consequently, λx.say(leave(x))(x), and the meaning of the whole sentence — say(leave(Bill))(Bill). The Principle B effect is accounted for because of the requirement to combine with two verbs before the pronoun may combine with the binder DP.

However, this view has significant shortcomings. First, if we have such meaning of *he* that allows us to account for the Principle B effect, then this version of *he* will never be free, because we have built the requirement to be bound into its meaning and category. So we will need some different omonymous lexeme *he* for sentences where this pronoun remains free[11]. Moreover, we will need a trans-derivational rule analogous to Rule I of Grodzinsky and Reinhart (1993) to prevent this free version of *he* to be coincidentally coreferent with some other c-commanding DP in its clause. The moral is that if we accept that binding and binding restrictions are built into pronouns, we have to have a more complex view both of the lexicon and of the grammar.

Secondly, such a theory of binding restrictions would suffer from the same problem as the standard Chomsky-Reinhart theory — namely, that it does not allow one lexical item to modify the binding restrictions of another lexical item.

To sum up, Jacobson's theory must be expanded with some account for the data

[11] For sentences like "The boy said that she slept" it is easy to adopt Jacobson's analysis for free pronouns, under which we accept that meanings of such sentences are of type ⟨e,t⟩. But it will not carry over to sentences in which there is no second verb, like in the simple "She slept", because here we would need to take out of the context not only some salient individual, but also some verb to combine with the pronoun in order to get a truth value, and this is, of course, very problematic, because it is not that "She slept" is different from "Ann slept" and that its meaning must include some additional verb, unlike the meaning of "Ann slept".

usually accounted for by the principles of the binding theory. However, there are several restrictions on possible analyses:

(15)
1. To eliminate the need for Rule I or any its analogue, we must state the binding restrictions in such a way that they may govern both bound-variable and coreference readings of pronouns.
2. Binding restrictions must not use any intermediate levels of syntactic representation (or else we will have to give up on direct compositionality).
3. One lexical item must be able to modify binding restrictions of another lexical item.

Below we will present a theory that satisfies these three restrictions. Our analysis will significantly increase the complexity of the grammar, though. But we argue that this additional complexity is required on independent grounds. The next section discusses a slight shift in the perspective on the dynamics of natural language that is needed to account for the Russian intensifier *sam*, and then in section 5 we will use the results of section 4 to build a theory of binding restrictions that is compatible both with the data presented in section 2 and the variable-free framework of Jacobson (1999) shortly discussed in this section.

4 Towards a possible solution: dynamic predicates as intensifier meanings

Dynamic semantic theories like DRT capture one of the aspects in which the interpretation of linguistic expressions is dependent on the context, that is, the anaphoric potential of linguistic expressions. What we need to account for dynamic predicates is to define a theory with an even richer notion of context in which there would be place for dynamic interpretation of such special predicates. In this section we set up such a theory.

We take as a point of departure the simple DRT language L of van Genabith et al. (prep) and extend it to a new language L_{dyn}.

The vocabulary of L consists of a set of discourse referents **DiscRef**, a set of definite relations **Name**, sets of non-logical constants $\mathbf{Rel}^n$ of arity n, and the set **Sym** of DRT connectives {=, ¬, ⇒, ∨}. In L_{dyn}, we add to these a new set **DynPred** that consists of dynamic predicate symbols.

Traditionally DRS-s consist of two parts: a set of discourse referents **U** (the universe) and a set of conditions **Cond**. We add to these two a third (possibly empty) set, which contains the current definitions of dynamic predicate states, **DynPredState**, and the symbol := { ... } ∈ Sym, defining the syntax of DRS-s as follows:

(16) The syntax of L_{dyn}:

1. The definition of DRS-s:
   If U ⊆ DiscRef; Cond is a possibly empty set of condions, and DynPredState is a possibly empty set of dynamic predicate states, then ⟨U, Cond, DynPredState⟩ is a DRS.

2. The definition of dynamic predicate states:
   If DS ∈ DynPren, and $x_i, \ldots, x_n \in$ DiscRef, then DS := $x_i, \ldots, x_n$ is a dynamic predicate state.
3. The definition of conditions:
   (a) if $x_i, x_j \in$ DiscRef, then $x_i = x_j$ is a condition.
   (b) if N ∈ Name and $x_i \in$ DiscRef, then N(x) is a condition.
   (c) if P is a predicate constant in Rel^n and $x_1, \ldots, x_n \in$ DiscRef, then P(x_1, …, x_n) is a condition.
   (d) if K is a DRS, then ¬K is a condition.
   (e) if K_i and K_j are DRS-s, then $K_i \vee K_j$ is a condition.
   (f) if K_i and K_j are DRS-s, then $K_i \Rightarrow K_j$ is a condition.

However, while we have added a new set of symbols and a new part of DRS-s containing dynamic predicate states, we do not intend to give them a model-theoretic interpretation. Instead, the models for L_{dyn} will be exactly the same as the models for L: the members of DynPred will not be in the domain of interpretation functions $\mathscr{I}$; and the dynamic predicate states DS will not affect the verification of DRS-s.

But if our extensions do not affect the semantics of the DRT language, then what do they do? We use them not in the process of interpreting DRS-s, but in the process of constructing DRS-s from natural language expressions. In addition to usual rules converting syntactic trees to discourse referents and DRS conditions, as described in detail in, e.g., Kamp and Reyle (1993), we introduce several new rules. These are predicate-specific introduction and update rules, and a general satisfaction rule that works for every dynamic predicate.

We first sketch the rules needed to account for the "unexpected" *sam* described in section 2.2. Let its meaning be a dynamic predicate **Unexp**: $\lceil \text{sam}_{unexpected} \rceil = \lambda x.\text{Unexp}(x)$. For starters, we define a transition from the empty DRS to the one which contains a clause "Unexp := {}" in its DynPredState:

(17) Unexp introduction rule:
If there is a DRS ⟨U, Cond, DynPredState⟩ U is empty, and Cond is empty, and Unexp ∉ DynPredState, then add to this DRS's DynPredState the state Unexp := {}.

Next, we need to provide means to update this state. In order to do this, we first define the notion of discourse referent equivalence class in (18), modeled after (Kamp and Reyle, 1993, p. 235), and then introduce the update rule (19), which must be executed in the process of analyzing any DP.

(18) Two discourse referents x and y belong to the same equivalence class A relative to DRS K iff there is either a condition x = y ∈ Cond_K or two conditions x = z and z = y ∈ Cond_K.

(19) Unexp update rule:
Let the processed DP occupy a semantic slot *s*, DynPredState contain a state Unexp := {…, x_i, …}, and the set of discourse referents X contain all x_i.
First, change the state Unexp := {…} to the state Unexp := {}.

Then for any discourse referent y such that y is not in the same equivalence class of discourse referents with any x_i *in* X, and the processing language user knows that y is unexpected to occupy *s*, and DynPredState contains a state Unexp := {...}, change this state into Unexp := {..., y}.

It is evident that this definition makes reference to the speaker's (or the hearer's) knowledge and expectations. The processing mechanism containing such rules is not fully determined by the linguistic input — instead, it depends both on linguistic input and the psychological state of the language user. Though such a mechanism may at first seem strange, we argue that such dependency on the specific language user is exactly what we need to account for the actual data. If a person A considers somebody's participation in a certain event very improbable, a person B (that possibly has other sources of information and thus a different base assumptions for making inferences) may think quite the contrary.

It may be argued, however, that sometimes the degree of unexpectedness may be determined by the linguistic input. For instance, it is hardly possible for anyone to hit oneself, and thus the Agent of a hitting event is very unlikely to be the Patient of the same event. But since this too is subject to variation from one situation to another, the import of the linguistic context seems to be cancelable. We think that it shows us that the best way to account for such import of the linguistic context is through the modeling of the language user reasoning, and not through the direct update of the dynamic predicate state. For instance, we may develop postulates allowing the language user to infer that the Agent of hitting is unexpected to be the Patient of the same hitting event in the absence of other relevant bases for inferences.

Now, when we have both the introduction rule and the update rule for Unexp, we may turn to the interpretation of *sam*. The first part is rather trivial: we assume that its meaning is processed in the same way as meanings of regular adjectives denoting regular, non-dynamic, predicates. The specific properties of dynamic predicate meanings are realized through a special satisfaction rule, that allows us to erase the condition that makes reference to a dynamic predicate — an impossible operation for normal conditions that must survive and then receive the model-theoretic interpretation. The satisfaction rule is general for all dynamic predicates (in other words, the specific dependencies on the language user's state of mind are encoded in the introduction rule and the update rule only).

(20) Dynamic Predicate Satisfaction rule:
Let $DP_k \in$ DynPred,
$DP_k := \{x_i, x_{i+1}, \ldots\ x_n\} \in$ DynPredState, and
$DP_k(y) \in$ Cond.
If there is x_j, where $i \leq j \leq n$, such that y is in the same equivalence class with x_j, then erase the condition $DP_k(y)$ from Cond. Otherwise, the derivation crashes[12].

To sum up, we have developed a framework that allows to capture the dynamism of language users' representations of certain special predicates. Normal expressions receive the same treatment as in the standard DRT and do affect truth-conditions. Dynamic predicates, on the other hand, are constantly updated correspondingly with the

[12] Alternatively, one may define as ill-formed any complete DRS in which there are conditions containing symbols from DynPred.

speaker's or the hearer's knowledge and beliefs, and do not affect truth-conditions directly, but restrict the process of constructing a DRS. It is relatively easy to assign to dynamic predicates their respective introduction and update rules basing on their import, once the mechanism for this is elaborated, though the exact analyses for, e.g., different versions of *sam* are beyond the scope of this paper.

It is worth noting that if we are to define the context change potential of the DRS-s of our new L_{dyn} language (and we leave this to the future work), the notion of information state (see Heim (1982), Groenendijk and Stokhof (1991)) will become insufficient. The information state corresponding to a DRS may be thought of as a package consisting of a proposition and a set of discourse referents available for subsequent anaphora. In a system that allows dynamic predicates, we will need to add to this package a record of the contents of DynPredState. Defined this way, information states will become implicitly dependent on the language user, since the contents of DynPredState is not determined by the linguistic input — instead, it is determined both by the linguistic input and the language user's reasoning.

When this is made clear, it becomes evident that this version of DRT represents not the semantics of linguistic expressions that is equal for all language users, but rather the semantics *and* (the part of) the user-dependent context. However, our update rule in (19) is defined so that if the Unexp state is not introduced by the introduction rule, the update rule cannot work. On the other hand, if DynPredState does not contain the state of a certain predicate, then the truth-conditional semantics just runs as usual, but the occurence of a linguistic expression denoting a dynamic predicate leads to the derivation crash. So in principle, we may restrict the un-classical part of the theory (as long as there are no dynamic expressions in the linguistic input) by just taking away the introduction rules. If we do so, then there will never arise a triggering configuration for the update rules and the satisfaction rules, and thus we will just return to the classical semantics without dynamic predicates.

Alternatively, one may define the predicate-specific rules in a different way, namely, to eliminate the introduction rule and to allow the update rule to introduce a new dynamic predicate state. Then it will be possible to have certain special triggering configurations that force the update rule to work only when it is actually needed. A most radical and convenient choice of such a special configuration would be a constituent containing the actual dynamic predicate. Then the costly computation based on the language user's knowledge and beliefs would be invoked only when it is really needed[13].

One more important point concerns the relation between dynamic predicates and presuppositions. The notion of presupposition may be defined in many various ways, depending on the specific theory. If we classify an expression as presuppositional on the basis of the fact that it makes the whole utterance to be inappropriate (to lack the truth-value) when certain contextual restrictions are not met, then it follows from the Dynamic Predicate Satisfaction rule that dynamic predicates are presuppositional in this sense.

[13]If we believe that this system models the human language faculty, then a question arises: which of these two possibilities does correspond to what happens inside our head? Again, we leave this question for future psycholinguistic research, but cf. Fedorova and Yanovich (2005) that, if on the right track, presents an argument in favor of the constant update view.

However, dynamic predicates lack some properties that unify the traditionally recognized members of the class of presupposition-inducing expressions, such as definite descriptions or factive verbs: dynamic predicates do not allow projection and accommodation in the same way as definite descriptions or factive verbs do. For instance, it is well-known that the whole sentence will not inherit a presupposition induced by some presuppositional expression if the presupposition may be bound by (that is, identified with) the part of some accessible DRS (see van der Sandt (1992), among many others, on the Binding Theory of presuppositions). Thus (21) does not inherit the presupposition of the existence of the king of France because the presupposition is satisfied by the antecedent of the conditional.

(21) If there is a king of France, then the king of France is bald.

However, in (22) we cannot accommodate $sam_{unexpected}$ by adding a condition to this point to some accessible DRS. It is in line both with the empirical data and with our analysis. To test if such accommodation is possible, we may construct a discourse like this:

(22) a. Esli by ja ne ožidal, čto Vasja udarit sebja, to ja by skazal,
If SUBJ I not expected that Vasja would-hit himself, then I SUBJ said
čto ...
that ...
"If I would not expected Vasja to hit himself, then I would say ..."

b. ... Vasja udaril sebja samogo.
... Vasja hit himself(pronoun) himself(intensifier)
"Vasja hit himself."

If the dynamic predicate restrictions might be accommodated like presuppositions, then uttering first (22a) would allow the speaker to utter (22b) without committing himself to the claim that he actually does not expect Vasja to be the Patient of hitting. But it does not: uttering (22b) may not be successful if the speaker does not actually believe in this unexpectedness. This constitutes a dramatical contrast with sentences like "If there is a king of France, then the king of France is bald", in which the entire sentence does not inherit the presupposition of the definite description. These facts are consistent with the theory outlined above: under our analysis, the Dynamic Predicate Satisfaction rule checks the DynPredState part of a DRS, and not the condition part. Hence nothing in the condition part may help us to satisfy the rule.

If we compare the behaviour of presuppositions and dynamic predicates in a local context, both put restrictions on it, but the difference in their effects is explained by their respective relations to model-theoretic interpretation. Presuppositions are in a sense normal conditions, that is, they require some propositional content to be present in the context in order for them to be satisfied. On the other hand, dynamic predicates restrict possible mind states of the language user, and do not receive any direct interpretation. Thus no propositional content of the context may satisfy them: it must be made by changing the language user's state of mind.

If, on the other hand, we will view the process of presupposition and dynamic predicate satisfaction/resolution globally, then we will see another distinction (which is still related to the first one, though): while presupposition resolution crucially involves, in

theories like that of van der Sandt (1992) and related work, a specific process of finding the appropriate binder or accommodation site, the resolution of dynamic predicates is much simpler: if the predicate may not be satisfied by the local context, it may not be satisfied at all. While the propositional part of context is structured, and we may accommodate a presupposition in many parts of this structure, it does not make sense to "accommodate" a dynamic predicate to a speaker's state of mind as it were a minute ago: all that matters for language users is their state of the mind as it is now. And it is only natural, since we cannot actually change the mind of ours as it was a minute ago, or as it will be in a minute.

5 From intensifiers to pronouns: How to build binding restrictions into pronoun meanings

In the previous section we have developed a theory for dynamic predicates and demonstrated how it helps to account for the interpretational import of the intensifer *sam*. In this section, we propose that binding conditions of anaphoric pronouns are dynamic predicates too.

It is evident that anaphoric pronouns have in their meanings some presuppositions. For instance, the referent of *he* must be male and atomic. Every theory of pronouns should somehow account for the existence of such 'trivial' constraints on pronoun reference. What we propose is that binding conditions may be represented via analogous conditions, if these conditions denote not usual predicates, but dynamic predicates corresponding to structural binding domains.

Suppose that we have a dynamic predicate ReflMinClause that is defined in such a way that when it meets any DP, it contains discourse referents introduced by all DPs c-commanding the processed DP and which are in the same minimal clause with it. Then if we just add to the conditions male(x)&ATOM(x) in the meaning of *himself* a condition ReflMinClause(x), it will do the job usually performed by Condition A: by the Dynamic Predicate Satisfaction rule, if the referent of *himself* may not be identified with the referent of some c-commanding DP in the same minimal clause, the derivation crashes (instead of being filtered out because of the wrong coindexing by Principle A, as in the classical Binding Theory)[14].

The first good point about this analysis is that it allows to construct a binding theory without indexes and filters on representations. Secondly, it allows us to govern both bound-variable and coreference construals of pronouns without performing transderivational computation, since it is not the binding that is checked but the identity of reference itself[15].

[14] A binding theory very similar to the just outlined account was proposed by Branco (2001): Branco defines several sets of referents, different sets being accessible for different binding classes of pronouns. Thus, he has sets A, B, C and Z, corresponding to binding principles (the set Z being introduced to account for long-distance anaphors). These sets are constantly updated in the process of derivation, and DPs may choose their referents only from their corresponding sets.

[15] As for the apparent contrexamples to (the traditional) Principle B, widely discussed in the anaphoric literature, in which one and the same individual is present in two different discourse guises, the two DPs in such cases are most likely to introduce discourse referents that do not belong to the same equivalence class.

Our proposal also fits well with the variable-free theory of Jacobson (1999), since it does not require any syntactic representational levels and packs the binding conditions into lexical meanings (and "unpacks", that is, realizes them, in the process of constructing a DRT representation from the syntactic output). Of course, it is not that the introduction of dynamic predicates does not make our grammar more complex, but we argue that this complexity is needed to account for linguistic expressions of a certain kind in general, not for anaphoric pronouns only. So the cost of introducing dynamic predicates is at least much less than that of indexing, Rule I, and other devices developed just in order to account for pronoun binding constraints.

Last but not least, under our analysis there is just no problem of one lexical item compositionally modifying the binding constraints of another lexical item in the structure. Since the binding constraints are just part of meaning, they can be composed by regular semantic composition rules, and thus the Russian pronoun complexes described in section 2.3 may be accounted for. It is as easy as it could be: actually, while the problem for the traditional binding theories is how it can be possible for one lexeme to modify binding restrictions of another, in our theory a different research problem arises: why two-word complexes of the form [pronoun + intensifier] may turn into single words so fast — what exactly makes them different from other free word combinations from the perspective of historic development?

Thus all three requirements on the possible binding theories in (15) are met by our analysis of binding conditions as dynamic predicates. What is left is to develop an analysis for the Russian data presented in 2.3, which will serve as an illustration of how our mechanism works.

We define several dynamic predicates corresponding to structural domains. There will be two predicates containing all discourse referents of c-commanding DPs in some minimal domain: **MinClauseCommand** and **FiniteClauseCommand**; and two predicates containing discourse referents that are either non c-commanding the current DP or outside of its minimal domain: **NonMinClauseCommand** and **NonFiniteClauseCommand**. We will also need two predicates **Subject** and **NonSubject** to account for subjective and anti-subjective orientation.

The meaning for *on* 'he' will include conditions NonMinClauseCommand(x) and NonSubject(x). The meaning for *sebja* will include conditions FiniteClauseCommand(x) and Subject(x). Finally, the meaning for *sam* will include the condition MinClauseCommand(x).

The conditions for the [*sebja* + *sam*] complex will be FiniteClauseCommand(x) & Subject(x) & MinClauseCommand(x). Since at any moment of the DRS construction the referents of which MinClauseCommand is true will be the subset of referents of which FiniteClauseCommand is true, it is equivalent to just MinClauseCommand(x) & Subject(x). It corresponds to the data: [*sebja* + *sam*] loses the possibility to be bound by the subject of the the minimal finite clause that *sebja* has.

On the other hand, the conditions for [*on* + *sam*] will be NonMinClauseCommand(x) & NonSubject(x) & MinClauseCommand(x). Here we arrive at a problem: the two conditions NonMinClauseCommand and MinClauseCommand are contradictory. Our data shows that the actual behaviour of this complex is such as it would be if the first constraint, inherited from *on*, was overridden by the constraint introduced by *sam*[16].

[16]As (3b) shows, this constraint may be overridden sometimes, though such examples remain some-

We propose a pragmatic explanation for the fact that it is the constraint inherited from the pronoun that is overridden. Here is the pragmatic reasoning behind this: one of the two constraints NonMinClauseCommand and MinClauseCommand must be canceled; the only import of *sam* is the introduction of MinClauseCommand; so if this constraint does not survive, there would be no point in adding *sam* at all. At the same time, NonMinClauseCommand is one of the two binding constraints that the pronoun *on* bears. So even if it is overridden by the constraint of *sam*, the pronoun still has some important binding-theoretic import (not to mention that it bears syntactic category that allows the whole DP to occupy an argument position, and several important features such as gender and number). Thus the conditions for the [*on* + *sam*] complex are NonSubject(x) & MinClauseCommand(x) (note that it is parallel to what remains from the conditions on [*sebja* + *sam*] after we eliminate the condition that becomes superfluous).

Thus the treatment of anaphoric pronouns themselves is relatively easy. What is more complex is the definition of update rules for the dynamic predicates corresponding to structural domains. If we would not have introduced dynamic predicates for an independent reason, the very idea of doubling the traditionally syntactic relations in the semantics may seem very controversial[17]. However, since the introduction of dynamic predicates has independent motivation, the problematic step that we have to take to account for anaphora is much less large. The difference between dynamic predicates for the intensifier *sam* and for anaphoric pronouns is that the states of the latter represent structural domains, while the states of the former represent some aspects of the structure of the language user's state of mind. However, the overall mechanism seems to be the same, though the update rules for predicates of these two types will have crucial differences. We illustrate with a sample update rule:

(23) MinClauseCommand update rule:
Let DynPredState contain a state MinClauseCommand := {…, x_i, …}, and the set of discourse referents X contain all x_i.
First, change the state MinClauseCommand := {…} to the state MinClauseCommand := {}.
Then for any discourse referent y such that y is not in the same equivalence class of discourse referents with any $x_i \in X$, and y is introduced by a DP that c-commands the processed DP and is in the same minimal clause with it, and DynPredState contains a state MinClauseCommand := {…}, change this state into MinClauseCommand := {…, y}.

There are two problems with this formulation. The first problem is that it makes direct reference to syntactic relations. Of course, it is not desirable in any theory, but in principle we have just three options: 1) to make the binding theory a part of syntax; 2) to make direct reference to syntactic relations in semantics; and 3) to pass the

what degraded.

[17] Though it is evident that any approach that tries to consistently make less work in syntax and more work in semantics will have to do so. There are even more radical proposals than ours in the literature: e.g., Fox and Lappin (2005) try to develop a system for computing quantifier scope that allows to compute the actual scope pattern in semantics on the basis of the underspecified output of syntax and a system of scope filters, and they have to introduce semantic predicates corresponding to such purely syntactic relations as "to be outside of the island of".

relevant syntactic relations from syntax to semantics in some way or other. The first option seems to be impossible in view of the fact that we need to constrain both bound-variable and coreference readings. As for the last two, it is hard to say which one is better: both are bad enough, but we still have to choose one of them. Note also that other DRT analyses for binding constraints suffer from the same problem too. (Kamp and Reyle, 1993, p.238) restrict themselves to simple structures that does not contain any other DPs but the subject and the direct object of the verb, and they implement Principle A by forcing the reflexive in the direct object position to be coreferent to the subject, and Principle B by forbidding for the pronominal in the direct object position to be coreferent with the subject of the same clause. The relevant syntactic relations are not expressed directly in their construction rules, but are introduced implicitly through labeling of the DPs in the triggering configuration. So in order to broaden the empirical coverage of this binding theory, one will need to either widen the relevant triggering configurations or to use syntactic relations explicitly in the rule. It is worth noting that Berman and Hestvik (1997), who put forward a much more explicit and complete system for restricting pronominal reference in the DRT framework, choose the second way and use in their rule definitions clauses like "(the DP introducing the discourse referent) A does not c-command (the DP introducing the discourse referent) B within (the DP introducing the discourse referent) B's binding domain" (from their (27)). Thus while the reference to syntactic relations in DRS constructuon rules does increase the complexity of our grammar, we cannot see a solution that would allow us not to use syntactic relations and at the same time to implement a reference resolution mechanism for pronouns in DRT.

The second problem of (23) is that it is very inefficient: every time we meet a DP, we must recalculate the dynamic predicate state starting from the empty state. This problem, however, is much less serious, since it is easy to make a computationally optimized set of rules equivalent to this update rule. In such a system, there would be a rule that will add every processed DP to the relevant dynamic predicate states, and there would be also rules for several special nodes which would either clear the contents of the dynamic predicate state (for MinClauseCommand, such a rule will run at every S category), or recompute the contents of the predicate starting from an empty state/restore a saved value of the predicate state contents (it will be needed in the case some tree node has two branches with DPs in each — after processing one branch, we will need to restore the contents of the predicate state as it was when we departed for processing this branch). Again, if we believe that the mechanism for pronoun resolution should correspond closely to what people actually do when they use language, then the question of choice between different implementations of update rules becomes an empirical question, since different optimizations may cause different side effects when people process linguistic expressions, but it is hard to argue for any specific implementation on purely theoretical grounds.

6 Conclusion

In this paper, we set up a framework that allows to account for the import of intensifiers in natural language and for the binding restrictions of anaphoric pronouns. This proposal allows us to solve the empirical problem of the Russian pronoun complexes

that cannot be accounted for under the standard binding theory using filters defined for pronoun binding classes. At the same time our proposal constitutes an extension to Jacobson's variable-free binding theory allowing to account for binding restrictions of individual pronouns without introducing such syntactic devices as indexing and grammatical trans-derivational rules such as Rule I.

It is not that the resulting system is as simple as the original DRT or Jacobson's variable-free framework, but we argue that the complexity of our theory adequately corresponds to the complexity of language. We divide components of meanings of natural language expressions to regular conditions and dynamic predicates. Regular conditions are interpreted truth-conditionally, and thus constitute a propositional content of a discourse; on the other hand, dynamic predicates restrict the language users' states of mind during the processing of a discourse. They are not inherited by the "meaning" of the discourse, but restrict the possible states of processing agents.

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Possessors, Goals and the Classification of Ditransitive Predicates: Evidence from Hebrew

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1 Introduction

Across languages, ditransitive predicates often allow two different realization schemes for one of their arguments. A well known example of this is the English dative alternation, exemplified in (1), where the second object of *send* is realized either as a direct object or as a prepositional phrase. Against the background of the widely held assumption that differences in morphosyntax correspond to differences in semantic predicate-argument relations, accommodating such variable realization schemes poses a challenge for theories of the syntax-semantics interface.

(1) a. Ann sent a box to Beth. (Object–oblique)

b. Ann sent Beth a box. (Double object)

Isolating semantic factors that motivate or license the two coding strategies found in the dative alternation and its equivalents in other languages has been the goal of much research. One factor that has been pointed out by many authors (Pinker 1989; Jackendoff 1990; Krifka 1999; Harley 2003; *inter alia*) is the availability, for a given predicate, of two semantic structures, one associated with **causation of possession**, the other with **causation of directed motion**. For example, on the event semantics account of Krifka (2004), a ditransitive verb with the arguments 'Ann', 'Beth' and 'the box' involves one of the two meanings in (2).

(2) a. ∃e∃e'[AGENT(e, Ann) ∧ THEME(e, box) ∧ CAUSE(e,e') ∧ MOVE(e') ∧ THEME(e', box) ∧ GOAL(e', Beth)]

b. ∃e∃s[AGENT(e, Ann) ∧ THEME(e, box) ∧ CAUSE(e,s) ∧ s:HAVE(Beth, box)] (= Krifka 2004:7, (45))

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In (2a), an agent acts on a theme, causing it to move to a goal. In (2b), on the other hand, an agent acts on a theme, bringing about a state in which the theme stands in a possession relation to a possessor. In Krifka's analysis, as in many others, the causation of possession meaning corresponds or gives rise to a direct object realization of the non-theme argument, while the causation of directed motion meaning corresponds or gives rise to an oblique realization of that argument.

The core idea of this analysis – relating a realization frame with two core arguments to a causation of possession meaning, and a frame with a core argument and an oblique to a causation of directed motion meaning – can be found both in syntactic approaches (e.g. Harley 1995, 2003; Hale and Keyser 2002) and semantic approaches (e.g. Pinker 1989; Goldberg 1992; Gropen et al. 1989). Underlying such analyses is the assumption that these two meanings are available to all ditransitive verbs that participate in the alternation in English. However, recent work by Rappaport Hovav and Levin (2005) (henceforth RH&L, see also Levin and Rappaport Hovav 2002) reveals systematic behavioral differences between different ditransitive verbs. RH&L argue extensively that while verbs like *send* and *throw* have both a causation of possession (COP) and a causation of directed motion sense, verbs like *give* unambiguously encode a COP meaning. The fact that such verbs show the English dative alternation is, they claim, not motivated by semantic factors, but rather by information structural ones.

In this paper I demonstrate a systematic difference between the argument realization schemes available to different ditransitive verbs in Hebrew. As in English, Hebrew ditransitive verbs have two options for realizing their non-theme argument. This argument can occur with two prepositions, *el* and *le*, both roughly equivalent to English *to* (glossed as EL and LE in the examples)[1].

(3) a. hu Salax et ha-xavila **le**-sami
he send.PST.3MS ACC the-package LE-Sami
He sent the package to Sami.

b. hu Salax et ha-xavila **el**-sami
he send.PST.3MS ACC the-package EL-Sami
He sent the package to Sami.

I present new data bearing on the behavior of the pronominal forms of *el* and *le*. The full data set reveals that the distribution of the two prepositions is more complex than has been recognized in previous studies (Landau 1994; Botwinik-Rotem 2003). I argue, based on this data, that their distribution is in fact determined by the semantic type of the predicate they occur with. Specifically, building on RH&L's proposal that some ditransitives are monosemous and others polysemous, I suggest a basic distinction in the semantics of ditransitive verbs between:

[1] In Hebrew examples throughout, I use 'S' for the palatal fricative, 'x' for the velar fricative and ' for the glottal stop. Throughout this paper, I do not represent the voiceless and the voiced pharyngeal fricatives, since they are pronounced as a velar fricative and a glottal stop respectively in my variety of Hebrew.

— Verbs that encode **causation of possession** (COP, e.g. *give*).
— Verbs that encode **causation of change of location** (COL, e.g. *walk* (causative)).
— Verbs that are compatible with both meanings (e.g. *send*).

My claim is that the availability of two Hebrew realization schemes, with *le* and with *el*, corresponds to the availability, for a ditransitive verb, of the COP and/or the COL meaning respectively[2]. I demonstrate that the correlation between frames and meanings in Hebrew is more strict and more transparent than in e.g. English; while in English monosemous verbs can still show the dative alternation, in Hebrew, verbal meanings completely determine the distribution of prepositional marking. Hebrew verbs that show an alternation between the two marking schemes are analyzed as having a meaning that is underspecified between COP and COL, and is hence compatible with both. However, this can only be seen in the pronominal domain, where more distinctions are encoded than in full nominals. I also propose, based on suggestive crosslinguistic evidence, that the three-way semantic distinction above determines morphosyntactic patterns across languages.

2 The distribution of *el* and *le*

2.1 A first generalization

Hebrew ditransitives seem initially to fall into two classes, according to the realization of their non-theme argument. Some verbs, which I refer to as *type I* verbs, realize their non-theme argument either with *le* or with *el*. These are exemplified in (4). Other verbs of this type are given in (5)

(4) yosef holix et axiv el ha- / la- xeder
Yosef walked ACC brother.his EL the / LE.def room
Joseph walked his brother to the room.

(5) **Type I verbs**:
heziz 'move', *hixnis* 'put into', *lakax* 'take' (someone somewhere), *daxaf* 'push', *he'if* 'fly' (caus.), *hesi'a* 'drive'.

Other verbs, which I refer to as *type II*, realize their non-theme argument **only with *le***, to the exclusion of *el*. These are exemplified in (6). Verbs of this type are given in (7).

(6) dani natan le / *el nurit et ha-tapu'ax
Dani gave LE / EL nurit ACC the-apple
Dani gave Nurit the apple.

(7) **Type II verbs**:
maxar 'sell', *horiS* 'bequeath', *hilva* 'loan', *he'enik* 'endow', *kana* 'buy'

[2]By using *causation of change of location* rather than the standard *causation of directed motion* throughout this paper, I aim to differentiate the specifically locative meaning of verbs like causative *walk* from the more abstract meaning of transfer verbs like *send*. In principle, COL-verbs are verbs of causation of directed motion that are not compatible with caused possession readings.

From the meanings of the verbs in (5) and (7), and given the patterns available to them, a natural conclusion is that *el* is a marker of locational goals and can replace *le* with verbs that take locational goal arguments[3].

(8) ***el* and *le* realization schemes, first generalization**: (cf. Landau 1994):
(a) *le* can occur with any ditransitive.
(b) *el* can replace *le* in the context of directional goals.

The function of *el* as a marker of locational goals in Hebrew can be seen also outside the ditransitive domain:

(9) hitkaravti el ha-delet
approach.PST.1.SG EL the-door
I approached the door.

However, in the next section I show that this generalization is empirically inadequate.

2.2 Refining the generalization

A complication of the picture outlined so far is introduced by the realization schemes available to pronominal arguments of ditransitive verbs. Hebrew has a set of independent subject pronouns, but non-subject pronouns take the form of inflected prepositions. For example, a pronominal argument of *el* occurs as person-number-gender inflection on the preposition, as shown in (10)[4]. I will refer to the form realizing a preposition and its pronominal argument as the *inflected form* of the preposition.

(10) a. el ha-yeled
EL the-boy
to the boy

b. el=av
EL=3.M.SG
to him

Looking at the distribution of inflected prepositions with the two verb types discussed earlier, an interesting asymmetry arises. While type II verbs behave in accordance with the generalization in (8), the behavior predicted for type I verbs does not carry over to the pronominal domain. Type II verbs show the same realization schemes for pronominals as for NPs; in both cases only *le* and not *el* is licensed, as shown in (11).

(11) natati la / *eleha tapu'ax[5]
give.PST.1.SG LE.3.F.SG / EL.3.F.SG apple
I gave her an apple.

[3]For both verb classes, the relative order of the non-subject NPs is determined by various factors, most importantly information structure and animacy. What exactly these factors are is an important question which, to my knowledge, has not been thoroughly investigated. In any case, word order generalizations are orthogonal to the distributional generalizations I draw in this paper and to the theoretical explanation I offer for them. Hence I do not discuss them.

[4]The same is true of direct object pronouns, which are realized as inflection on the accusative marker *et*.

Type I verbs on the other hand, fail to license *le* with a pronoun, even though they license *le* with NPs. This can be seen in the context of relative clauses, which in Hebrew call for resumptive pronouns. Thus, the verb *holix* 'walk' that license either preposition in (4) fails to license *le* with a pronoun in (12). Another example is given in (13).

(12) ha-xeder$_i$ Se- yosef holix elav$_i$ / *lo$_i$ et axiv
the-room that- Yosef walked EL.3.M.SG / LE.3.M.SG ACC brother.his
The room that Joseph walked his brother into.

(13) a. ron heziz et ha-sapa el ha- / la mitbax
Ron moved ACC the -sofa EL the- / LE.DEF kitchen
Ron moved the sofa to the kitchen.

b. ron heziz elav /*lo et ha-sapa
ron moved EL.3.M.SG LE.3.M.SG ACC the-sofa
Ron moved the sofa there.

The behavior of pronouns clearly shows that, contrary to the accepted generalization in (8), it is not the case that *le* can always replace *el*. In particular, pronominal *le* cannot replace pronominal *el* with type I verbs. The generalization about the realization schemes available for ditrasitives must therefore be modified as in (14).

(14) ***el* and *le* realization schemes, modified generalization**:
a. In the non-pronominal domain, *le* can always replace *el*.
b. In the pronominal domain, *le* and *el* are mutually exclusive:
– *le* marks arguments of type II verbs.
– *el* marks arguments of type I verbs.

Cases in which both prepositions are available to mark full nominal arguments but where only *el* is available with a pronoun are not restricted to ditransitives. As shown in (15), some monotransitive verbs that occur with *el* such as *hitkarev* 'approach' in (9) above, show the same pattern.

(15) a. hitkaravti el ha- / la delet
approach.PST.1.SG EL the / LE.DEF door
I approached the door.

b. hitkaravti eleha / *la.
approach.PST.1.SG EL.3.SG.F / LE.3.SG.F
I approached it/her.

This exemplifies a general change in spoken Hebrew, where *le* is taking over the functions of *el* in the nominal domain. Against the backdrop of this process, the strong ungrammaticality of *le* in the pronominal domain is even more striking. This is discussed in more detail below.

[5]Inflected *le* is a clitic and must always immediately follow the verb if unstressed. The result is that in this and following examples involving pronouns, the order of the non-subject arguments will always be *le*-NP<Theme. This is a purely morphological fact about pronominal *le* and does not reflect any generalization about the relative order of the arguments of a ditransitive. As mentioned above, that order is determined by various factors, most importantly information structure.

2.3 A further complication

While the modified generalization in (14) holds for the data discussed so far, further data show it to be empirically inadequate. There are verbs whose behavior with nominal arguments groups them with type I verbs, i.e. they license both the *le* and the *el* realization scheme. However, unlike other type I verbs, these verbs also license both schemes with pronominal arguments. This is exemplified in (16):

(16) a. Salaxti le / el rina et ha-sefer
sent.PST.1.SG LE / EL Rina ACC the-book
I sent Rina the book.

b. Salaxti la / eleha et ha-sefer
sent.PST.1.SG LE.3.F.SG / EL.3.F.SG ACC the-book
I sent her the book.

I refer to verbs that behave like *Salax* 'send' as Type III verbs. A list of such verbs is given in (17).

(17) Type III verbs:
masar 'pass', *he'evir* 'transfer', *zarak* 'throw', *fikses* 'fax', *heSiv* 'return', *hevi'* 'bring'

The paradigm in (16) shows that inflected *el/le* are not in fact mutually exclusive as stated in (14). The new generalization that emerges from the full consideration of both nominal and pronominal data is stated in (14).

(18) ***el* and *le* realization schemes, new generalization:**
(a) In the non-pronominal domain *le* can always replace *el*
(b) In the pronominal domain:
— Type I verbs: *el*
— Type II verbs: *le*
— Type III verbs: *el* and *le*

The distribution of verbs and prepositional arguments is summarized in (19).

(19) **Realization of non-theme arguments with Hebrew ditransitive verbs**:

VERB		*le*	*le*+pron	*el*+pron	*el*
TYPE I:	*holix* 'walk' (causative)	+		+	+
TYPE III:	*Salax* 'send'	+	+	+	+
TYPE II	*natan* 'give'	+	+		

3 Explaining the distribution

The table in (19) shows a systematic correspondence between verb type and realization scheme for pronominals. While type III verbs alternate between pronominal *el* and *le*, the other types allow only one to the exclusion of the other. This strict correspondence is maintained for *el* with non-pronominals, but not for *le*: verbs that fail to license

pronominal *el* (i.e. type II verbs), also do not license non-pronominal *el*, but verbs that fail to license pronominal *le* nevertheless alternate between the two schemes with non-pronominals. In this section I suggest an analysis of what determines the availability of inflected prepositions for a given verb. I begin with the pronominal data, as it provides the more systematic pattern, and then move on to discuss the patterns of full NPs.

My proposal here is that the three verb types delineated by the realization patterns form three cohesive semantic classes, which can be informally characterized as follows:

— TYPE I: Verbs of **caused change of location** (*walk*, *move*)
— TYPE II: Verbs of **giving** (*give*, *sell*)
— TYPE III: Verbs of **transfer** (*send*, *pass*)

My hypothesis is that, in the pronominal domain, *el* is an allative marker, while *le* is a dative marker. The Hebrew dative is used for marking possessors/experiencers, while the allative is used to express goals. The distribution of pronominal *el* and *le* is determined by the availability for a verb of COL and COP meanings. Verbs of caused directed motion have only the COL meaning available to them, and are hence only compatible with pronominal *el*, the allative marker. Verbs of giving have only the COP meaning available, and are only compatible with *le*, the dative marker, for both pronouns and NPs. Verbs of transfer are underspecified: they describe events of transfer, which include transfer of location as well as, optionally, transfer of possession. Therefore, their meaning can be resolved to both COP and COL. The Hebrew pronominal data thus provide support for RH&L's claim that some ditransitive verbs are associated with only one event schema, while others are compatible with two.

That *el* is a marker of directional goals is uncontroversial and is clear from the examples discussed so far. That the preposition *le* is generally a marker of possessors, also outside the ditransitive domain, can be seen in so called "possessor raising" constructions such as (20), as well as in the run-of-the-mill possessive constructions, equivalent to English *have* constructions, as in (21).

(20) hu ganav li et ha-Sa'on
he stole LE.1.SG ACC the-watch
He stole my watch.

(21) yeS li Sa'on
exist LE.1.SG watch
I have a watch.

Whether or not a verb can occur with a particular inflected preposition depends therefore on its meaning, and whether that meaning is compatible with the function of the preposition. **Verbs of giving** encode causation of possession, their non-theme argument is a possessor, and they are therefore only compatible with pronominal *le*, the dative marker. **Verbs of caused directed motion** encode change of location, and are only compatible with the allative marker, pronominal *el*. **Verbs of transfer** have underspecified meanings. They encode causation of a movement from a source to a goal. This movement may or may not result in possession. Since conceptually such verbs

can describe events involving both a change of location and causation of possession, they can occur with either marker.

The meanings of the three verb classes can be represented as in (22), inspired by Krifka (2004):

(22) **Types of ditransitive meaning**:
(a) *natan* 'give' (COP reading):

$\exists e \exists s$ [AGENT(NP_{agent},e) $\wedge$ CAUSE(e,s) $\wedge$ s: HAVE($NP_{possessor}$, NP_{theme})]

(b) *holix* 'walk' (COL reading):

$\exists e \exists s$ [AGENT(NP_{agent},e) $\wedge$ CAUSE(e,s) $\wedge$ s: AT (NP_{theme},$NP_{location}$)]

(c) *Salax* 'send' (transfer reading):

$\exists e \exists e'$ [AGENT(NP_{agent},e) $\wedge$ CAUSE(e,e') $\wedge$ GO (e',NP_{theme}, NP_{goal})]

These representations capture the semantic distinctions between the three classes of verbs, thus accounting for the Hebrew data. Moreover, they have some decisive advantages over the standard decompositional analyses of ditransitives. The standard decompositional analyses of ditransitives discussed earlier posit both a causation of possession and a causation of location meaning for all ditransitives. The reason for this is that these analyses have generally focused on English, where verbs of giving and verbs of transfer both alternate[6]. However, the data discussed so far clearly shows that this is not the case for Hebrew, where only verbs of transfer (i.e. verbs like *Salax* 'send') alternate.

Even for alternating verbs, positing ambiguity between two lexical representations is not the most attractive solution. Analyses adopting polysemy for alternating verbs have generally assumed that in any particular use of an alternating verb, one argument realization scheme is selected, presumably determining which reading is intended. Intuitively, however, it is not the case that in every case one meaning is determined to the exclusion of the other. For example, neither *John sent Mary the book* nor *John sent the book to Mary* preclude the causation of possession reading. Nor does either of them preclude the causation of change of location reading. The reason for this is that the meaning of *send* is simply compatible with both meanings[7]. It therefore seems preferable to assign alternating verbs a meaning that is *underspecified* between COP and COL.

Such an underspecified meaning is exactly what the representations in (22) are supposed to model[8]. While the representations of *give* and *walk* both involve a stative argument[9], the meaning of transfer verbs like *send* specifies an event of transfer, in which the theme traverses a path towards the goal. This event of transfer is telic, but

[6]Later on I show that English does distinguish verbs like *give* and *send* from verbs of caused directed motion like causative *walk*.

[7]In some cases, the arguments of a 'send'-type verb can be incompatible with one of the meanings, and the corresponding realization is then precluded. Such cases are discussed in the next subsection.

[8]But see Beavers and Francez (to appear), who argue that the precise semantic relation between the meaning encoded by core and oblique realization schemes in ditransitives, as well as more generally, is more naturally characterized in terms of lexical entailments à la Dowty (1991) than in terms of predicate decompositions.

[9]As Krifka (2004) points out, the stative argument could be replaced by a propositional argument.

the nature of its result state is not specified by the verb, and is compatible with both a possessive HAVE-state as well as a locative AT-state. This explains the compatibility of verbs of transfer with both the COP and COL readings without assigning them two separate meanings.

Two points are in order in relation to these decompositional representations. First, it is clear that the actual events described by verbs encoding a COP reading such as *give* often involve motion along a path, similarly to verbs of transfer. However, this is a fact about the world, not about the meaning of verbs. A crucial point in lexical semantics, discussed in detail in DeLancey (1991), is that the verb meanings are not read off of the real world, but rather are grammaticized. While COP verbs are perfectly compatible with real-world events of transfer, they do not encode transfer, but only causation of possession. This is evidenced by various aspects of their behavior. For example, *give* in English can occur with NPs that cannot be construed as moving from a source to goal, such as *headache* in (23). For extensive discussion see RH&L.

(23) a. His babbling gave me a headache.

b. *His babbling / he sent me a headache.

Second, standard representations do not reflect the fact that the meaning of verbs of transfer does not entail that the goal of transfer has been achieved. It is well known that sentences such as *John sent Mary a letter* involve an implicature, rather than an entailment, that Mary got the letter. The question of how exactly to modalize the meanings of transfer verbs is irrelevant here, and I abstract away from it.

3.1 Pronominal vs. non-pronominal *le*

As the table in (19) shows, non-pronominal *le* can essentially occur with any ditransitive verb, even those verbs that strongly disallow inflected *le*.

One way to explain this is to say that type I verbs are monosemous with pronouns, but polysemous or underspecified with full NPs. This is an unlikely explanation, since the lexical semantics of verbs is not in general dependent on the category of a complement, but rather is a lexical property of verbs. If type I verbs are semantically underspecified or ambiguous between COP and COL semantics, then the pronominal nature of an argument should not change that. Furthermore, the pronoun/NP distinction does not determine semantics for any other class of verbs. I therefore maintain that type I verbs unambiguously encode COL semantics, and the explanation for the availability of uninflected *le* has a non-semantic explanation.

Why does pronominal *le* distribute differently than non-pronominal *le*? My hypothesis is that the distribution of non-inflected *le* is due to a process of generalization of *le* in contemporary spoken Hebrew: the functions of *el* are taken over by *le*. This is a general process, independent of the ditransitive domain. An example of this process in monotransitives was given in (15) above. Another example is provided by the monotransitive verb *hitga'age'a* 'miss (someone, something)'. This verb can in general take an argument marked by either *el* or *le*:

(24) hitga'aga'ti el ha- / la xaver Seli
miss.PST.1.SG. EL the / LE.DEF friend of.1.SG
I missed my friend.

In spoken contexts, native speakers much prefer *le* to *el* in a sentence like (24)[10]. However, this is not the case in the pronominal domain: (24) is categorically ungrammatical with inflected *le*:

(25) hitga'aga'ti * lo / elav
miss.PST.1.SG. LE.3.M.SG / EL.3.M.SG
I missed him.

Synchronically, then, the class of pronominals behaves differently from full NPs, and encodes distinctions that full NPs do not. This is by no means unusual. Crosslinguistically, it is common for the pronominal sub-class to make more distinctions than the class of NPs, cf. the preservation of case distinctions in English pronouns. The complementary distribution of inflected prepositions in Hebrew might be similarly diachronically motivated. In other words, it is possible that non-inflected *el* and *le* retain a distinction that has been lost in full NPs. Regardless of the diachronic aspects of these differences in Hebrew, any theory must account for the synchronic distribution of prepositional markers in both subclasses of nominals.

At this point it is possible to state an explanatory generalization about the distribution of the two prepositions *el* and *le*.

(26) **Final generalization**:
(a) *le* can always mark the non-theme NP argument of a ditransitive verb.
(b) Pronominal *le* is a marker of possessors
(c) Pronominal *el* is a marker of goals.
(d) Verbs with meanings compatible with both change of location and causation of possession occur with either preposition.

The relation between prepositions, verbs and meanings is represented graphically in (1).

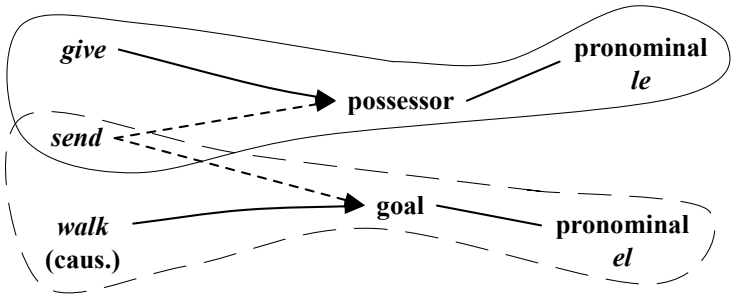

Figure 1: Clustering of verbs, meanings and prepositions.

3.2 Further evidence: The semantic nature of arguments

If transfer verbs indeed have a meaning underspecified between causation of possession and causation of change of location, then we expect that in contexts in which a

[10]Unfortunately, quantitative data, which would be illuminating here, are difficult to provide due to the lack of a corpus of spoken Hebrew.

more specific meaning is required for some reason, the verb will resolve to that meaning and the marking associated with it. There is in fact an array of such contexts, in which the semantic nature of the arguments of transfer verbs precludes either the causation of possession meaning or the directed motion reading. As predicted by the generalization in (26), the choice of meaning is reflected in the choice of pronominal preposition.

- **Causation of possession ruled out**:

There are two kinds of contexts in which the COP reading can be ruled out. First, it can be ruled out due to the semantic nature of the non-theme argument. Some non-theme arguments cannot be construed as possessors with verbs like *Salax* 'send'. In such cases, the verb cannot occur with pronominal *le*, as predicted. This is shown in (27). In (27a), the non-theme argument is the noun *kfarim* 'villages', which cannot be construed as possessing the theme, and pronominal *le* is ungrammatical. In contrast, the non-theme argument of (27b) is the noun *sarim* 'ministers', which can be construed as possessing the theme, and pronominal *le* is fine.

(27) a. ha-kfarim$_i$ Se- ha-memSala Salxa elehem$_i$ / *lahem$_i$ xayalim
the-villages that- the-government sent EL.3.M.PL / LE.3.M.PL soldiers
The villages to which the government sent soldiers.

b. ha-sarim$_i$ Se- ha-Sofetet Salxa elehem$_i$ / lahem$_i$ mixtavim
the-ministers that- the-judge sent EL.3.M.PL / LE.3.M.PL letters
The ministers to whom the judge sent letters.

Second, COP readings can be blocked by the theme argument. As pointed out by Botwinik-Rotem (2003), animate themes are not compatible with a possession reading, because animate things are not normally possessed. Indeed, pronominal *le* is unavailable in the presence of animate themes with verbs like *Salax* 'send', as shown in (28).

(28) a. dan Salax et ha-yladim el/le- rina
Dan sent ACC the-children EL/LE- Rina
Dan sent the children to Rina. (Botwinik-Rotem 2003:95, (26a))

b. dan Salax eleha /??la et ha-yladim
Dan sent EL.3.F.SG / LE.3.F.SG ACC the-children
Dan sent the children to her.

c. ?? yeS le rina et ha-yladim
be LE Rina ACC the-children
??Rina has the children.

(28c) shows a possessive construction in which the theme is animate is generally infelicitous. The sentence is infelicitous in a context in which it describes the result of a sending event. Of course, a similar sentence meaning *Rina has children* is perfectly grammatical, but describes inalienable possession, which conceptually cannot be the result of an event of causation of possession.

• **Causation of change of location reading ruled out**:

Abstract nouns that do not change physical location in transfer must be construed as possessed. For example, the theme *kadur* 'ball' in (29a) is a physical object that changes physical location in a transfer event described by the verb *masar* 'pass', and the recipient of this theme can be realized with either preposition in (29b). However, the abstract noun *misra* 'job' in (29c) is not something that can be caused to change location, only to change possession. As expected, the verb can only co-occur with pronominal *le* in this case.

(29) a. hu masar le/el merser et ha-kadur
he passed LE/EL Merser ACC the-ball
He passed Merser the ball.

b. hu masar lo /elav et ha-kadur
he passed LE.3.M.SG /EL.3.M.SG ACC the-ball
He passed him the ball.

c. hi masra lo /*elav et ha-misra
she passed LE.3.M.SG EL.3.M.SG ACC the-job
She passed the job on to him.

4 Crosslinguistic patterns

In this section I show that the constellation of data in figure (1) is not unique to Hebrew. The association of different morphosyntax with the three verb classes identified above is cross-linguistically quite robust, strengthening the view that the grammatical behavior of ditransitives is to a large extent determined by their semantics, and in particular by the semantic contrast argued for in the previous section.

If the account developed above is correct, it raises several expectations as to the behavior of ditransitives crosslinguistically. Specifically, if a language has different morphosyntactic means for encoding goals and possessors, then we expect the distribution of these coding schemes with ditransitives to carve out the three verb classes that the pronominal data carves out for Hebrew:
— Verbs that inherently encode causation of possession should tend not to allow goal marking on the non-theme argument.
— Verbs that inherently encode change of location should not allow possessor marking on their non-theme arguments.
— Verbs that are underspecified for these meanings should allow either marking, modulo the semantics of the arguments.

In what follows I discuss the relation between the Hebrew pattern and the English dative alternation. I argue that that the distribution of the double object construction and the *to*-variant is determined by similar semantic factors as the distribution of *el* and *le*. I then move on to discuss more general crosslinguistic patterns.

4.1 The English 'dative alternation'

The familiar English dative alternation is presented in (30).

(30) a. Tyrone sent Jerome the letter.

b. Tyrone sent the letter to Jerome.

Analyses of the English dative alternation commonly assume that alternating verbs are polysemous (cf. Green 1974; Oehrle 1976; Krifka 1999 and many others). The accepted view is that the double object (DO) variant (30a) is associated with a transfer of possession reading, while the *to*-variant (30b) is associated with a causation of directed motion reading.

As discussed earlier, RH&L argue that while some English alternating verbs are polysemous, others are monosemous. Specifically, they argue that verbs like *give* encode causation (rather than transfer) of possession, whereas verbs like *send* are ambiguous between causation of possession and directed motion. In terms of the analysis developed above, verbs like *give* are specified for COP semantics, whereas verbs like *send* have underspecified semantics. In this section I want to show that the availability of realization schemes in English (DO and *to*-variants) corresponds to the availability of COP/COL meanings in a way similar to *el/le* in Hebrew. As in Hebrew, in English the availability of either realization scheme can be blocked by the semantics of an argument. The English data, however, is complicated by the fact that verbs like *give* participate in the dative alternation, which would seem to indicate an underspecified semantics for them. However, I maintain following RH&L and others that the alternation shown by *give* and similar verbs is not motivated by the same semantic factors that generally motivate the dative alternation. English verbs of giving encode COP semantics in both variants. English is different from Hebrew (and from many other languages, as discussed in section 4.2) in allowing the oblique frame to realize the possessor argument of ditransitives.

Verbs of giving in English are restricted to a causation of possession reading. English *give* differs from *send* in that its non-theme argument must be a possessor. While this is a standard observation for *give* in the DO variant (Green 1974; Pinker 1989; Harley 2003, and many others), it is equally the case for the *to*-variant, as RH&L point out.

(31) a. *Maurice gave a book to Minneapolis.

b. *Maurice gave Minneapolis a book.

The restriction to possession is therefore a property of the *verb*, not just of one of the realization schemes. The same semantic property of verbs of giving is responsible for the unavailability of pronominal *el* with *natan* 'give' and other type II verbs in Hebrew.

An important difference between Hebrew and English, which obscures this parallel, is that English *to* is more general than Hebrew *el*, and can occur with *give* (see e.g. Levinson (2005) for a recent discussion of the different functions of *to* in the dative alternation). As several authors have pointed out, the occurrence of *give* with *to* is motivated by information structural constraints (Erteschik-Shir 1979; Arnold et al. 2000; Wasow 2002; Bresnan and Nikitina 2003, see also discussion in RH&L and Krifka (2004)), not by semantics. In other words, unlike Hebrew, English allows verbs encoding COP to alternate. Hebrew does not allow this, first because the allative marker *el* is semantically not as general as English *to*, and is restricted to locational goals, and second because the kinds of information structural effects that in English require a change

in grammatical relations (because of strict word order) can be achieved by word order in Hebrew.

In English, as in Hebrew, the meaning of verbs of transfer is underspecified between COP and COL. This is evidenced by the fact that, as in Hebrew, the meaning of such verbs can be determined by the semantic nature of the argument. In such cases, the distribution of the English DO and *to*-variants parallels that of Hebrew *el* and *le*.

COP readings can be blocked when the semantics of the non-theme argument is incompatible with possession. Since Oehrle (1976) and Green (1974) it is standardly observed that purely locational arguments such as place names are not possessors, and cannot occur felicitously in the DO construction with verbs like *send* :

(32) *John sent London a letter.

(32) is good only on an institutional reading (e.g. *the London office*)).This is the case not just for place names like London, but generally for spatial locations:

(33) a. *Teddy sent the front soldiers.

b. *John threw the garbage my abstract.

This data exactly parallels the unavailability in Hebrew of pronominal *le* for spatial goals with *Salax* 'send' (see 27 above).

COP readings can also be blocked by the theme argument. If the theme is animate, the causation of possession reading is unavailable for *send*, and so is the DO:

(34) a. John sent the boys to the principal.

b. *John sent the principal the boys.

Again, this is exactly parallel to the unavailability of pronominal *le* with animate themes with Hebrew type III verbs, as in the examples pointed out by Botwinik-Rotem (2003) ((28) above).

Finally, causative verbs of directed motion in English are restricted to goals, as they are in Hebrew. In other words, English, too, has type I verbs. As expected, the DO construction is not available for such verbs.

(35) a. The guards walked the prisoner to the visitor.

b. *The guards walked the visitor the prisoner.

c. My sister moved the books to the cellar.

d. *My sister moved the cellar the books.

This is exactly parallel to the unavailability of pronominal *le* with *holix* 'walked' and other type I verbs in Hebrew.

To summarize this section, I have shown that English ditransitive verbs form three different semantic classes, similarly to the three classes identified for Hebrew. The distribution of DO and *to*-variants follows a similar pattern as *le* and *el* in Hebrew. The English DO construction is associated with COP semantics, and the *to*-variant is associated with a COL semantics. The oblique realization scheme is unavailable with verbs

of giving in Hebrew. It is available for such verbs in English, but does not correspond to a COL reading as it does with verbs of transfer. The English dative alternation with verbs of giving is therefore in some sense a different phenomenon than that alternation with other verbs. The parallelism between Hebrew and English provides further support to the analysis of *el* and *le* proposed above, as well as for Rappaport Hovav and Levin (2005)'s claim that different classes of ditransitive verbs are associated with different semantics.

4.2 Other languages

The correlation between realization schemes and meanings argued for above is supported by crosslinguistic data. In their study of the realization schemes available for ditransitive verbs across languages, Croft et al. (2001) have found that ditransitives form the following implicational hierarchy:

(36) Ditransitivity Hierarchy: give > send > throw

Croft et al. show that this hierarchy is relevant for stating generalizations about the distribution of direct argument vs. oblique realization schemes in ditransitive constructions. In particular, they claim that:

(i) If there are constraints on the distribution of a ditransitive construction, the construction will be associated with the higher end of the Ditransitivity Hierarchy.

(ii) If there are constraints on the distribution of an oblique constructions, especially a spatial oblique construction, the construction will be associated with the lower end of the Ditransitivity Hierarchy.

The situation argued for above in Hebrew falls in nicely with Croft et al.'s generalization. There are constraints on the dative marker *le*, and its occurrence is associated with the higher end of the hierarchy, namely with verbs like *give*. And there are constraints on the distribution of the allative marker *el*, and its occurrence is associated with the lower end of the hierarchy, namely with verbs of caused directed motion like (causative) *walk* as well as verbs of transfer like *send*. I have not discussed the verb *zarak* 'throw' in Hebrew, but it behaves like *send*, i.e. it is a type III verb. Croft et al.'s hierarchy also reinforces the observation that the occurrence of the *to*-variant with English *give* is exceptional. In most languages, a verb meaning 'give' does not allow an oblique realization of the non-theme argument.

Refining the argument in Croft et al., Levin (2004) points out crosslinguistic generalizations as to verbs that allow the non-theme argument to be realized as a direct argument, as in the English double object construction. In (37) I compare data taken from Levin 2004 and some additional data to the distribution of Hebrew pronominal forms.[11]

Given the pattern outlined so far, we expect that a language which has two realization schemes for ditransitives, one in which the non-theme argument is a direct argument, and another in which it is oblique, will show two properties:

[11]The data from Levin (2004) is based on Chung and Gordon (1998) for Mandarin Chinese and Anagnostopoulou (2003, 2004) for Greek.

(a) The direct argument scheme should pattern like pronominal *le*.

(b) Verbs should be more likely to place restrictions on the direct argument scheme if they do not lexically encode possession.

In other words, we expect to find a parallelism between the distribution of inflected *le* and other realization schemes in which the non-theme is a direct argument, and we expect such realization schemes to correlate with COP meaning, i.e. with the high end of the Ditransitivity Hierarchy. In particular, we expect restricted acceptability of such realization schemes to occur with verbs that have underspecified meanings. I have shown that with such verbs, the availability of inflected *le*, as well as of the DO variant in English, is restricted by the semantic nature of the non-theme argument, which must be a possessor. In (37), '+ ' signifies availability of the relevant realization pattern, '+/–' indicates limited availability, conditioned on the non-theme argument being construable as possessor, and '–' indicated unavailability. I use '+/?' for cases where a pattern is available and I do not have data on whether or not it is restricted.

(37) **Availability of direct argument realization of non-theme argument**

VERB	Mandarin	Greek	German	Hebrew *le*+pron
'give'	+	+	+	+
'sell'	+	+	+	+
'send'	–	+/–	+/–	+/–
'throw'	–	+/?	+/–	+/–
'take'	–	+/?	–	–

The table clearly confirms the expectations for Greek, Mandarin and German. It also shows some interesting crosslinguistic variation. In particular, the constraints on the double object construction in Mandarin Chinese seem much more restrictive than the restrictions on the English first object or the Hebrew dative.[12] However, the variation maintains the direction predicted by Croft et al. (2001). There are restrictions on the double object construction in Mandarin, and this construction is associated with the higher end of the Ditransitive Hierarchy. The hierarchy and the table in (37) show that across languages, realization schemes for non-theme arguments of ditransitives align with verb classes in ways similar to their alignment in Hebrew. This strongly supports the idea that there are systematic semantic distinctions driving this alignment, of the kind argued for here. The fact that ditransitive verbs form an *implicational hierarchy*, rather than a set of mutually exclusive classes, supports the kind of semantic analysis provided earlier in this paper, namely one in which some verbs have meanings that are underspecified between the two main readings associated with the ditransitves: causation of possession and causation of change of location.

[12] As pointed out to me by Waltraud Paul, the Mandarin data is more complex. There are several issues involved, including the status of the lexeme *gei3*, the equivalent of English *to*, which also functions as a verb meaning 'give' in a serial verb construction (see e.g. Paul (1988) for discussion). Further research is required to determine the exact nature of the ditransitive domain in Mandarin.

5 Conclusions

This paper discussed the relation between the availability of argument realization schemes and the availability of verbal meanings. I have presented new data from the interaction of Hebrew prepositions with pronouns, that shows that the distribution of argument realization schemes in Hebrew ditransitives is determined by the availability of three verbal meanings: causation of possession, causation of change of location, and transfer.

The data reveal a three-way distinction among ditransitive verbs in Hebrew, similar to the one proposed by RH&L for English, supporting their claim that the ditransitive domain is not semantically uniform. The three identified verb classes determine similar morphosyntactic patterns across languages, highlighting the uniformity of the mapping from verbal semantics to morphosyntax.

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Adverbials and Mandarin argument structure

Jules Gouguet*

1 Introduction

This paper deals with the syntax and interpretation of postverbal adverbials and the internal argument in Mandarin Chinese. It will be shown for internal arguments and adverbial expressions such as duration, iteration, manner predicates, resultative clauses and resultative verbal compounds, that their varying distributional patterns all reduce to the same basic syntax. This will contrast with current approaches that require variation in the syntax of First Merge for these elements. Underpinning the uniformity of our account is a reduplicative phenomenon, known as verb copying (VC), that interacts with the different adverbials mentioned. In a theoretical framework along the lines of Chomsky (2000, 2001), involving movement by copy, we arrive at a novel account of reduplication, without multiplying stipulations. Reduplication, it will be argued, may occur when certain structural conditions are met; no special morphology is required. Assuming an analysis of VC that meets these conditions means assuming that the various constructions that are compatible with VC must all have the same basic structure needed to produce these conditions. Though this assumption constrains the possible analyses of the verbal domain (vP) in Mandarin, it does not diminish descriptive scope over the data, relative to competing proposals – on the contrary, it extends the scope, at the same time streamlining the description.

We begin in section 2 with a look at the different types of postverbal adverbials and their distribution with respect to the internal arguments of transitive verbs. Included is a presentation of VC. Section 3 lays out our analysis of the basic structure of vP in Mandarin, including the variety of constructions produced by the interaction of properties specific to the different adverbials and two other factors: the movement of the internal argument and the movement of VP. The essentials of the syntax of reduplication are put forth in section 4, including a comparison to the surprisingly non-reduplicative phenomenon of remnant movement. And in section 5 we will consider the structural assumption that is common to most other analyses of these constructions, but that is inherently incompatible with our own proposal.

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2 The data

2.1 Adverbials and Verb complementation

Traditional Chinese grammar distinguishes between two classes of adverbials according to distribution with relation to the verb. Preverbal adverbials are referred to as *zhuangyu*, and they typically include those adverbials which situate the event in time or space, express manner or speaker attitude. Postverbal adverbials, or *buyu* – the class which most concerns us here – include expressions of duration, iteration, result and (again) manner.[1] Examples are given below. Notice that resultatives can be clausal or incorporated into a compound with the main verb.

(1) *Buyu* types[2]

a. *duration*

wo pao le san xiaoshi
1s run PFV three hour

'I ran for three hours.'

b. *iteration*[3]

wo tiao le san ci
1s jump PFV three time

'I jumped three times.'

c. *manner*

ta chang de hen haoting.
3s sing DE very good.listen

'He sings well.'

d. *resultative clause*

tamen chang de wo mei xinsi kan xiaoshuo.
3pl sing DE 1s have.no mood read novel

'Their singing made me not in the mood to read novels.' (from Li 1998)

e. *resultative verb compound*

ta chang-lei le.
3s sing-tired PFV

'She sang herself tired.'

The distribution of *buyu* adverbials shows variation relative to the internal argument (IA) of the main verb. Duratives and iteratives can be directly preceded or followed by IA (though each order imposes its own interpretative restrictions; see footnote 15).

[1] Traditionally, *zhuangyu* can be translated as 'adverbial' and *buyu* as 'complement'.

[2] Abbreviations used throughout in the glosses: CL=classifier; EXP=experiential; PFV=perfective.

[3] "Frequency" is the term usually employed in the literature, instead of "iterative", but it seems better suited to describe adverbials that express the relation between event occurrences and time frame, such as *chang2* ('often').

(2) a. wo kan le san xiaoshi shu
1s read PFV three hour book
'I read for three hours.'

b. wo kan le zhei ben shu san xiaoshi
1s read PFV this CL book three hour
'I read this book for three hours.'

(3) a. wo piping le san ci Zhangsan
1s criticize PFV three time Zhangsan
'I criticized Zhangsan three times.'

b. wo piping le Zhangsan san ci
1s criticize PFV Zhangsan three time
'I criticized Zhangsan three times.'

IA cannot follow result clause adverbials at all, though it can directly precede them, as shown in (4).[4] In (5) we see that IA may neither follow nor directly precede manner adverbials.

(4) a. *ta qi de hen lei ma.
3s ride DE very tired horse

b. ta qi de ma hen lei.
3 ride DE horse very tired
'He rode the horse until it was tired.'

(5) a. *ta chang de hen haoting ge.
3s sing DE very good.listen song
(intended: 'He sings songs/the song well.')

b. *ta chang de ge hen haoting.
3s sing DE song very good.listen

In the case of *resultative verbal compound* (RVC) constructions, the compounding of the result expression with the verb means that a postverbal IA is necessarily post-adverbial—there is no place for a pre-adverbial postverbal argument.

(6) ta qi-lei le (nei pi) ma.
3s ride-tired PFV that CL horse
'He rode horseback/ that horse and got tired.'
'He rode the horse until it was tired.' (cf. Cheng (2005))

Note, however, that (6) has two different readings: one where the resultative is subject-oriented, one where it is object-oriented.[5]

[4] See Li (1999:459) for a demonstration that the nominal construed the IA of the main verb cannot be analyzed as being in the result clause.

[5] An additional difference between the readings is discussed in footnote 15.

2.2 Verb copying

There is another possibility for the postverbal distribution of *buyu* and IA, open to all *buyu* (listed), and that is the VC construction. In these cases, the verb occurs twice, the first occurrence directly preceding the IA, the second occurrence, possibly inflected for aspect, directly preceding the adverbial.

(7) ta kan zhei ben shu kan le san ci / san xiaoshi
3s look this CL book look PFV three time / three hour
'She read this book three times/ for three hours.'

(8) ta qi nei pi ma qi de hen lei
3s ride that CL horse ride DE very tired
'He rode that horse such that he/it got tired.'

(9) ta chang ge chang de hen haoting
3s sing song sing DE very good.listen
'She sings (songs) well.'

In the case of RVCs, the resultative predicate is compounded with the second occurrence of the verb, directly following it, and directly preceding any aspectual inflection.

(10) ta qi (nei pi) ma qi-lei le
3s ride that CL horse ride-tired PFV
'He rode horseback/ that horse and got tired.'

Notice that in (10), in contrast with (6) and (8), only the subject-oriented reading is available and not the object-oriented one.

On the surface, the VC construction appears somewhat symmetrical, having two VPs, each with same V head, only with different complements. So it is important to note the more asymmetrical properties of VC: aspectual morphology can only appear on the second V, not the first, (7)'; and IA and the adverbial cannot switch places, (7)".[6]

(7)' *ta kan le zhei ben shu kan san xiaoshi

(7)" *ta kan san xiaoshi kan le zhei ben shu

Another important property is that the first occurrence of V can move leftwards with IA.

(11) (kan shu) wo (kan shu) keyi (kan shu) kan san tian.
look book 1s look book can look book look three day
'I can read books for three days.' (cf. Tang 1990:198)

2.3 Summary

Before moving on to the analysis of these data, let us have an overview of the different properties it should account for.

[6] A reviewer suggests that the first instance of V can be aspectually marked. However, native speakers interviewed only accept such sentences if there is a break before the second V, which I take to mean that these are biclausal or vP -coordinated structures.

(12) Postverbal distribution of IA relative to *buyu* adverbials

Buyu type	Pre-adverbial	Post-adverbial	VC
Durative	Yes	Yes	Yes
Iterative	Yes	Yes	Yes
Result clause	Yes	No	Yes
Manner	No	No	Yes
Resultative compound	n/a	Yes	Yes

In addition to these distributional facts, a proper analysis of VC and the *v*P phase in Mandarin should account for:

(13) a. the asymmetry of VC – ex. (7)', (7)"
b. the mobility of V + IA – ex. (11)
c. subject/object-orientation in RVC constructions – ex. (6) and (8) vs. (10)

3 Analyzing *v*P and VC

In this section, we will look at the basic syntax of *v*P in transitive constructions[7] containing *buyu* adverbials, proceeding from one construction to the next by the manipulation of three factors: IA movement, VP movement and verb movement.

3.1 *v*P

Beginning at the bottom, IA is selected by V, with which it merges as a complement. VP is then selected by a functional head F_Qty (for "quantity"), associated with a *telic* 'inner' aspect (see Pereltsvaig (2000), Kratzer (2002), and Borer (2005), among others). This head requires a *situation delimiter argument* (Wechsler and Lee (1996)), and to that end it may either agree with a bound IA or with an adverbial expression merged as its specifier, as seen in (14).[8] Next, the light verb *v* merges, introducing the external argument (EA)(Kratzer (1994), Chomsky (1995)). We assume that 'outer' aspectual morphology, like the perfective *le* or the 'experiential' *guo*, are realizations of v. We also assume that the *de* particle that directly follows the verb before result clauses and manner adverbials realizes v.[9] As in many languages, *v* triggers head movement, causing V to adjoin to it. As it stands, (14) derives post-adverbial distribution of the IA, as in (2a).[10]

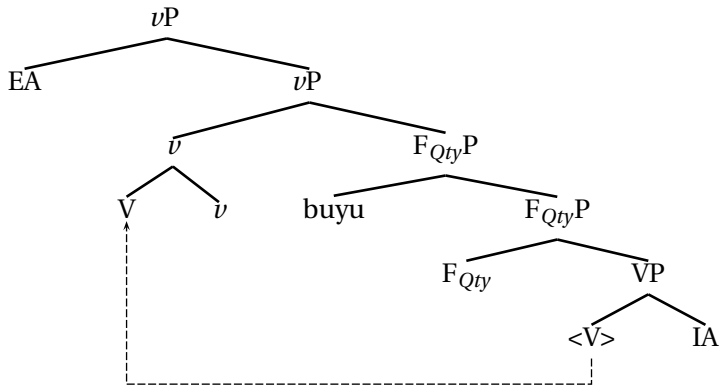
[7] The syntax of the corresponding unergative constructions differs in no substantial way not directly deducible from the absence of IA.

[8] The agreement relation here might be the assigning of accusative case. See Travis (1984), Wechsler and Lee (1996), Pereltsvaig (2000), Kratzer (2002), and Borer (2003), among others.

[9] *De*, like *le* and *guo*, is a functional, toneless variant of a lexical verb. It is also in complementary distribution with them.

[10] The angle brackets are an informal notation indicating an unpronounced copy (i.e., a 'trace'). Only the top node of an unpronounced constituent is bracketed.

(14)

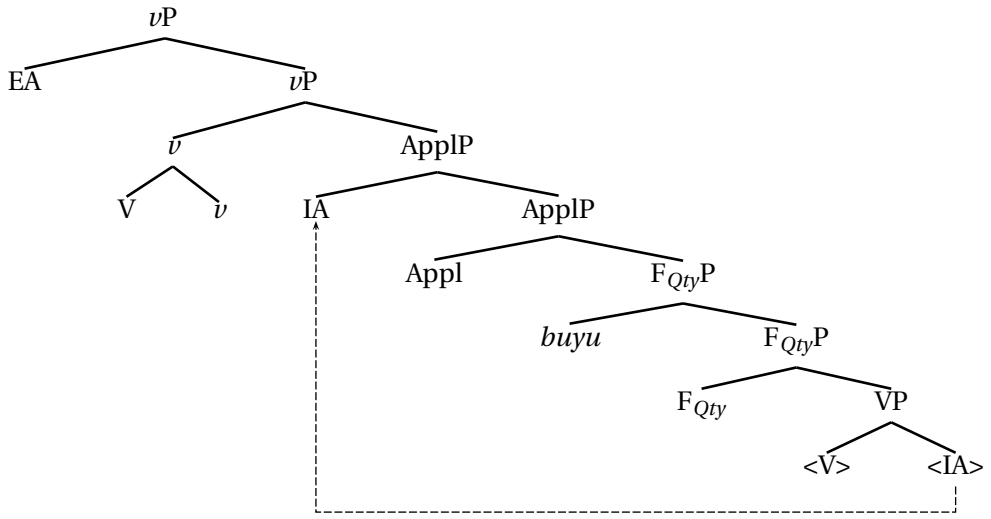


This structure is distinct from other proposals for Mandarin in that all *buyu* adverbials are merged in a position c-commanding VP. In addition to deriving post-adverbial IA distribution, it is also a key step for deriving the constructions analyzed in the following sections.

3.2 IA movement

Pre-adverbial distribution is produced by raising IA to the spec of a projection higher than the adverbial, as argued for by Soh (1998). I have given this projection the designation of applicative (Appl) for reasons that will come to light below, in section 3.5. But this position could just as well be an outer specifier of F$_{Qty}$P, so long as it c-commands the adverbial.

(15)

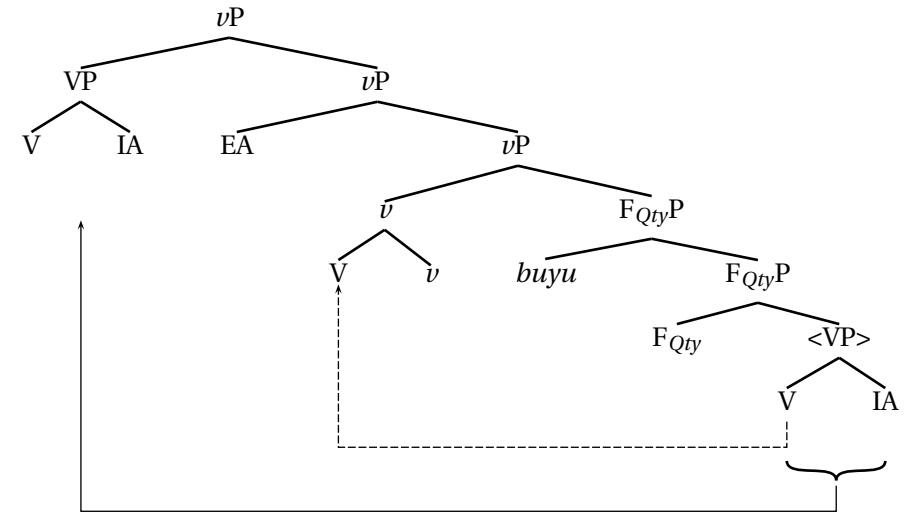


This structure accounts for the distribution observed in (2)b, with duratives and iteratives, and in (4)b, with resultative clauses.

3.3 VC

The derivation of VC constructions picks up where we left off in (14). The next crucial step is when movement of VP to the edge of the phase is opted for.[11][12]

(16)



So V is involved in two displacements: in one it moves as a head, in the other a constituent containing it is moved. V now has two occurrences, one as the head of a chain, the other within the head of a chain. Crucially, the relation of c-command does not obtain between the two. In section 4, we will propose that whatever the operation is that selects which copy in a movement chain is pronounced, it relies on c-command to recognize such a chain. In this case, no chain is formed directly between the upper occurrences of V, allowing both to be pronounced, deriving the reduplication of VC constructions. How this case differs from remnant movement, despite obvious similarities, will also be discussed in section 4.

The derivation in (16) succeeds in capturing the asymmetrical properties of VC featured in (7)' and (7)". The first V cannot bear aspectual marking since it is still in VP. And the adverbial cannot switch places with IA and directly follow the first V, because it is not V's true complement and there is no constituent exclusively containing V and the adverbial which could raise to the edge of *v*P . As V and IA do form a constituent, it is not surprising to see them move together, in (11), to positions higher than the edge of *v*P .

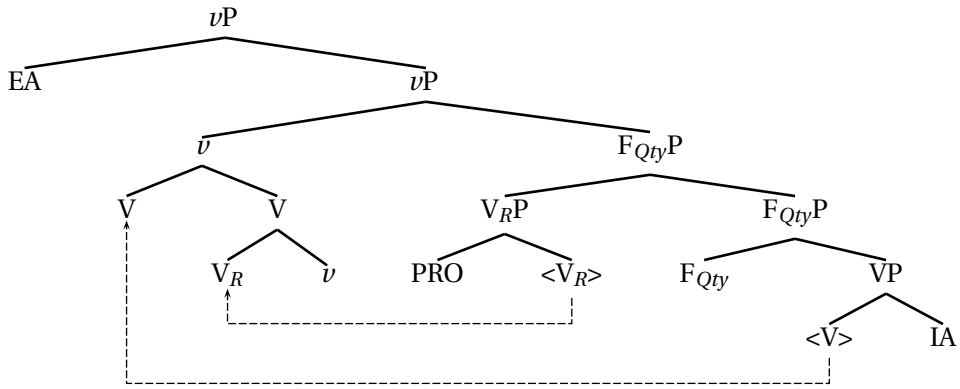
[11] Following Belletti's (2001) idea of a "VP periphery" or Chomsky's (2005) notion of "edge features", we expect VP's movement to the edge of *v*P to be related to information structure or scope-taking. This prediction seems to beborne out—see Tsao (1990) and Tang (1990). This view of VC is contrasted with proposals claiming that the phenomenon is mainly a 'last resort' strategy for argument licensing. These are discussed briefly in section 5.

[12] This basic structure for VC was first proposed independently in Gouguet (2003) and Bartos (2003). Bartos' proposal only uses this structure to account for cases involving duratives and iteratives, using an entirely differentstructure for result and manner (see section 5). The account of the reduplicative effect proceeds along different lines as well.

3.4 RVCs

The particular properties of RVC constructions stem from a difference in the adverbial itself, and this difference interacts with the three derivation types just seen. While result clause adverbials are full CPs, the resultative in RVCs has no independent flexional structure – it is analyzed as a VP (noted as V_RP) with a null argument (following Huang 1992).[13] Because of this, V_R is in the domain probed by *v*, causing it to raise at the same time as the main V. Thus the compound V-V_R-*v* is formed in an example of 'multiple' verb movement (cf. Collins (2002a)). That RVC should be derived through multiple verb movement is already proposed by Wu (2004b), though the overall structure is somewhat different. When multiple verb movement takes place in a derivation such as (14), we arrive at this structure:[14]

(17)



Basically following Huang's (1989) general control theory, a null subject in Chinese will be bound by the first c-commanding DP in its domain (or free if there is no such DP). Here, PRO's domain is the full clause, meaning that it will be bound by EA. As such, (17) derives the subject-oriented reading of (6), repeated here.

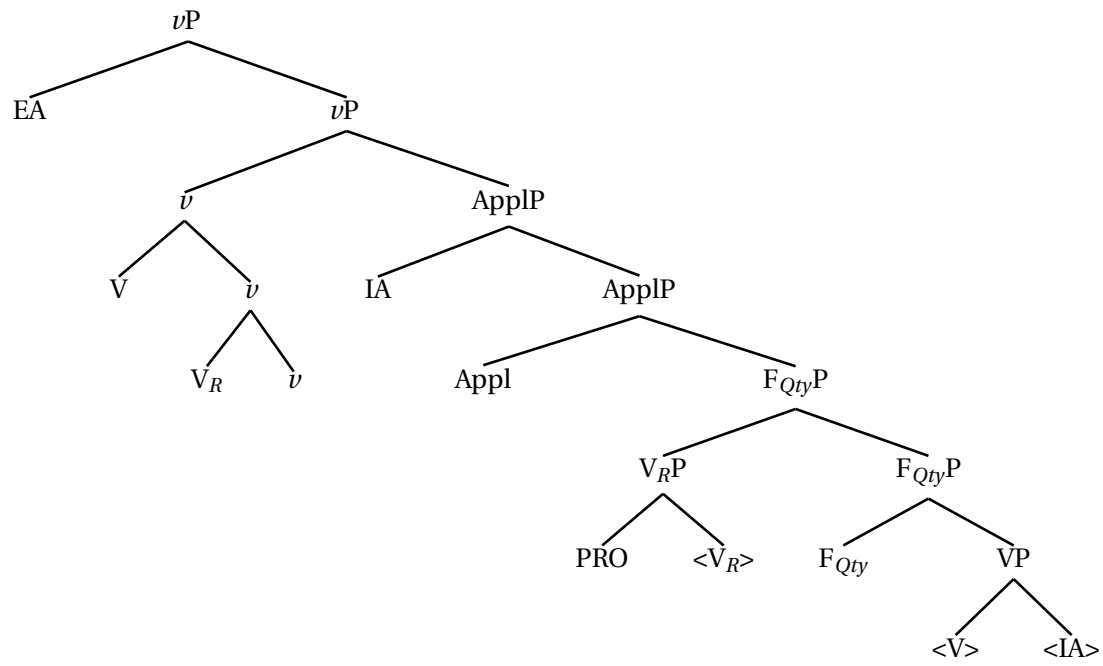
(6) ta qi-lei le (nei pi) ma.
3s ride-tired PFV that CL horse
'He rode horseback/ that horse and got tired.'
'He rode the horse until it was tired.' (cf. Cheng (2005))

Turning to a derivation similar to (15), involving an applicative head, IA moves over V_RP, but the displacement is rendered string vacuous after v-driven head movement raises V_RP.

[13] In fact it may have a fuller argument structure—see Li (2005). Here we have limited the discussion to predicates taking a single argument.

[14] Though the step is ommitted in (17), V should move through F_{Qty} in obeyance of the Head Movement Condition (Travis (1984)). If this is the case, then the complex head V-F_{Qty}, as the head of *v*'s complement, could be considered closer to *v* than V_R. Head adjunction to *v* must then proceed by "tucking in" (Richards (1997), Collins (2002b)), meaning that the second of two adjunctions is the closest, i.e., after V (or V-F_{Qty}) adjoins to *v*, V_R does not adjoin to V-*v*, but directly to *v*, deriving V-V_R-v.

(18)



Despite no phonological evidence for it, the movement is detected in the interpretation: with IA now in Spec,ApplP, it binds PRO in V_RP, producing the object-oriented resultative in the second reading of (6).[15]

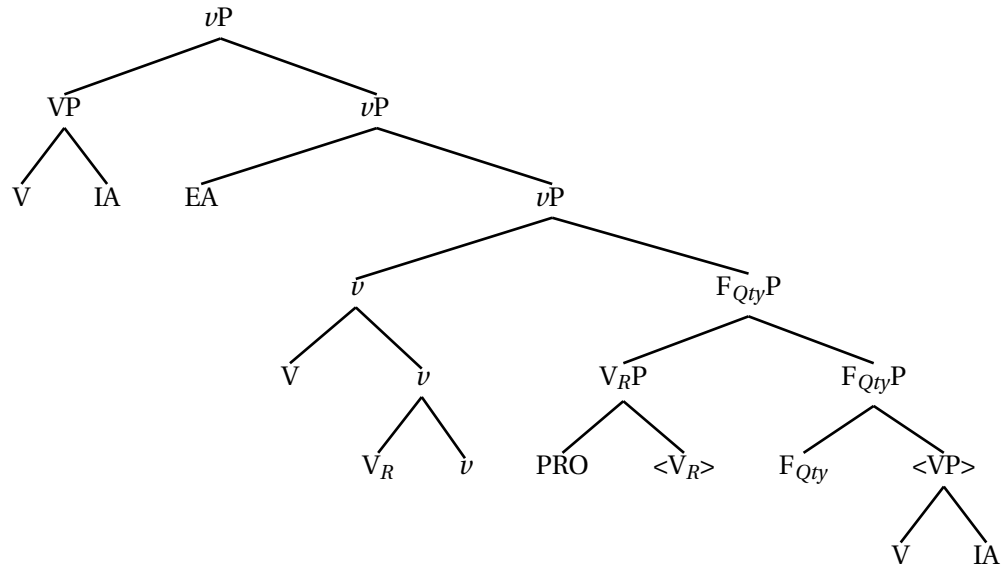
When multiple verb movement occurs in a VC derivation based on (16) (or perhaps more accurately, when VP movement occurs in an RVC derivation like (17)), we arrive at the structure (19) that underlies clauses with both VC and RVC, such as (10), repeated below.

[15]An additional argument for the movement of IA comes from comparison with constructions containing durative or iterative adverbials. As seen in (i), the pre-adverbial IA cannot be a weak, unquantified indefinite.

(i) * ta kan le shu san xiaoshi.
3 read PFV book three hour
intended: 'She read (books) for three hours.'

If this restriction applied to the underlying pre-adverbial position in RVC constructions, it would account for the incompatibility of weak, unquantified, indefinite IAs with the object-oriented readings—i.e., (6) does not have the reading 'ride horses tired', only 'ride THE horses tired' or 'ride horses to the point that one is tired'.

(19)



(10) ta qi (nei pi) ma qi-lei le
3s ride that CL horse ride-tired PFV
'He rode horseback/ that horse and got tired.'

In this structure, EA, and not IA, binds PRO in V_RP, thus predicting that only the subject-oriented reading is available when VC combines with RVC—a prediction confirmed by (10)l.

Before closing this subsection on RVC, let's consider a final type of construction, as seen in this example from Huang (1992):

(20) Zhangsan ku - shi le shoupa
Zhangsan cry wet PFV handkerchief
'Zhangsan cried the handkerchief wet.'

Since (20) is not a subject-oriented resultative, we might expect it to have the object-oriented structure of (18). But *shoupa* ('handkerchief') is not the IA of *ku* ('cry'), a fact which explains why a VC version of the construction is not possible in (21)—no copy of *shoupa* is contained in VP.

(21) *Zhangsan ku shoupa ku - shi le
Zhangsan cry handkerchief cry wet PFV

Shoupa is thematically licensed by the resultative predicate *shi* ('wet'), so the most natural representation would resemble (17), but with *shoupa* in place of PRO, and with a non-branching VP.

3.5 ApplP

In section 3.2 we proposed that IA moves to the spec of the projection ApplP, instead of adjoining to the projection hosting the adverbial, even though it changes little for our account of *v*P in Mandarin. One reason for this choice relates to the effect of moving to

this position in RVC constructions, as seen in the previous section. Since this position controls the orientation of the result phrase, it seems appropriate to characterize it as an A-position, be it an unthematic and derived one. This projection merges a lower subject (or outer object) to the complex predicate that is its complement. As it is not a thematic position, Spec,ApplP can only be filled by 'internal merge' (Move) (Chomsky (2000, 103)). The use of the term 'applicative' is perhaps not entirely appropriate; here, ApplP does not introduce a new argument (cf. (Pylkkänen, 2002)), but a new argument position. Another term could be used without changing our analysis. One should note, however, that there is some basis for comparison with more typical applicatives. Consider the case of double-object constructions, as in this example taken from Huang et al. (2004, 189):[16]

(22) ta shang-guo Zhangsan (liang ci) jinyinzhubao.
3s award-EXP Zhangsan two time money.jewelry
'He awarded Zhangsan money and jewelry (twice).'

The indirect object, often analyzed as being introduced by an applicative (Marantz (1993)), has the same distribution relative to iterative adverbials as does the displaced IA in the examples we have seen. Perhaps the projection under consideration is a non-thematic variant of the standard ApplP (just as unaccusative v is a non-thematic variant of transitive or unergative v).[17]

The fact that Spec,ApplP has an effect on the orientation of RVC was attributed to V_RP's not being a separate domain for binding, leaving its null argument to be controlled by the displaced IA, or if there is no movement of IA, by EA. What then is the relation between this position and the orientation of result clauses, in cases where these have null subjects? Consider first example (23), where there's a result clause and VC:

(23) woi da Zhangsanj da de $e_{i/*j}$ hen lei /$e_{*i/j}$ hao-tao-da-ku
1s hit Zhangsan hit DE very tired howl-wail-great-cry
'I beat Zhangsan such that [I/*he] got tired/ [*I/he] cried out.'

Here, the adverbial can be oriented to either EA or IA (provided a pragmatically compatible result is chosen) in contrast with the case of RVC and VC in (10), where only subject-orientation is possible. If the result clause is a full CP (see, for example, Li

[16] Huang et al. (2004, 190) consider other examples, where the iterative expression is clause final, but find that such constructions are substantially different.

[17] Another relevant example is the so-called "flip-flop" construction, described by Li (1999) and Wu (2004a), among others. This construction, which necessarily involves a resultative (clause or compound), reverses the distribution of EA and IA, as shown in (i). Notably, EA appears to the right of v and is interpreted as the subject of the resultative. These properties of the construction could be accounted for if we assume that EA is exceptionally first-merged in anA-position between vP and FQtyP—possibly another variant of what we have undertaken to call 'ApplP'.

(i) a. zhe ben shu kan *(-lei) le Lisi
this CL book read-tired PFV Lisi
'Reading this book made Lisi tired.'
b. zhe ben shu kan de Lisi *(jin-pi-li-jin)
this CL book read DE Lisi exhausted
'Reading this book made Lisi exhausted.' (adapted from Wu (2004a))

(1999)) and an independent binding domain, then it doesn't matter that only EA c-commands the null subject (IA being embedded in VP), since it is free in its domain; the contrast is predicted. Turning back to Spec,ApplP, structurally, we would not expect that IA in this position would determine the orientation of the result clause. And yet, (24) only seems to have the object-oriented reading.

(24) woi da de Zhangsanj e$_{*i/?j}$ hen lei /e$_{*i/j}$ hao-tao-da-ku
1s hit de Zhangsan very tired howl-wail-great-cry
'I beat Zhangsan such that [*I/?he] got tired/ [*I/he] cried out.'

We might conclude from this that ApplP has more than a structural role to play, that by making its spec a lower subject of the complex predicate it functionally binds the null subject (if there is one) of the result clause. An advantage to this sort of account would be to explain why manner *buyu* do not admit pre-adverbial IAs, as was shown in (5b), repeated here:

(5) b. *ta chang de ge hen haoting.
3s sing DE song very good.listen

If Appl is merged then the phrase *hen haoting* is forced to be predicated of the IA rather than the event, i.e., it is coerced to a resultative. The deviance of (5)a then would derive from the predicate being an unsuitable one for this usage; it would mean something like "she sang the song nice to listen to".

On the other hand, Li (1999, 448) presents examples where pre-adverbial IA doesn't force object-orientation, including (25):

(25) wo deng de ta zuo-li-bu-an.
1s await DE 3s restless
'I became restless from awaiting him.'

Such examples favor seeing ApplP's role as only structural, provided that the contrast with (24) can be accounted for. Further research is needed.

3.6 Summary

In this section, we have demonstrated that it is possible to account for the bulk of the data in section 2 by assuming a *v*P structure, common to all the constructions under consideration, where adverbials are hosted by a projection (properly) containing VP. The variation between the constructions stems from three factors: whether Appl is merged, whether the adverbial constitutes an independent domain, and whether VP moves the edge of *v*P . These factors determine, respectively, the displacement of IA, verb compounding and 'verb copying'.

One issue, however, hasn't been addressed: the lack of post-adverbial distribution for IA in the case of clausal result or manner *buyu*, in (4) and (5). In section 5 we will put this aspect of the analysis into perspective with other contemporary approaches to *v*P in Mandarin. But first, we will consider a theoretically more explicit description of VC.

4 Syntactic reduplication

The copy theory of movement (Chomsky (1995)) is obviously well suited to the description of reduplicative phenomena in syntax insofar as there is the potential to pronounce more than one link in a movement chain.[18] This potential has been exploited in several recent accounts of VC, including Bartos (2003), Cheng (2005), Gouguet (2003, 2004) and Wu (2004b). Of course, it is vital to any such account to explain why it differs from the norm, where movement doesn't lead to the pronunciation of more than one occurrence of a given lexical item. In this section we set out to show that our proposal, which builds on Gouguet (2003, 2004), doesn't differ from the so-called norm in any substantial way. The key difference is in the timing of operations.

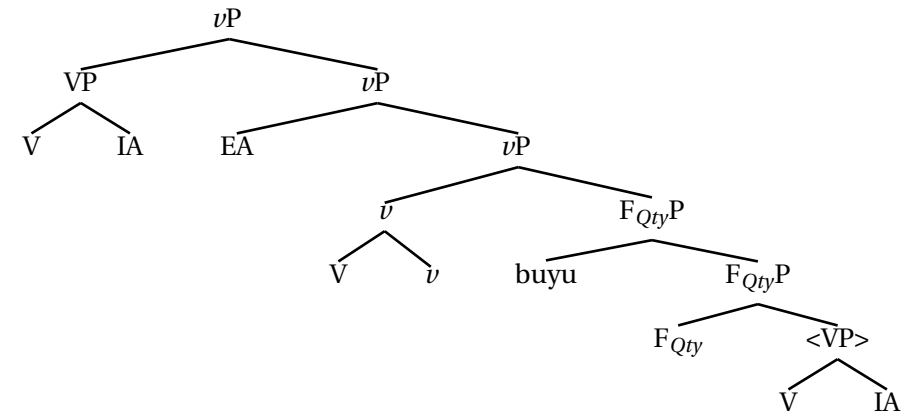
4.1 Copy pronunciation

As the normal situation seems to be one in which only the structurally highest link of a copy-chain is pronounced, let us propose the following operation:[19]

(26) *Copy pronunciation:*
Pronounce copy *a* of syntactic object *A* iff there exists no copy *a'* such that *a'* c-commands *a*.

Notice that (23) does not rely on recognizing inherent differences between copies, as opposed to Nunes' (2005) Chain Reduction (in combination with Formal Feature Elimination) that must compare the number of uninterpretable features between copies(see also Chomsky (2000)). Here, only the structural context of each copy need be considered.[20] We'll assume that (23) is part of operations that cyclically 'transfer' parts of the derivation to PF (Uriagereka (1999),Chomsky (2001)). Let's see now how it applies to the derivation of VC in (16), repeated here:

16



[18] We may distinguish between reduplication in syntax and reduplication in morpho-phonology, where the latter is an apparently word-internal process.

[19] A reviewer suggests a "non-technical" alternative to (26): "the second occurrence of a verb (the copy) cannot be c-commanded by the first." Since movement normally involves a copy c-commanding another copy of the same syntactic object, I assume that "occurrence" here means a phonologically interpreted copy. The suggested constraint then seems to hold, but it does less work than (26) since it does not tell us which copy to interpret when one copy c-commands another.

[20] See Chomsky's (2000) notion of *occurrence*.

Copy Pronunciation will mark the upper VP copy for interpretation at PF, as well as the copy of V within it, since neither is c-commanded by copies of themselves. The copy of V adjoined to v will be marked for pronunciation as well. The lower copy of VP being c-commanded by the upper, and thus will not be pronounced.

In (16), there is no departure from the so-called normal situation, since there is only the pronunciation of the heads of two different chains. The only thing that might be said to be unusual is that copies of the same syntactic object appear in both chains. In fact, this situation arises frequently in syntax, in cases of remnant movement. But this then raises a new question, one that is addressed immediately in the next section.

4.2 Remnant movement

Sentences such as (27a), which are given a remnant movement analysis, (27b), pose a direct challenge to (23). Isn't it predicted that *Peter* will be treated like V in a VC construction and thus pronounced twice?

(27) a. Geküsst hat sie Peter nicht.
kissed has she Peter not
'She has not kissed Peter.'

b. [$_{CP}$ [$_{VP}$<Peter> geküsst] hat sie Peter nicht < [$_{VP}$<Peter> geküsst]>]

Not necessarily. According to phase theory (Chomsky, 2000, 2001), all extraction from the complement of v—v's domain—must take place before the merger of C; when C is merged, the domain of v is spelled out, becoming an island to extraction according to the Phase-Impenetrability Condition.

(28) **Phase-Impenetrability Condition**
In a phase α with head H, the domain of H is not accessible to operations outside α, only H and its edge are accessible to such operations. (Chomsky 2000:108)

This means that in (27), where XP is the complement of v, *Peter* must scramble out of XP during the vP phase, moving at least as high as vP .[21] But does XP, which ultimately moves to CP, also have to move to vP? Since XP is v's complement, it seems that (28) renders it inaccessible to the next phase head, C, unless it moves to the edge of vP . But I propose that the domain of v should be taken to be the domain dominated by v's complement—the interior of the complement—and not the complement itself. XP is not in the island created by (28), because it is the island. So XP, as a whole, can still be accessible in the next phase, allowing it to move directly to Spec,CP.[22] However, the interior of XP is spelled out before movement takes place, meaning that Copy Pronunciation determines that the XP-internal copy of Peter is not pronounced. At the end

[21] XP is either VP or a functional projection containing VP.

[22] See Nunes and Uriagereka (2000) for a similar proposal on Spell-out domains and accessibility.It should be noted that this proposal doesn't lessen the intended empirical scope of (28). Also it allows the 'edge' of a phase to be defined as the syntactic objects immediately contained by the projection of the phase head. One advantage of such a definition is that it avoids complement-to-specifier movement, which would be reqired for a phase-head's complement to become accessible to operations in the next phase.

of the CP phase, where XP moves to the left periphery, the remainder of the derivation is transferred and Copy Pronunciation determines that the upper copy of XP is pronounced, giving us (27a/b).

The only relevant difference between the case of remnant movement and the case of VC is whether the constituent containing the syntactic object in question—the verb in (16) or IA in (27)—moves before or after it is subject to Spell-out. So under the simple assumption that only the heads of chains are pronounced, it is possible to derive both reduplication and remnant movement, provided we pay close attention to the order of operations in a cyclic derivation.

5 Comparison with existing accounts

While space doesn't allow us consider other accounts in great detail, we will in this section look at one aspect that unites them – namely, the placement of adverbials in vP .The fact that other accounts (Bartos (2003), Cheng (2005), Huang (1992), Li (1999), Paul (2002), Tang (1990), Wu (2004b) among others) consistently merge result and manner adverbials as complements of V, following Larson (1988).

This is of great interest to us because it is completely incompatible with our analysis and therefore poses a great threat to it. For VC to be described as VP movement, it is necessary that VP contain IA and exclude the adverbial, otherwise the adverbial would move along with the rest of VP. Let us then consider the motivation for placing the adverbial in VP.

5.1 Extraction

Li (1999) concludes that result clause adverbials must be in a complement position from the fact that they allow extraction, as seen in (29b), derived from (29a) by topicalization.

(29) a. tamen chang de wo mei xinsi kan xiaoshuo
3.pl sing DE I have.no mood read novel
'Their singing made me not in the mood to read novels.'

b. nei ben xiaoshuo, tamen chang de [$_{CP}$ wo mei xinsi kan __].
that CL novel 3.pl sing DE I have.no mood read
'That novel, I wasn't in the mood to read because of their singing.'

This conclusion only follows if extraction from specifiers is impossible. But, as pointed out by Di Sciullo and Isac (2004), specifiers can be extracted from:

(30) Who is there a description of __ in this book?

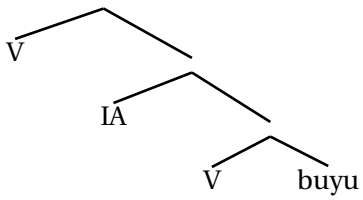
Di Sciullo and Isac suggest that it is not specifiers per se, but moved phrases, that are islands to extraction. Since in our analysis, result clauses are merged directly as Spec,F$_{Qty}$P, no island effect is expected; and even if we do not accept that movement alone causes island formation, (30) still shows that adequately that specifier-hood cannot be a sufficient cause either.

5.2 Distribution

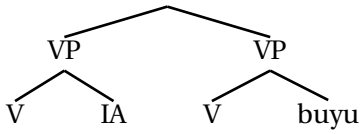
Merging result and manner *buyu* as complements of V has the advantage of accountingfor the lack of post-adverbial distribution of IA when these adverbials are involved (see (4) and (5), above). But while this could be seen as a possible cause, it is not a necessary one, only being argued for *ex silentio*. Likewise, if IA is the complement of V, as we have assumed, it does not follow that it must always be able to appear preceded by the adverbial.

In contrast, that the adverbial is the complement of V entails that IA is not (assuming binary branching)—a prediction that is, at least apparently, contradicted by VC. For this reason, other accounts are either forced to analyze the first occurrence of V in a VC construction as not forming a constituent with IA (Bartos 2003, Cheng (2005), Paul 2002), or if they do analyze the two as forming a constituent, then it is some sort of base generated 'VP-adjunct', distinct from the main VP (Cheng (2005), Huang (1992), Tang (1990), Wu (2004b)).[23] These two approaches are represented abstractly by (31a) and (31b):

(31) a.



b.



In the first case, the two occurrences can be related by standard head movement, but additional stipulations are needed to account for the pronunciation of a lower copy in a c-command chain (for instance, the morphological fusion operation proposed by Nunes (2005), (adopted by Cheng (2005)). In the second case, one appeal to Copy Pronunciation for reduplication, but the two occurrences of V cannot be related by standard movement.

In the first case, the two occurrences can be related by standard head movement, but additional stipulations are needed to account for the pronunciation of a lower copy in a c-command chain (for instance, the morphological fusion operation proposed by Nunes (2005), adopted by Cheng (2005)) . In the second case, one may appeal to Copy Pronunciation and lack of c-command for reduplication, but the two occurrences of V

[23]The attentive reader will notice that both types of account are attributed toCheng (2005). Cheng uses the first type to derive object-orientation of result, the second for subject-orientation, maintaining that orientation is determined by control. Consequentially, VC is to be seen as a derivationally heterogeneous phenomenon. Bartos (2003) arrives at the same conclusion, though by a different route (see footnote 11).

cannot be related by standard movement. Either they must be unrelated, i.e. resulting from separate lexical insertions, or linked by "sideward" movement (Cheng 2005, adopting Nunes 2005). This would be an unusual instance of sideward movement because it requires that the V head trigger its own movement, while it is still the "locus"of the derivation (Collins (2002a)), instead of merging the IA as a spec. Cheng (2005) proposes that indefinite IA's cannot be merged in Spec,VP, forcing the sideward movement of V to IA as a "last resort". This very interesting proposition seems to be undermined by the fact that definite nominals and proper names can be the IA in a VC construction.[24]

5.3 Conclusion

In this paper we have seen that it is possible to give a uniform account of Mandarin *v*P internal adverbial expressions, ranging from full clauses to elements of compounds, andincluding VC constructions. This account was shown to be compatible with a syntactic analysis of reduplication, derived only from what is needed to account for the normal(non-reduplicative) interpretation of chains at PF and the timing of operations.

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[24]In the cases where Cheng (2005) uses (31a) to analyse VC, IA is VP's spec, so non-indefinites *are* expected to be compatible. But this structure is used to derive the object-oriented reading of the resultative, so it cannot account for the possibility of a subject-oriented resultative VC construction with a non-indefinite IA, e.g. (23).

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What room for viewpoints?

Jacques Jayez and Anne Beaulieu-Masson

1 Introduction

In this paper, I study the semantic properties of the French discourse marker *de ce point de vue*, analogous to *in this respect*, *in/under/from this perspective* and *from this angle*. Intuitively, *de ce point de vue* (DCPV) signals that it introduces a certain perspective on a situation. In a configuration of the form *A* DCPV *B*, where *A* and *B* are propositions, it conventionally implicates that *B* is true or makes sense under the perspective associated with *A*. The empirical description of section 2 shows that, as a sentential adverb, DCPV has two main uses. Either it relates the speech act it introduces to a set of propositions (a viewpoint) without imposing specific constraints on this relation or it combines with a consequence discourse relation. In the latter case, DCPV cannot introduce *non-factual* speech acts, whose propositional content is true or false independently of any perspective. In section 3, we explore the notion of non-factuality and propose that it is a special form of non-monotony with conflicting default assumptions. In section 4, I investigate the use of DCPV as a VP-adverb and conclude that it indicates that the VP-action was carried out from a certain perspective. The upshot of the paper is the distinction between non-factuality and other, similar, dimensions such as modality or standard non-monotony.

2 Description of *de ce point de vue*

DCPV is the anaphoric demonstrative version of the construction *de* Det *point de vue* (lit. 'from' Det 'point of view'). Although nothing essential hinges on this point, I prefer to consider the expression as related to a construction rather than the result of a standard compositional process between the preposition *de* and a well-identified sense of *point de vue*. First, if *point de vue* is taken to be synonymous to *perspective*, as in *adopter une perspective* / *un point de vue* ('to adopt a perspective / a viewpoint'), it is unclear why we have a difference such as *de ce point de vue* / ??*cette perspective*. Second, if *point de vue* is taken to denote a (punctual) place, as in *Nous avons atteint le point de vue à sept heures* ('We reached the viewpoint at seven'), it is unclear why it is possible to adopt, endorse, etc. a *point de vue* since one does not 'espouse a place'. As noted in Porhiel (1997), the construction can take nominal complements or adjectival modifiers: *du point de vue de Marie* ('from the point of view of Mary'), *d'un point de vue philosophique* ('from a philosophical point of view').

Semantically, DCPV occurs as a sentential adverb or a VP-adverb. The difference is illustrated in (1). (1b) is clumsy because sentence-initial DCPV is preferably interpreted

as a S-adverb connecting two propositions. However, the proposition that EU's policy had been previously investigated does not clearly satisfy the semantics constraints on DCPV, as we will see in section 2.2. In this paper, I focus on the sentential use, turning only briefly to the VP-adverb in section 4. Whenever possible, I construct parallel examples with *in this respect* (ITR). Although I do not rate the English glosses, it can be observed that ITR patterns like DCPV in many cases.

(1) a. 40% des émissions de CO2 sont provoquées par les produits pétroliers. Si l'on examine de ce point de vue la politique de l'Union européenne [...][1]
'40% of CO2 emissions are caused by fossil fuel products. If we consider EU's policy in this respect ...'

b. ? 40% des émissions de CO2 sont provoquées par les produits pétroliers. De ce point de vue la politique de l'Union européenne avait été examinée.
'40% of CO2 emissions are caused by fossil fuel products. In this respect, EU's policy had been investigated.'

2.1 Consequence and non-consequence environments

The central observation about DCPV is exemplified in (2).

(2) a. L'avion de Marie n'a pas décollé à l'heure, DCPV ses vacances ont mal commencé.
'Mary's plane didn't take off on time, ITR her vacations started poorly.'

b. ??L'avion de Marie n'a pas décollé à l'heure, DCPV elle a été en retard à son rendez-vous.
'Mary's plane didn't take off on time, ITR she was late for her appointment.'

When DCPV is fine in an environment E, general purpose consequence discourse markers such as *donc* (≈ *therefore*) or *alors* (≈ *so*) are often appropriate in E. Consequence relations can connect various types of speech acts; in particular, they can introduce interrogatives expressing doubt, perplexity or genuine ignorance, see Jayez (2002). For instance, the act conveyed by the interrogative in (3) is presented as following from the situation: since the speaker admits that he cannot be a champion, he wonders what his best choice is. DCPV, too, can introduce interrogatives with an equivalent interpretation. In (3b), the speaker presents his question as a consequence of the first proposition, which also constitutes the perspective under which the speaker raises the question.

(3) a. Je n'ai pas les capacités pour atteindre le niveau rêvé, par conséquent : est-ce que je préfère arrêter totalement ou est-ce que je préfère quand même réaliser des performances qui me sont possibles?[2]
'I don't have the abilities to reach the level I dreamt of. So, do I prefer to stop everything or do I still prefer to deliver the performances that are within my abilities?'

[1] Adapted from a French text at `http://www.lagauche.com/lagauche/article.php3?id_article=1138`.

[2] Excerpt from a French text about hockey at `http://www.editionhockey.com/ed16halle.htm`

b. Je n'ai pas les capacités pour atteindre le niveau rêvé. DCPV est-ce que je préfère arrêter totalement?
'I don't have the abilities to reach the level I dreamt of. ITR do I prefer to stop everything?'

However, there are two reasons to doubt that DCPV is only a consequence discourse marker. First, in some examples, the existence of a consequence interpretation is not sufficient. E.g., the odd example (2b) is fine when DCPV is replaced by a consequence discourse marker, see (4).[3]

(4) L'avion de Marie n'a pas décollé à l'heure, donc/alors/du coup elle a été en retard à son rendez-vous.
'Mary's plane didn't take off on time, therefore/so/as a result, she was late for her appointment.'

Second, the consequence interpretation is sometimes unclear or optional, whereas DCPV is perfectly natural. The question in (5a) is motivated by a goal that one can infer from the first sentence, i.e. to gain a better understanding of restructuring. However, whether it is a consequence of the goal is difficult to decide. (5b) exhibits the frequent 'domain-based' use of DCPV. The complete text revolves around the problem of electronic document indexing. The Gallica project consists in digitizing the documents of the French National Library. Since Gallica archives are pdf images, it is impossible to apply standard text-processing searching facilities to them. The author of (5b) acknowledges this lack and expresses his ignorance as to the policy of the parallel European project. The author's ignorance is relevant to a goal that can be inferred from the first sentence, namely to bring information on the topic of indexing facilities. The author expresses his current possible contribution to this goal. I return to this case in the next section under (8).

(5) a. La troisième séance sera consacrée à l'analyse du phénomène des restructurations. DCPV, comment replacer la période que nous vivons dans un contexte historique ?[4]
'The topic of the third session will be the analysis of economic restructuring. ITR, how should we appreciate the current period in an historical context?'

b. L'absence d'indexation du texte est effectivement une seconde lacune [...]. DCPV, j'ignore sur (*sic*) le projet de bibliothèque numérique européenne s'oriente vers une solution de type gallica.[5]
'The absence of text indexing is indeed another missing feature. ITR, I don't know whether the digital library European project moves towards a Gallica-style solution.'

[3]The glosses offered for the consequence discourse markers are particular to this example and are not intended to provide general equivalents.

[4]Excerpt from a French text at `http://72.14.207.104/search?q=cache:VP-0Y40Az0IJ:www.insee.fr/fr/ppp/sommaire/imet95-96a.pdf`

[5]Excerpt from a French text at `http://frederic-rolin.blogspirit.com/archive/2006/01/10/gallica-pepites-et-deceptions-dans-le-domaine-juridique.html`

The examples reviewed so far suggest that a propositional structure *A* DCPV *B* is subject to two constraints.
1. DCPV signals that *B* is relevant to at least one proposition A' connected with *A* or that A' is relevant to *B*.
2. In addition, the nature of *B* depends on whether DCPV corresponds to a consequence relation or not. In the former case, DCPV is sensitive to the factual character of the proposition it introduces, as shown by the contrast in (2). Whereas the proposition that Mary was late can describe a fact, that is, an objective state of affairs whose existence is independent of the perspective we adopt, the proposition that her vacations started poorly sounds rather like a judgement or evaluation. In certain cases, DCPV introduces sentences that do not directly express judgements but rather conversationally implicate them. For instance, the speaker of (6) expresses the wish that political programs concern many citizens instead of just being the preserve of political parties. He then asks a rhetorical question, whose implicature can be paraphrased as 'strong presidentialism has diverted people from getting engaged into politics'.

(6) DCPV, est-ce que la question clé n'est pas celle de la présidentialisation installée du régime sous lequel nous vivons depuis 1958?[6]
'ITR, is not the main question that of the steadily presidentialist regime under which we have been living since 1958?'

In the next section, I rephrase (1) and (2) more accurately.

2.2 Respects and relevance

In order to analyse DCPV, I introduce the descriptive notion of a *respect*. A respect is a viewpoint that a speaker adopts to draw a certain conclusion or to refer to a domain of relevance. Respects are felt as contrastive. For instance, a proposition is true or relevant in virtue of being considered under a particular perspective. It might be false or irrelevant under another, different, perspective.

To circumscribe this notion we need two ingredients, an ontology which determines the pieces respects are made of and their modes of coherence, a dependency relation which determines the connection between the respect and the proposition or speech act introduced by DCPV.

Respects are relative to discourse agents. For an agent *a*, a respect is a set of eventuality-descriptions and attitudes or plans ascribed to *a* and presented as related to another proposition. Attitude statements express the beliefs, desires and intentions of the agent, like in so-called 'BDI-models' (see Woolridge (2000) for an overview). Plans correspond to the skills and know-hows of agents. Formal models of plans connect them to intentions and beliefs in a complex way that I will not discuss here, see Lochbaum (1998). Respects are often structured as domains (mathematics, philosophy), dimensions of evaluation (beauty, quickness) or agents as sources of attitudes, see PPs like *du point de vue des mathématiques* 'from the point of view of mathematics', *du point de vue de*

[6] Excerpt from a French text at `http://espacesmarxbordeaux.apinc.org/IMG/html/BN262_Bordeaux.html`.
The left context can be paraphrased by 'To be possible, social change requires that citizens themselves be involved in the elaboration of political programs '.

l'efficacité 'from the point of view of efficiency' or *du point de vue de Marie* 'from the point of view of Mary' (Porhiel 1997).

(7) Let $i(A)$ denote a speech act with illocutionary force i and propositional content A. For an agent a, a *respect* relative to a speech act $i(A)$ is a set P of propositions that satisfies the following three conditions.
   1. The propositions in P describe eventualities or express the fact that a entertains a certain attitude towards a propositional content or the fact that a believes she has a plan for a certain goal.[7]
   2. P is (i) the set of implicatures of a unique proposition A' or (ii) represents the attitudes and plans attached to a common theme, domain, event, dimension of evaluation or agent.
   3. In case (2.i), $i(A)$ is a non-factual consequence of P. In case (2.ii), $i(A)$ or the propositional content of the attitude expressed in A is related to at least one of the elements of P by a relevance relation.

The notion of relevance I use is that of Merin (1997, 1999).

(8) **Merin's relevance** A is *positively* (*negatively*) *relevant* to B just in case updating the context with A raises (lowers) the probability of B. A and B are relevantly related whenever A (B) is relevant to B (A).

What complicates the picture is that, according to (7.3), relevance may involve only the propositional content. For instance, in (5b) the proposition that the absence of text-indexing facilities is unwelcome has relevance to the proposition that the European project adopts a gallica-style solution.

In certain cases, the notion of respect is intuitively clear. For instance, in (2a), the proposition that Mary's plane was delayed is a respect that licenses the conclusion that her vacations started poorly. Similarly, in (9a), the information state that corresponds to the domain of philosophy is a respect. A domain is not just a *space* (Nunberg 1978, Fauconnier 1984) nor a *medium* (Ross 1988). Loosely speaking, spaces and media are set of propositions that have a certain spatio-temporal unity. For example, (the representation of) a film, a novel, a play are spaces/media. In general, spaces/media are different from domains because they have no thematic unity,[8] although they can contain respects. For instance, an expression like *du point de vue de ce film* ('from the perspective of this film') usually makes reference to opinions expressed in the film and ascribed to the author.

It is an open question whether one can subsume domains, spaces/media and other 'frames' under one unifying category, see Charolles (1997) for French. Giving an objective status to the notion of thematic coherence is notoriously difficult (Gliozzo 2005) and I will use the notion as a conceptual black-box in this paper. In many cases, the propositions that constitute the respect are not explicit but only hinted at by a previous sentence, as in (9b). The preferred interpretation is that, if one takes into account the set of propositions found in metaphysics, the book *Non-Metaphysical Metaphysics* is

[7] In Lochbaum (1998), plans that are the objects of beliefs are called *recipes*.

[8] In this connection, one may also note that spaces/media do not contain plans or attitudes of the speaker, although they can contain plans and attitudes of the characters.

outstanding.

(9) a. Philosophically, God is perhaps not free.
b. J'ai beaucoup étudié la métaphysique, DCPV *Non-Metaphysical Metaphysics*, de S. Brightbrains, est remarquable.
I have studied metaphysics much, ITR *Non-Metaphysical Metaphysics* by S. Brighbrains is outstanding.

The constraint on the S-adverb DCPV is expressed in (10). I assume that, being a demonstrative expression, DCPV is subject to the accessibility preferences on anaphoric demonstratives for binding to and accommodation of its possible antecedents, see Diessel (1999) for an overview and Kleiber (2003) for a recent analysis for French.

(10) When DCPV is a S-adverb, DCPV $i(A)$ is appropriate iff there is an accessible respect relatively to $i(A)$.

Condition (7.3) mentions non-factuality. However, the notion has not been defined yet. It is investigated in the next section.

3 Non-factuality

In this section I consider the consequence interpretation. A respect involved in a consequence interpretation will be called a C-respect.

3.1 Attitudes and modal bases

In many cases, the odd examples that contain factual propositions are not improved by adding a modality.

(11) ?? L'avion de Marie n'a pas décollé à l'heure. DCPV elle (doit être/sera probablement/sera peut-être) en retard.
'Mary's plane didn't take off on time, ITR she (must be/will probably be/will perhaps be) late.'

However, when rating examples like (12), certain speakers have mixed feelings.

(12) a. % L'avion de Marie n'a pas décollé à l'heure. DCPV peut-être qu'elle sera en retard.
'Mary's plane didn't take off on time, ITR maybe she will be late.'
b. % L'avion de Marie n'a pas décollé à l'heure. DCPV il est probable qu'elle sera en retard.
'Mary's plane didn't take off on time, ITR it is probable that she will be late.'

Moreover, examples like (13) sound much more natural. The intended interpretation can be paraphrased by 'the fact that many families chose a shanty town *of their own will* makes it probable that they hoped to be rehoused more efficiently'.

(13) Beaucoup de familles ont choisi de s'installer dans le bidonville de leur plein gré. DCPV il est probable qu'elles ont été attirées par des promesses de reloge-

ment.[9]
'Many families chose to settle in the shanty town of their own will. ITR it is probable that they were attracted by promises to rehouse them.'

Finally, C-respects may be paraphrased by DCPV, *on peut donc dire que* ('ITR, one may then say that').

(14) L'avion de Marie n'a pas décollé à l'heure, DCPV on peut donc dire que ses vacances ont mal commencé.
'Mary's plane didn't take off on time, ITR one can then say that her vacations started poorly.'

So, I have to account for the fact that DCPV (i) is anomalous when it introduces a factual piece of information and (ii) can occur more felicitously in certain attitudinal contexts.

Under the consequence interpretation considered in this section, being a C-respect is a relational notion, since C-respects are defined 'with respect to' non factual-propositions that constitute their conclusions. So, being the premise of a consequence is not equivalent to being a C-respect. For instance, in (2b), the proposition that Mary's plane was delayed is not a C-respect since the conclusion is factual. What kind of relation could 'being a C-respect' correspond to? A straightforward answer is that a C-respect is a modal viewpoint, as in Kratzer's (1981) approach.

In Kratzer (1981), it is proposed that modal doxastic and deontic utterances exploit *modal bases*, i.e. sets of worlds, and ordering relations on modal bases. To wit, $w' \leq w$ means that w' is preferred over w along the dimension (epistemic, doxastic, etc.) with respect to which the worlds in W have been chosen.[10] Let us call a pair $(W, \leq)$, where W is a set of worlds and $\leq$ a partial order on W, a *modal viewpoint*.

One could then analyse (2a) as follows. There is a modal viewpoint such that the proposition that Mary's plane was delayed 'entails' that her vacations started poorly. Entailment is best conceived as in preferential systems of conditional logic in the manner of Lewis (1973).[11]

Returning to (2a), if definition (i) of footnote 11 applied to it in a model m, del-plane > poor-stvac would be true in m iff for every world w where del-plane is true there is some $w' \leq w$ such that del-plane > poor-stvac is true at w' and downward. What kind of preference relation is appropriate in this case? A simple answer is: any relation such that del-plane > poor-stvac is true in all the most preferred worlds, that is, a relation

[9] Adapted from a French text at `http://www.coe.int/T/DG3/RomaTravellers/documentation/fieldvisits/MisRapportvaldemingomez_fr.asp`.

[10] $w' \leq w$ is often paraphrased by 'w' is at least as normal as w'.

[11] More explicitly, one may define a preferential entailment relation > along the lines of (i).

(i) Let $m = (W, \leq)$ be a modal viewpoint. $p > q$ is true in m iff for every w where p is true, there is a world w' such that (i) $w' \leq w$, (ii) $p \wedge q$ is true at w' and (iii) for every world w'' such that $w'' < w'$, $p \Rightarrow q$ is true at w''.

The intuition behind this kind of definition is that if p is true somewhere in W, there must be a world at least as normal as the world where p is true and such that $p \Rightarrow q$ is true there and down through the world sequence. In other terms, one can always reach a point where $p \Rightarrow q$ becomes irreversibly more normal than $p \wedge \neg q$. Note, however, that, like in other systems based on classical logics, (i) does not exclude possibly irrelevant conditional truths like T > T or F > T/F, where T is any tautology and F any contradiction.

which presents the connection between the two propositions as more normal than any situation where the first proposition is true and the second false. For instance, this may be the case if the speaker adopts the common sense[12] rule that an unpleasant circumstance negatively taints the event of which it is a part.

Let us now compare (2a) and (2b). One might argue that the latter is odd because (i) DCPV requires that the sentence it introduces be interpreted from some modal viewpoint and (ii) the proposition that Mary was late for her appointment has an 'objective' quality and is not true or false from any particular perspective.[13] If this explanation is correct, the semantics of DCPV turns out to be rather simple: DCPV expects a point of view.

But consider (11). Intuitively, the modal viewpoint concerns what the speaker considers plausible. w' is more normal than w ($w' < w$) if it conforms to the speaker's standards of plausibility better than w does. It is then unclear why DCPV is not appropriate in that context. One might argue that, although modal viewpoints are amenable to a uniform representation, they still differ in nature. E.g. doxastic and evaluative attitudes possibly point to different viewpoints. Although this hypothesis is not implausible, it raises two problems. First, the contrast between (11) and (13) remains unexplained. Second, the alleged difference is very vague and has to be substantiated for its explanatory value to be assessed.

To sum up, there is nothing in the notion of modal viewpoint that allows us to characterise non-factual propositions in a simple way. Therefore, C-respects cannot be reduced to modal relations.

3.2 C-respects and *qua* objects

A more promising line of explanation is provided by Fine's (1982) analysis of *qua* objects. A *qua* object is a pair of the form <*d*,*F*>, read '*d qua F*', where *d* is an entity, the 'base' and *F* a (possibly complex) property, the 'gloss'. For instance, an expression like *a statue of Goliath* refers to a certain amount of matter (the base) and exhibits a gloss that describes the shape of the statue (its similarity to Goliath). This analysis leads to the question of a possible dependency between glosses, a notion made explicit in Fine's subsequent work. E.g., the statue is beautiful 'in virtue of' having a certain shape, not 'in virtue of' weighing one ton. (2a) sounds similar, since it is in virtue of the gloss 'Mary's plane was delayed' that the gloss 'Mary's vacations started poorly' makes sense. One could then propose that DCPV marks a dependency between descriptions.

However, this is not a sufficient criterion, because one can easily construct odd examples that exhibit an obvious dependency, see (15). Yet, 'ABC has two equal angles in virtue of the nature of the objects that are isosceles' is a valid proposition in Fine's (2000) system.

(15) ??Le triangle ABC est isocèle, DCPV il a deux angles égaux.
'The triangle ABC is isosceles, ITR it has two equal angles.'

[12] In this paper, I use 'common sense' in a deliberately loose way, to refer to non-mathematical rules in general, including social, religious and causal beliefs as well as proverbs.

[13] In fact, this point is open to discussion. One might argue that a very short delay does not count as a delay even if, strictly speaking, it is a delay, see Lasersohn (1999) on this problem.

Admittedly, the dependency shown in (15) is very strong since it coincides with mathematical necessity. If a triangle is isosceles, it *must* have two equal angles, whatever perspective one adopts. This suggests that DCPV might perhaps be more natural in the presence of a weaker dependency. This possibility is not supported by the facts. First, replacing necessary connections between propositions by plausible ones is not sufficient, as evidenced by (16).

(16) ??Jean est fatigué, DCPV il va aller dormir.
'John is tired, ITR he is going to sleep.'

Second, even weaker relations do not license DCPV. For instance, the proposition that ABC is a triangle is positively relevant to the proposition that ABC is isosceles. In contrast, the proposition that ABC is a chair or a horse is negatively relevant to the proposition that ABC is isosceles. (17) shows that exchanging plausibility for positive relevance does not improve the sentences.

(17) ??ABC est un triangle, DCPV il pourrait être isocèle.
'ABC is a triangle, ITR it might be isosceles.'

In general, in a structure *A* DCPV *B* where *B* is a consequence of *A*, DCPV is appropriate only if it exists at least one common sense rule that presents *A* as a sufficient condition for *B*. This constraint is not satisfied in (17). To be isosceles, a polygon must be a triangle or a tetrahedron but it is not enough that it is a triangle, or a tetrahedron or either a triangle or a tetrahedron.

A similar observation holds for propositions that describe actions. If Mary turns the key into the keyhole, she may be said to have (un)locked the door. In that case, DCPV sounds inappropriate, unless we imagine that there are several respects in which a door can be closed.[14] Symmetrically, if Mary just picks up the key, in order to close the door, DCPV is again infelicitous. In the former situation, the consequence relation is too strong, whereas it is too weak in the latter. The distinction between the two cases corresponds to the difference between *generation* and *enablement* (Pollack 1986, 1990). An action A_1 generates an action A_2 when executing A_1 coincides with executing A_2. A_1 enables A_2 if A_1 contributes to executing A_2 but, in addition to executing A_1, it is necessary to do something else in order to achieve the result of A_2.

(18) a. % Marie a tourné la clef dans la serrure, DCPV elle a fermé la porte.
'Mary turned the key into the keyhole, ITR she closed the door.'
b. ??Marie a pris la clef, DCPV elle a fermé la porte.
'Mary picked up the key, ITR she closed the door.'

3.3 Taking stock

What did we learn so far? First, that C-respects are not reducible to modal viewpoints in the sense of Kratzer's modal base theory (section 3.1). Second, that C-respects are neither entailments (strong consequence relations) nor preconditions or enablements (weak consequence relations). Third, that they are grounded in common sense rules.

[14] Olivier Bonami (p.c.) pointed out that, for instance, a door could be 'closed' because it is locked but 'open' because it is off the latch or ajar.

The contribution of the notion of *qua* object is more difficult to appreciate. Although Fine's approach is too liberal to capture C-respects, it embodies an important intuition, namely that we draw inferences on the basis of *partial* views of an object. In the next section, I propose an analysis that aims at calibrating this intuition in a more explicit setting.

3.4 Analysing C-respects

I start from the idea that DCPV is out whenever it introduces a factual proposition, whose truth does not depend on a particular perspective. Moral, aesthetic, intellectual, emotional judgements are qualifications, i.e. they involve perspectives. So, DCPV fits particularly well into contexts where speakers express judgements of that kind.

In this respect, DCPV is analogous to the *trouver que* verb studied by Ducrot (1975). Ducrot noticed that *trouver que* cannot naturally introduce a factual proposition.

(19) a. Je trouve que Jean est bête.
'I find that John is stupid.'
b. ??Je trouve que Jean est venu.
'I find that John came.'

However, to make the intuition more precise, one has to substantiate the notion of 'factual proposition'. A particularly pressing question is whether factual propositions and facts are one and the same thing.

3.5 Factuality and facts

There is a large amount of literature on 'facts' (see Ginzburg and Sag (2000), Jayez and Godard (1999), Kratzer (2002) for recent work and references therein). But the entities characterised as 'facts' cut across the present distinction. E.g., according to Ginzburg and Sag (2000), *remember* takes a fact-denoting clause. Under this assumption, if facts and factual propositions were the same, one would expect that non-factual *that*-clauses be anomalous with *remember*, an assumption which is not verified, as evidenced by the possibility of (20b).

(20) a. John remembers (the fact) that Mary was late.
b. John remembers (the fact) that Mary's vacations started poorly.

One might object that such environments do not (always) select phrases that denote *metaphysical* facts, but rather phrases that can denote entities that constitute the denotation of words like *fact* in English or *fait* in French. Generally speaking, the status of *that*-clauses and, more generally, of substitution tests is complex and I am not going to delve into this problem here (see Godard and Jayez (1999), King (2002), Moffett (2003), Moltmann (2003, 2004)). Whatever the correct analysis of 'facts' might be, examples like (20) show that factual and non-factual *that*-clauses can be complements of *the fact*. So, what is required is that we make clear the notion of factual proposition and the rest of the paper is an attempt in this direction.

3.6 Factual propositions

In pretheoretical intuition, propositions that assert the existence of a perceptible event or assign mathematical properties to an object are factual. We consider a mathematical proposition to be factual because its truth can eventually 'stabilise', that is, when one has produced a set of mathematically acceptable justifications for a proposition, the latter cannot be defeated by other, subsequent, justifications.

For empirical judgements, the situation is far from clear. Suppose that, during a police investigation, a witness declares that he saw John getting in his car at time t. The witness is sincere, but it subsequently turns out that it was Sam, masquerading as John, who actually got in the car at t. Whereas the proposition that John got in his car at t depends on the evidence we have, it is interpreted as factual, as shown by the oddness of (21).

(21) **Context** : John is tall, bald and owns a CSSP05 sweat
??Le témoin a vu un homme grand, chauve, avec un sweat CSSP05, monter dans sa voiture à huit heures, DCPV John est monté dans sa voiture à huit heures.
'The witness saw a tall, bald man with a CSSP05 sweat, get into his car at 8, ITR John got into his car at 8.'

One may describe the example in two opposite ways. On the one hand, since people have to revise their beliefs to accept that it was Sam, not John, who got in the car, it seems that there is new evidence that *contradicts* the former. Thus, the consequence ('John got in his car at 8') cannot be withdrawn without there being a contradiction at some stage. On the other hand, one might retort that empirical judgements are *always* unstable. Even the most accurate physical observation relies on the assumption that the experiment apparatus is working smoothly at the moment of the observation. Considerations of this kind form one of the themes of Wittgenstein's *On Certainty* (Wittgenstein (1969)). Wittgenstein claims that all judgements, including the results of mathematical proofs, are in principle open to discussion, since they depend on particular behaviours, which might be faulty. However, he does not draw the conclusion that all categories of judgements are one and the same. We consider mathematical results and most perceptions to be 'beyond reasonable doubt', although they are not or we cannot prove they are.

Suppose that we adopt Wittgenstein's perspective that there is no 'absolute' certainty.[15] Can we still make a difference between judgements like 'John got into his car' or 'Mary was late for her appointment' and 'Mary's vacations started poorly'? Are factual propositions more 'robust' than non-factual ones? Perceptual judgements may be revised, that is, they can change if information is added. In other words, in issuing such judgements, we can prove wrong. If Mary's plane was delayed and in addition she broke her leg and had her bags stolen, there is little doubt that her vacations started poorly. So, our figment is not really shakier than in the case of direct perception. A similar observation holds for mathematical conjectures. A mathematical conjecture can never be proved, hence never become a 'fact'. Yet it is considered to be factual, more factual than the robust judgement that Mary's vacations started poorly.

However, this does not entail that factual and non-factual propositions are alike in

[15] Or, maybe more accurately, that the notion of absolute certainty does not make sense.

every respect.[16] They might not differ as to their certainty. But they still differ as to their definitional properties. In most cases, we can tell what would count as a proof of a factual proposition,[17] even if we have no idea about how the proof could be achieved. Mathematical definitions are crisp, not fuzzy: if one has a proof that x is a polygon and that it has three angles, one has thereby a proof that x is a triangle. Whether and how it is possible to have a proof that x is a polygon or has three angles is beside the point. Similarly, if one has a proof that Mary saw someone who looked like John at t and a proof that she is not mistaken, one has thereby a proof that John was where Mary saw him at t. It is not so for C-respects. If one has a proof that Mary's plane was delayed, one has not *ipso facto* a proof that her vacations started poorly. One has only a proof that her vacations started poorly *under a certain perspective*. What is crucial is the mode of dependency between premises and conclusion. As noted by Olivier Bonami (p.c.), this applies to measures. For instance if John is taller than 6 feet, I can say that 'in this respect' he is tall, meaning that I consider some threshold inferior or equal to 6 feet to be the threshold of tallness (see Cresswell (1976)).

This short discussion suggests that non-factual propositions have two properties. They are rule-like and relativized to C-respects. As rules, they cannot be (strong) implications. For instance, a delayed plane cannot entail in a strong sense that one's vacations start poorly. Rather, non-factual propositions derive from nonmonotonic inferences, i.e. inferences that can be cancelled by subsequent information. In addition, non-factual propositions depend on their 'premises', the propositions that have been used to derive them. This allows one to entertain 'contradictory' views on the same entity. In a nutshell, if the notation $p_1 \dots p_n \vdash q$ stands for the fact that q is derivable from the premises $p_1 \dots p_n$, the difference between factual and non-factual propositions can be represented informally as in (22). When q is factual, it is simply derivable from some premises (22.1). When q is not factual, it is derivable (i) through a nonmonotonic relation ($\mid\!\sim$) and (ii) in relation to the premises, as suggested by the notation $(p_1 \dots p_n : q)$. Formally, propositions of the form $(\Sigma : p)$ and $(\Gamma : p)$ count as different, which ensures that $(\Sigma : p)$ and $(\Gamma : \neg p)$ are not contradictory.

(22)
1. $p_1 \dots p_n \vdash q$ — q is factual
2. $\begin{cases} p_1 \dots p_n \mid\!\sim (p_1 \dots p_n : q) \\ p'_1 \dots p'_k \mid\!\sim (p'_1 \dots p'_k : \neg q) \end{cases}$ — q is non-factual

3.7 Preferential systems

A natural choice for representing non-factuality inferences is a nonmonotonic system. Monotony and nonmonotony are properties of consequence relations, that is, relations between sets of formulae. Following standard usage, I note consequence relations by $\vdash$. If Φ and Ψ are sets of formulae, $\Phi \vdash \Psi$ means intuitively that Ψ is a consequence of Φ.

[16] See Diamond (1991) on this point and related issues in Wittgenstein's philosophy.

[17] This does not entail that we are able (i) to characterise all the possible things that would count as a proof of a factual proposition or (ii) to determine whether a given piece of behaviour complies with our criteria for being a proof of the proposition.

(23) **Monotony** A consequence relation $\vdash$ is monotonic iff, for every Φ and Ψ, if $\Phi \vdash \Psi$ then $\Phi \cup \Phi' \vdash \Psi$ for any Φ'.

A nonmonotonic consequence relation does not satisfy monotony. Noting $\mid\!\sim$ such relations, we have.

(24) **Nonmonotony** A consequence relation $\mid\!\sim$ is nonmonotonic iff there exists Φ and Ψ, such that $\Phi \mid\!\sim \Psi$ and, for some Φ', $\Phi \cup \Phi' \not\mid\!\sim \Psi$

There is a huge variety of nonmonotonic systems, for instance default logics, autoepistemic logics, preferential models, etc., see Brewka (1991) for an overview. However, recent work (Kraus et al. (1990), Friedman and Halpern (1995, 2001), Friedman et al. (2000)) shows that most systems can be parametrised in the framework of *preferential systems*, defined in terms of preference relations, (following Lewis (1973) and Shoam (1987)). In addition to providing a standard of comparison, the preferential systems cast a bridge between nonmonotonic logic and conditional logics, as used in formal semantics, for instance in Kratzer-like modal approaches.

Following Friedman and Halpern (2000:section 6), I introduce the notion of a *plausibility structure* for first-order statistical conditional logic. Intuitively, a plausibility structure looks like a probability structure, but it assigns a rank within an ordered set instead of a numeric value to the measurable sets. Statistical conditional logic avoids some of the pitfalls of first-order modal conditional logic. The syntax is that of first-order logic augmented with the condition (25).

(25) If A and B are first-order formulae and X a set of variables, $A \rightsquigarrow_X B$ is a formula, called a *default*. If $\delta = A \rightsquigarrow_X B$ is a default, A is the *antecedent* of δ and B its *consequent*.

The intuition behind (25) is that $\rightsquigarrow_X$ acts as an operator binding the variables in X. For instance, $P(x,y) \rightsquigarrow_{\{x,y\}} Q(x,y)$ means that most x's and most y's satisfying P also satisfy Q, $\exists x(P(y) \rightsquigarrow_{\{y\}} P(x))$ means that, for some x, most y's that satisfy P are such that $P(y)$ entails $P(x)$, etc. Defaults $A \rightsquigarrow_X B$ and $A \rightsquigarrow_Y B$ where X and Y can be obtained from each other by variable renaming are considered to be equivalent.

(26) Let us assume that we work in a first order language with a countably infinite set of variables. A first-order statistical plausibility structure **PL** is a quadruple (U, I, D, Pl), where:
1. U is a set (the domain of individuals),
2. I is a first-order interpretation function,
3. D is a partially ordered set with a top $\top$ and a bottom $\bot$,
4. Pl is a plausibility measure of the form $\wp(U^{\aleph_0}) \to D$ that satisfies:
   . $\mathsf{Pl}(\emptyset) = \bot$, $\mathsf{Pl}(U^{\aleph_0}) = \top$,
   . If $X \subseteq Y$, $\mathsf{Pl}(X) \leq \mathsf{Pl}(Y)$.

The intended meaning of (26.4) is that Pl assigns a rank to each set of assignment functions from variables of the language to elements of U. These functions are represented by countably infinite sequences of elements of U. Any n-ary relation can be represented as a set of assignment functions whose only the first n elements are considered. E.g., the relation $\{\langle a,b,c\rangle, \langle c,d,a\rangle\}$ is the set $\{g : (g(x_1) = a \wedge g(x_2) = b \wedge g(x_3) =$

$c) \vee (g(x_1) = c \wedge g(x_2) = d \wedge g(x_3) = a)\}$. So, any member A of $\wp(U^{\aleph_0})$ is a set of k-ary relations for $k \in \mathbb{N}$. From a probabilistic or 'plausibilistic' point of view, $A \subseteq B$ means, for each $k \in \mathbb{N}$, that it is at least as likely to find a k-sequence from B than a k-sequence from A.

For classical expressions, the satisfaction conditions are standard. For defaults, we have (27). The constraint can be roughly paraphrased as follows: $A \rightsquigarrow_X B$ is true in a structure whenever either no plausible assignment of values to X satisfies A or it is more plausible to find an assignment on X that satisfies A and B than an assignment on X that satisfies A and $\neg B$.

(27) Let g be an assignment function and $g \approx_X g'$ note that g and g' differ from each other at most on the set X, $\mathbf{PL}, g \models A \rightsquigarrow_X B$ iff either:
1. $\mathsf{Pl}(\{g' : g' \approx_X g \wedge \mathbf{PL}, g' \models A\}) = \bot$ or,
2. $\mathsf{Pl}(\{g' : g' \approx_X g \wedge \mathbf{PL}, g' \models A \wedge B\}) > \mathsf{Pl}(\{g' : g' \approx_X g \wedge \mathbf{PL}, g' \models A \wedge \neg B\})$.

If A and B are closed formulae, for $A \rightsquigarrow_X B$ to be true it is necessary that A be false or A and B be true, so $\rightsquigarrow_X$ coincides with material implication. This is as expected, since $\rightsquigarrow$ is meant to express *rules* on classes of objects or eventualities, not isolated facts. For instance, a possible representation for the vacations example (2a) involves a rendering of 'generally, when a plane is delayed (e) at the beginning of e', e' starts poorly'.

$$\textit{del-plane}(e) \wedge \textit{st}(e, e') \rightsquigarrow_{\{e,e'\}} \textit{poor-st}(e, e')$$

The classic 'Tweety' example illustrates the possibility of combining potentially conflicting rules within consistent theories. *tweety* is a constant symbol.

$$\begin{aligned} T = \quad & \{\textit{penguin}(\textit{tweety})[r_1], \forall x(\textit{penguin}(x) \Rightarrow \neg \textit{fly}(x))[r_2], \\ & \forall x(\textit{penguin}(x) \Rightarrow \textit{bird}(x))[r_3], \textit{bird}(x) \rightsquigarrow_{\{x\}} \textit{fly}(x)[\delta]\}. \end{aligned}$$

By r_1 and r_3 we obtain $\textit{bird}(\textit{tweety})[r_4]$. By r_1 and r_2, we obtain $\neg \textit{fly}(\textit{tweety})$. If most birds fly, there is no contradiction between this fact and the fact that Tweety, being a penguin, cannot fly.

3.8 Adding non-factuality

What happens if we have the following two defaults?

(28) $A_1(x) \rightsquigarrow_{\{x\}} B(x)[\delta_1]$
$A_2(x) \rightsquigarrow_{\{x\}} \neg B(x)[\delta_2]$

Suppose that δ_1 and δ_2 are true in a model $\mathbf{PL}$. Let us note $[\![A]\!]$ the set of assignment functions g such that $\mathbf{PL}, g \models A$. Assume that $[\![A_1(x)]\!]$ and $[\![A_2(x)]\!]$ are different from $\bot$. Then, we have:

$$\mathsf{Pl}([\![A_1(x) \wedge B(x)]\!]) > \mathsf{Pl}([\![A_1(x) \wedge \neg B(x)]\!])$$
$$\mathsf{Pl}([\![A_2(x) \wedge \neg B(x)]\!]) > \mathsf{Pl}([\![A_2(x) \wedge B(x)]\!])$$

Consider $[\![A_1 \wedge B]\!]$. If it is empty, then $\mathsf{Pl}([\![A_1 \wedge B]\!]) = \bot$ and $\mathbf{PL} \not\models \delta_1$. So, $[\![A_1 \wedge B]\!] \neq \emptyset$. For the same reason, $[\![A_2 \wedge \neg B]\!] \neq \emptyset$. If $[\![A_1 \wedge B]\!] \cap [\![A_2 \wedge \neg B]\!] \neq \emptyset$, there exists a g such that $\mathbf{PL}, g \models B(x) \wedge \neg B(x)$, a contradiction. Therefore, $[\![A_1 \wedge B]\!] \cap [\![A_2 \wedge \neg B]\!] = \emptyset$.

Whereas this conclusion is formally acceptable, it cannot provide a basis for viewpoints and C-respects. After all, justifying two opposite conclusions by adopting two different perspectives is the rule rather than the exception. Nonmonotonic logic requires that, in such cases, we have some kind of arbitration, for instance that we choose among rules or extensions. However, the very idea of arbitration between rules is alien to our intuitive notion of perspective. In order to allow for non-trivial interpretations of cases like (28), I propose a simple extension of statistical conditional logic.

The reason why (28) is problematic is that no individual can satisfy $B(x) \wedge \neg B(x)$ in the same model. To circumvent the problem, I modify the first-order language by adding 'relativized' formulae of the form $A : B$, 'B under the perspective A'. If A and B are well formed formulae of L, the language under consideration, $A : B$ is also a well-formed formula of L.

To make ':' behave like a type operator, we need the following conditions.

(29) $(A : B) \Rightarrow (A : B)$ is valid. $(A : B) \vee (A : B')$ and $\neg(A : B)$ are respectively equivalent to $(A : B \vee B')$ and $(A : \neg B)$.

One can easily show that, if B and B' are equivalent, so are $(A : B)$ and $(A : B')$.

If $A \rightsquigarrow_X B$ is a default, its corresponding *respect-default* or *R-default* is $A \rightsquigarrow_X (A : B)$. The idea I pursue is to look at C-respects in terms of *justification*. The term 'justification' is used in proof-theory. There, the general idea is that one can reason about statements of the form 't is a proof of A' or 't is a justification for A', $t : A$ in symbols, see for example Artemov and Nogina (2005), Fitting (2005).

With viewpoints, the intended meaning is only partly similar. Suppose we have two conflicting defaults $A \rightsquigarrow_X B$ and $A' \rightsquigarrow_X \neg B$. They can be translated into two R-defaults $A \rightsquigarrow_X (A : B)$ and $A' \rightsquigarrow_X (A' : \neg B)$. If A and A' are compatible relations, there is a plausibility structure that satisfies the two R-defaults for the same individuals.

In general, compatibility between defaults cannot be determined by defaults alone. For instance, the fact that no bird is a fish is more sensibly expressed by a rigid rule $\forall x(\mathit{bird}(x) \Rightarrow \neg \mathit{fish}(x))$. More interestingly, in the context of the following set of expressions, the two defaults δ_1 and δ_2 are conflicting, because the rule r_1 entails that the consequents of δ_1 and δ_2 exclude each other.

(30) $\mathit{del\text{-}plane}(e) \wedge \mathit{st}(e, e') \rightsquigarrow_{\{e,e'\}} \mathit{poor\text{-}st}(e, e')[\delta_1]$
$\mathit{nice\text{-}weather}(e) \wedge \mathit{st}(e, e') \rightsquigarrow_{\{e,e'\}} \mathit{nice\text{-}st}(e, e')[\delta_2]$
$\forall e, e'(\mathit{nice\text{-}st(e,e')} \Rightarrow \neg \mathit{poor\text{-}st}(e, e'))[r_1]$

For compatibility issues, we need to consider sets of closed formulae and defaults, aka theories. A *theory* is a pair (T, Δ), where T is a set of first-order closed formulae and Δ is a set of defaults. I first introduce three auxiliary definitions to speak about sets of conflicting defaults.

(31) Let (T, Δ) be a theory. Two defaults $A \rightsquigarrow_X B$ and $A' \rightsquigarrow_X B'$ in Δ are *conflicting* if $T \models \neg(B \wedge B')$. A set of defaults $\Delta' \subseteq \Delta$ is *B-conflicting* if, for some default δ of the form $A \rightsquigarrow_X B$ in Δ, Δ' is the minimal set that contains δ and all defaults of Δ that conflict with δ.

We can organise Δ into a set of conflicting sets as follows.

(32) $conf(\Delta) = \{\Delta'_B : B$ occurs as a consequent of a default in $\Delta \wedge \Delta'_B$ is $B-conflicting\}$.

(33) If Δ is a set of defaults, $vp(\Delta)$ is the result of replacing each pair of conflicting defaults $A \rightsquigarrow_X B$ and $A' \rightsquigarrow_X B'$ in Δ by their corresponding R-defaults $A \rightsquigarrow_X (A : B)$ and $A' \rightsquigarrow_X (A' : B')$. $vp(conf(\Delta))$ notes the result of applying vp to each member of $conf(\Delta)$.

(34) Let (T, Δ) be a theory where Δ contains conflicting defaults. It admits of a *vp-solution* iff there exists a plausibility structure **PL** such that:
1. **PL** satisfies $(T, vp(conf(\Delta))$,
2. for every $\Delta' \in vp(\mathbf{conf}(\Delta))$, **PL** assigns at least one identical sequence of individuals to every subset of compatible antecedents in Δ'.

(34) define a vp-solution as a plausibility structure that satisfies the R-default version theory and guarantees that conflicting defaults can be satisfied by the same individual(s). For instance, the system in (30) gives rise to the theory in (35). This theory can be satisfied by a model which assigns intersecting domains to *del-plane*, *nice-weather* and *st*.

(35)

T	$\{\forall e, e'(nice\text{-}st(e,e') \Rightarrow \neg poor\text{-}st(e,e'))[r_1]\}$
$vp(conf(\Delta))$	$\left\{\left\{\begin{array}{l} del\text{-}plane(e) \wedge st(e,e') \rightsquigarrow_{\{e,e'\}} (del\text{-}plane(e) \wedge st(e,e') : poor\text{-}st(e,e'))[\delta_1] \\ nice\text{-}weather(e) \wedge st(e,e') \rightsquigarrow_{\{e,e'\}} (nice\text{-}weather(e) \wedge st(e,e') : nice\text{-}st(e,e'))[\delta_2] \end{array}\right\}\right\}$

The approach sketched here captures the partial character of evaluative judgements by incorporating justifications into the consequent. Similarly, Fine's treatment of *qua* objects and independent but related suggestions (Attardi and Simi (1995), Moore (1999), Varzi (1997)) underline the interplay between partiality and inconsistency.

3.9 DCPV and non-factuality

If (T, Δ) is a theory, I write $(T, \Delta) \vdash A$ to indicate that A can be derived from (T, Δ) by the axioms of plausibility logic.[18] As usual, $T \vdash A$ means that A can be monotonically derived from A.

In a theory, B is non-factual if and only if (i) there is no way to derive a rigid implication of the form $A \Rightarrow B$ and (ii) each default with B as a consequent is balanced by a conflicting default.

(36) Let (T, Δ) be a theory. B is non-factual with respect to (T, Δ) iff:
1. there is no A such that $T \vdash A \Rightarrow B$ and $A \Rightarrow B$ is not a tautology,
2. if $(T, \Delta) \vdash A \rightsquigarrow_X B$ for some A and some appropriate X, for some B', $(T, \Delta) \vdash A' \rightsquigarrow_X B'$ and B and B' are incompatible.

Definition (36) excludes the cases where B is a rigid consequence and also those where there is no conflicting default.

(37) In the context of a theory (T, Δ) and under a consequence interpretation, where C is the C-respect, DCPV $i(A)$ is appropriate only if $i(A)$ is non-factual with respect to $(T \cup \{C\}, \Delta)$.

[18] The relevant axiom system is know as $\mathbf{C}^{stat}$, see Friedman et al. (2000:section 7).

Mathematical objects do not naturally enter a C-respect relation, as seen for (17), because they possess exact definitions, a fact which violates (36.1). To repeat, what (36) captures in such cases is the existence of a definitional structure, no the existence or possibility of a verification. A mathematical conjecture may never be proved. It is still definitionally clear. In general, empirical sets of nonmonotonic sufficient conditions do not correspond to definitions but rather to observations-conclusion pairs. Insofar as the observations are correct and there are no conflicting observations, the conclusion is considered to be 'proved' ('beyond reasonable doubt' in a particular context). So, whereas empirical judgements are, in principle, always open to revision, they can, again in principle, be stabilised.

3.10 Modals

The differences noted in section 3.1 have not been explained yet. Suppose that modals like *probably* or *possibly* trigger conventional implicatures, in contrast to modal clauses (*it is* ADJ$_{mod}$ *that* S), which trigger assertions, and that this difference is reflected in the mode of update. It has been noted (Jayez 2006) that conventional implicatures cannot combine with the asserted content of another proposition through certain discourse relations or discourse markers. For instance, following Potts (2005), I assume that expressives are conventional implicature triggers. In (38a), the consequence relation cannot link the implicature that John is stupid and the assertion that he ruined the speaker's party. So, (38a) is not equivalent to (38b).

(38) a. I don't like John because the stupid guy ruined my party.
b. I don't like John because the guy is stupid and he ruined my party.

If parentheticals are implicature triggers, they do not combine with the asserted content of another proposition. Instead, it is the asserted content of the proposition which combines with the asserted content of the other proposition. If the former is factual, DCPV is predicted to be infelicitous. In contrast, modal clauses express alethic judgements of the speaker and, as judgements, are compatible with DCPV.

However, this straightforward explanation conflicts with the analysis offered in Jayez and Rossari (2004), henceforth JR, where it is proposed that certain modal adverbs, including *probably* or *possibly*, do *not* trigger conventional implicatures. Instead, they are part of the asserted content, in contrast with other, truly parenthetical, adverbials like *heureusement* 'fortunately', *paraît-il* 'I hear' or *selon/d'après NP* 'according to NP', which contribute implicatures.[19] In the context of the present discussion, this analysis predicts that there should be a difference between *probably* and *fortunately*, a prediction which is incorrect in view of examples like (39).

(39) a. The meeting was a real mess. In this respect, it is a good thing that John was not there.
b. The meeting was a real mess. ??In this respect, John, fortunately, was not there.

[19] Potts (2005) independently made the same proposal for certain parentheticals.

JR argue that, in the case of modal adverbs, the modality is part of the asserted content because it interacts with denials and rejections, in contrast with other parenthetical adverbs. For instance, B1's answer in (40) can be interpreted as a direct rejection of A1's assertions. In contrast, B2's answer cannot be interpreted as meaning 'it is unfortunate because John is going to crash the new car'. JR argue that assertions and answers target the update of the common ground. In a nutshell, whenever a speaker asserts that A, she proposes that the common ground be updated with A; when she rejects an assertion that A, she indicates that she refuses the proposed update. (40A2,B2) suggests that a sentence *fortunately* S does not target an update with 'it is fortunate that'.

(40) A1 – John has probably got a new car
B1 – No, it's not very likely; he has run out of money
A2 – Fortunately, John has got a new car
B2 – No, he's going to crash that one too
[**context**: John is a very unsafe driver, with a lot of accidents; B2 thinks that he should not drive at all]

In order to take into account observations (39) and (40), I propose to modify JR's analysis as follows. Let us assume, for simplicity, that we work in a framework where (i) updates are eliminative, as in most dynamic semantics theories, including JR's approach, and (ii) we have only two agents, s, the speaker, and h, the hearer. Modal adverbs like *probably* give rise to conventional implicatures, like other parentheticals and unlike *it is* ADJ_{mod} *that* S constructions. More precisely, when s utters *probably* A, she asserts that A is probable at every world of the common ground and implicates that she believes A to be probable. I need to introduce some machinery in order to explain the difference between assertion and implicature in that case. Recall that the common ground is usually defined as the set of propositions that every agent believes and believes that every other agent believes and that every other agent believes that every other agent believes, etc.

(41) $CG(s,h) = \{A : Bel_s A \wedge Bel_h A \wedge Bel_{x_1} \ldots Bel_{x_n} A$ for every finite sequence $x_1 \ldots x_n$ where $x_i = s$ or h for $i = 1 \ldots n)\}$

Let W be the set of doxastic alternatives of w for an agent. I consider only alternatives that satisfy the modal ground, that is, I assume that every world in W satisfies every proposition in $CG(s,h)$. For simplicity, I assume that doxastic alternatives are plausibility structures.[20] The definition of a probability operator is then elementary.

(42) $\mathsf{Prob}\ A$ is true at w iff $\forall w_i \in W(\mathsf{Pl}_i(A) > \mathsf{Pl}_i(\neg A))$.

In an eliminative update framework there are two possibilities for an update with a proposition of the form $\mathsf{Prob}\ A$. Either we suppress the worlds where $\mathsf{Prob}\ A$ is false or we suppress the worlds w that violate (42). More formally,

(43) Let W be a non-empty set of worlds.

[20] An additional assumption would be that doxastic alternatives are ordered, as in Kratzer's modal bases, and that probability is expressed with respect to the ordering relation. Nothing essential depends on the present choice.

1. $W \dot{+} A = \{w_i \in W : w_i \models A\}$.
2. $W \dot{+}_{prob} A = \{w_i \in W : \mathsf{Pl}_i(A) > \mathsf{Pl}_i(\neg A)\}$

The dynamic difference between *probably* S and *it is probable that* S is spelt out in (44). For simplicity, I ignore here the recursive aspect of updates, that is, their propagation along all the finite vectors mentioned in (41).

(44) a1. The assertive update associated with *It is probable that* S is a standard update of the form $\dot{+}\mathsf{Prob}\ A$, where A is the proposition expressed by S.
a2. The implicative update is null.
b1. The assertive update associated with *probably* S is of the form $\dot{+}_{prob}A$, where A is the proposition expressed by S.
b2. The implicative update is of the form $\dot{+}Bel_s\mathsf{Prob}\ A$.

If (44) is correct, the reason why (11) is anomalous is simply that the update concerns factual propositions, in contrast to (12) and (13), where the update concerns a modalized proposition. Turning to (40), I observe that the contrast between *probably* and *fortunately* is also induced by the nature of update. Whereas *probably* triggers an update of the general form $\dot{+}_M A$, *fortunately* triggers a standard update of the form $\dot{+}A$ and implicates that s believes that A is unfortunate.

However, I still have to clarify the status of reportive/evidential parentheticals. Consider *according to* NP. A rejection of *According to* NP, S is preferably interpreted as a rejection of S, see (45).

(45) A – According to Mary, John has ruined her party
B – No, that's impossible!
[**Preferred interpretation**: John did not ruin Mary's party]

Yet an assertion that 'according to a given source, S' is felt as weaker than an assertion that S or that *fortunately*, S. It has been noted (Palmer 1986) that evidentials are in principle distinct from modals: whereas a modal expresses a degree of (un)certainty, an evidential codes an information source.[21] If this distinction is appropriate, it follows that an assertive update with an evidential must be weaker than an update with a modal. In (46), I propose that the assertive update associate with *according to* NP consists in keeping all the worlds where, if the source NP is reliable, the proposition is true. A refutation of a form *according to* NP, S can consist in attacking A, the proposition expressed by S, i.e. in proposing that every world where A is true be cancelled.

(46) a. The assertive update associated with *According to* NP, S consists in eliminating every point where the proposition that the source NP is reliable is true and A is false.
b. The implicative update is an update with the proposition that s believes that the source believes that A.

[21] Mushin (2001) proposes the general category of *epistemological stance* to subsume different items or constructions. However, she draws a distinction between *inferential* stance and *reportive* stance, which may be considered as akin to Palmer's distinction for my current purpose.

(46) does not entail that the speaker believes A, a property which is consonant with the contrast between (47a), where the speaker is committed to the truth of A, and (47), where she is not.

(47) a. ??John probably ruined Mary's party but it's impossible.
b. According to Mary, John ruined her party but that's impossible.

More work is needed to determine whether this treatment can be extended to other non-modal parentheticals, like *I hear*.

4 Extension to other cases

As noted in section 2, DCPV can be a VP-adverb.

(48) Les divers aspects de l'identité sociale ne sont pas considérés des caractéristiques individuelles mais plutôt des concepts qui se recoupent. Il est donc important d'examiner de ce point de vue tous les facteurs qui pourraient contribuer à sa situation sociale.[22]
'The various aspects of social identity are not considered as individual features but rather as interacting concepts. Therefore, it is important to investigate under that perspective any factor that might influence one's social situation.'

The text invites researchers on social identity to investigate the various factors involved, keeping in mind that facets of social identity are interacting concepts and not features of particular persons. When pursuing this idea, a researcher should evaluate and analyse every situation under the given perspective. However, this does not entail that all her assumptions, proposals and observations should be a *consequence* of the perspective. When there is a consequence relation, the VP-adverb is compatible with a non-factual proposition. Yet, the consequence paraphrase mentioned in section 3.1 is inappropriate; in (49), substituting 'In this respect, one can then say that the secretaries have examined the following texts' does not make much sense.

(49) Tous les membres [...] ont considéré qu'il serait utile de procéder à un examen de l'ensemble des textes [...] du point de vue de la forme et de la langue. Le secrétariat a donc examiné, DCPV, les textes ci-après [...][23]
'All the members considered that it would be useful to evaluate all the texts from the viewpoint of form and language. Therefore, the secretaries have examined in this respect the following texts . . . '

I propose that, when it is not a VP-adverb, DCPV signals that the agent who carries out the action described by the VP evaluates the modalities and results of her execution with respect to the perspective that DCPV points to. In the terms of Merin's notion of relevance (Merin 1997, 1999), there is some positive or negative relevance between certain propositions that define the respect and certain propositions that describe the execution.

[22] Excerpt from a Canadian-French text at `http://72.14.207.104/search?q=cache:jZCQSJXlnP8J:www.onpea.org/fr/events/conferenceproceedings/conference04fr/26davieshalliday.pdf`

[23] Excerpt from a French text at: `http://unesdoc.unesco.org/images/0007/000753/075313fo.pdf`.

(50) Let P be a set of propositions, that expresses a perspective and S a sentence of the form X VP DCPV, where DCPV is adjoined to VP and refers to P and X VP expresses an action. Let P' be a description of the complex event referred to by X VP. DCPV signals that:
$\exists p, p'(p \in P \wedge p' \in P' \wedge$ (p has positive relevance to $p' \vee$
p' has positive or negative relevance to p).

It is unlikely that the viewpoint has negative relevance to an aspect of the VP-event, since, normally, the event is controlled by an agent who takes the viewpoint into account.

Unsurprisingly, the PP-construction *du point de vue de* NP (DPVD), illustrated in (51), is not essentially different from the two cases studied so far. (51a) is similar to consequence examples with a sentential DCPV and can be accounted along the lines of (37). (51b) resembles examples like (5) and (6) and follows from the general constraint in (10). The set of propositions which constitutes the domain of colour is relevant to the proposition that the speaker finds a style. (51c) is analogous to the VP-adverbial cases described above.

(51) a. Du point de vue de la couleur, ce tableau est raté.
'From the point of view of colour, this painting is a failure.'
b. Du point de vue de la couleur, mon envie était de trouver un style.[24]
'From the point of view of colour, I wanted to find a style.'
c. Dans ce rapport, l'immigration est abordée du point de vue de l'entreprise.[25]
'In this report, immigration is considered under an entrepreneurial perspective.'

DPVD is not just a topic-introducer, contrary to what the English gloss of (51b) might suggest. (52) shows that DPVD cannot freely replace topic-shifters like *quant à* or *en ce qui concerne* ('as concerns/regards', 'concerning/regarding').

(52) a. En ce qui concerne la voiture, je ne sais pas ce qu'elle a.
'Concerning the car, I don't know what the problem is with it'
b. ?? Du point de vue de la voiture, je ne sais pas ce qu'elle a.
'From the car's perspective, I don't know what the problem is with it'

As with DCPV, the NP complement of DPVD NP must denote an abstract quality, a trope,[26] an agent, etc., in short, entities which can be considered as dimensions of evaluation or, more generally, of attitude expression towards an evaluative clause. A car is hardly a dimension, so (52) is predicted to be very strange. When there is neither an evaluation by the speaker nor a relevance relation, the result is also infelicitous.

(53) a. Du point de vue de la couleur, Monet est supérieur.
'As concerns colour, Monet is better.'

[24] Excerpt from a French text at `http://www.auracan.com/Interviews/Bluehope/Bluehope2.html`
[25] Excerpt from a French text at `http://www.institut-entreprise.fr/index.php?id=586`
[26] In the sense of Campbell (1990). Tropes are particular manifestations or instantiations of abstract properties. Whiteness is an abstract property. The particular whiteness of a specific sheet of paper is a trope.

[Evaluation by the speaker]

b. Du point de vue de la couleur, Monet espérait résoudre définitivement le problème.
'As concerns colour, Monet hoped to find an ultimate solution to the problem.'
[a proposition to which the domain of colour is relevant]

c. ?? Du point de vue de la couleur, j'ai besoin de deux tubes de rouge.
'As concerns colour, I need two red paint tubes.'

Finally, let me note that, when *point de vue* is a *nom prépositionnel* ('prepositional noun'), in the terminology of Danon-Boileau and Morel (1997), it is similar to the S-adverb DCPV. The VP-adverb use is less natural. However, the usages seem unstable.

(54) a. Point de vue couleur, ce tableau est raté
'As to colour, this painting is a failure'

b. Point de vue couleur, je souhaite trouve un style
'As to colour, I wish to find a style'

c. ?J'ai examiné le tableau point de vue couleur
I examined the painting as to colour

This suggests that *point de vue* is more restricted than DCPV and DPVD and is not entirely parallel to other 'prepositional nouns', like *côté* 'side' or *question* (Le Querler (2003)).

5 Conclusion

In this paper, I have shown that DCPV has essentially three types of use. As a S-adverb, it can introduce a non-factual consequence of a certain perspective or a speech act/proposition relevantly related to the perspective. As a VP-adverb, it expresses the perspective under which an action described by the VP is controlled by the agent. I have devoted much space to the discussion of non-factuality, which proves difficult to characterise. The connection between consequence and non-factuality is found with several discourse markers, for instance *sous cet angle* 'under this angle', *dans cette perspective* 'in this perspective', *dans cette optique* 'in this view', etc. and is certainly not a trick of fate. To assign its place very precisely, a deeper understanding of its similarities and differences with information sources and domains is necessary. This is a task I must leave to future work.

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A unified analysis of passives, anticausatives and reflexives

Dalina Kallulli*

1 Introduction

It is well-known that, across languages, the anticausative alternant of an alternating pair systematically involves morphological marking that is shared by passive and/or reflexive predicates. For instance, in Albanian, similar to Latin and Modern Greek (MG), both the sentence in (1a) containing an anticausative and the sentence in (1b) containing a passive are rendered homomorphously as in (2).[1]

(1) a. The vase broke.
b. The vase was broken.

(2) Vazoja *(u) thye.
vase.NOM NACT broke.AOR.3S
(i) 'The vase broke.'
(ii) 'The vase was broken.'[2] (Albanian)

While both anticausatives and passives arguably lack an external argument (Marantz 1984), only the latter, but not the former, sanction *by*-phrases identifying the so-called

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[1]The following abbreviations are used in the glosses in the examples: ACC (for accusative case), ACT (for active voice), AOR (for aorist), CL (for clitic), DAT (for dative case) , IMP (for imperfective), NACT (for non-active voice), NOM (for nominative case), P (for past tense), PR (for present tense), S (for singular).

[2]In Albanian the non-active paradigm is built by employing three distinct linguistic means with a well-defined distribution, as described in (i) (adapted from Trommer (2005)):

(i) If the clause contains perfect tense:
express Non-active by choice of the auxiliary
Else: If the clause contains Tense (Present or Imperfect) but not Admirative:
express Non-active by an inflectional affix
Else: express Non-active by a reflexive clitic

logical subject, and can combine with purpose clauses and agent-oriented adverbs, as shown in (3) through (5).

(3) a. The window was broken by Pat / the earthquake.
b. *The window broke by Pat / the earthquake.

(4) a. The boat was sunk to collect the insurance.
b. *The boat sank to collect the insurance. (Roeper, 1987, 268)

(5) a. The ship was sunk deliberately.
b. *The ship sank deliberately.

Depending on the theory, these facts have been taken to show that the external argument in the passive is still expressed in the syntax, albeit in an alternative manner (Baker et al. (1989), Emonds (2000)), or that the syntactically suppressed argument of a passive verb is present in argument structure (Roeper 1987, Grimshaw 1990), that is, that passives have an implicit argument. In contrast, the fact that anticausatives cannot combine with *by*-phrases, purpose clauses, or agent-oriented adverbs (Manzini (1983), Roeper 1987) is taken as evidence that the suppression of the external cause takes place in the mapping from the lexical semantic representation to argument structure (Levin and Rappaport Hovav (1995)). In other words, in spite of differences of opinions concerning the proper treatment of passives, the consensual view has been that anticausatives are lexically reduced (see also Chierchia (1989, 2004) and Reinhart (1996)).

In this paper, I examine certain properties of passives and anticausatives that to the best of my knowledge have hitherto not been discussed systematically in the literature, and the ensuing ramifications for a universal theory of these constructions. Specifically, I challenge the view that passives and anticausatives are formed in different modules of the grammar and offer a uniform analysis for both constructions. The paper is organized as follows. Section 2 investigates the distribution of *by*-phrases and *from*-phrases across English, Albanian, Latin and MG and its significance for theories of passives and anticausatives. Based on a discussion of less well-known data, section 3 provides evidence for two primitives, namely *activity* and *cause*, which I contend underlie the passive/anticausative distinction. In section 4, I put forward a novel account for the distribution of purpose clauses and agent-oriented adverbs in passives. In section 5 I discuss the derivation of the dyadic unaccusative constructions introduced in section 3. Finally, in section 6 I extend my analysis to reflexives.

2 *By*- and *from*-phrases: The significance of the comparison

2.1 English

While anticausatives in English do not sanction *by*-phrases, as Piñón (2001) notes, they can combine with *from*-phrases identifying the (external) cause of an event. This is shown in (6a) vs. (6b).

(6) a. *The window cracked by the pressure.

b. The window cracked from the pressure.

However, though *from*-phrases identifying causes are generally fine with anticausatives, they are bad when the cause is not an event, as shown in (7).[3]

(7) *The window cracked from John / the book.

The contrast between (6b) and (7) is also replicated with non-alternating unaccusatives, as in (8a) vs. (8b), though there also are unaccusatives that do not combine with a *from*-phrase introducing a cause, as in (8c).

(8) a. Eva died from cancer.
b. *Eva died from John / the book.
c. *The refugees arrived from the invasion.[4]

The fact that not all unaccusatives license *from*-phrases suggests that not all unaccusatives have underlying causative semantics, in line with Levin and Rappaport Hovav (1995) and contrary to Chierchia (1989, 2004) and Reinhart (1996).

Finally, *from*-phrases are uniformly disallowed in passives, irrespectively of whether they introduce events, as in (9a), or non-eventive participants, as in (9b).

(9) a. *Eva was killed from cancer.
b. *Eva was killed from John / the book.

To generalise over the data presented in this section, it seems that in (adult) English only what Levin and Rappaport Hovav (1995) refer to as external causation verbs can combine with a *from*-phrase identifying a cause.

2.2 Albanian (and Latin and MG)

As was shown in (2), unlike in English, passives and anticausatives in Albanian, as in Latin and MG, can be formally indistinguishable. This is so for two reasons. First, these languages use two distinct conjugational paradigms, namely active versus non-active (Albanian and MG), or active versus passive (Latin), a distinction which often though not always corresponds to the transitive/unergative vs. unaccusative verb classes.[5] Second, like Latin and MG, Albanian collapses (the distribution of) *by*-phrases introducing the logical subject in passives and *from*-phrases introducing a cause in anticausatives.[6] As this latter fact would lead us to expect, the sanctioning of *by*-phrases,

[3] It follows then that animate cause(r)s are excluded from anticausatives.

[4] The sentence in (8c) is of course fine if the prepositional phrase is interpreted as a (locative) source.

[5] The correspondence of the active vs. non-active distinction to the transitive/unergative vs. unaccusative verb classes is rough by virtue of the fact that while transitives/unergatives are always active morphologically, some unaccusative verbs appear in this voice (i.e., are morphologically unmarked) too. Crucially, however, in all three languages unergatives cannot be formally (i.e., morphologically) nonactive/passive, just as passives and (lexical) reflexives cannot be formally active. For details, see Kallulli (1999a,b) on Albanian, Gianollo (2000, 2005) on Latin, and Alexiadou and Anagnostopoulou (2004) on Greek.

[6] Alternatively, the Albanian, Latin, MG counterparts of *by*-phrases are ambiguous between *by*- and *from*-phrases. While in Latin and MG the same word is used both for *by* and *from* in passives and anticausatives, Albanian has two distinct prepositions, namely *nga* and *prej*, each meaning both *by* and

which is taken to be one of the most salient properties of the passive in English and one that distinguishes passives from anticausatives, does not apply in Albanian (and in Latin and MG). To illustrate, the Albanian counterparts of the sentences in (6b) and (7) are given in (10a) and (10b), respectively. As expected then, the grammaticality contrast in the English examples in (6b) and (7) is not replicated in Albanian.

(10) a. Dritarja u kris nga presioni.
windowNOM NACT crack.AOR.3S from/by pressure
'The window cracked from the pressure.' (Albanian)

b. Dritarja u kris nga Xhoni / libri.
windowNOM NACT crack.AOR.3S from/by John / book
'The window was cracked by John / by the book.' (Albanian)

Taken together, the arguments presented in this section suggest that the significance granted to the fact that *by*-phrases are sanctioned with passives but not with anticausatives is not justified – to reiterate, firstly, the distribution of *by*- and *from*-phrases in English cannot be captured by appealing merely to the distinction between unaccusatives (whether anticausative or other) and passives, and secondly, there are languages that altogether collapse the distinction between *by*- and *from*-phrases. The existence of such languages shows that the ability to license a *by*-phrase irrespective of the ability to license a *from*-phrase cannot be granted the diagnostic status it has received in studies that focus on the English verbal passive. In other words, if the ability of a passive verb to combine with a *by*-phrase is taken as evidence for the existence of the external argument in passives (irrespective of whether this argument is syntactically expressed or implicit, depending on the theory), then so should the ability of an anticausative verb to combine with a *from*-phrase identifying the (external) cause of the event. Under this view, anticausatives cannot be lexically reduced, contrary to Chierchia (1989, 2004), Levin and Rappaport Hovav (1995) and Reinhart (1996). I suggest then that *by*-phrases and *from*-phrases are more closely related than has been assumed in discussions of the sanctioning of *by*-phrases in passives in English. Interestingly, as Clark and Carpenter (1989) note, children commonly use *from*-phrases instead of *by*-phrases in passives in English, too. I contend that *by*- and *from*-phrases do not differ as to their ability to identify arguments (either implicit or syntactically expressed, depending on the theory), but rather with respect to other features that distinguish the passive and the anticausative formations. Specifically, here I will argue that the passive/anticausative distinction hinges on the nature of the feature in v encoding the ontological event type of the verb.

3 Two primitives and one account of the distribution of *by*- and *from*-phrases

The central claim of this paper is that the passive/anticausative distinction boils down to an event-based (i.e., a lexical semantic) difference, namely the difference between

from. (Due to space considerations, in this article I only use *nga* throughout.) Both *nga* and *prej* phrases are always interchangeable, or have identical distribution (i.e., they entail each other). Consequently, *by*- and *from*-phrases are indistinguishable in Albanian.

an activity and a causative event, which I contend is syntactically relevant. In other words, while not attempting an exhaustive ontology of event types, I submit that *activity* and *cause* are two syntactic primitives. Let us consider the evidence for the primitive status of *activity* and *cause*. Many languages share the construction in (11), in which a dative (or in some languages, a genitive) combines with a non-active (or reflexive) core yielding among other possible interpretations a reading that in previous work (Kallulli 2006) I have referred to as 'unintended causation'.[7]

(11) Benit i-u thye një vazo.
BenDAT himCL-NACT break.AOR.3S a vase
' Ben unintentionally broke a vase.' (Albanian)

On the other hand, many languages also share the construction in (12), where a dative combines with a non-active (or reflexive) core yielding among other interpretations what in previous work I have referred to as an involuntary state reading, rendered for lack of a better alternative through 'feel like' in the English translation.[8]

(12) Benit i-u hëngër një mollë.
BenDAT himCL-NACT ate.AOR.3S an apple
'Ben felt like eating an apple.' (Albanian)

Formally, the sentences in (11) and (12) are identical. Yet, their interpretation varies greatly. Moreover, while the unintended causation reading is missing in (12), both the involuntary state reading and the unintended causation reading may obtain with one and the same predicate, as illustrated through the Albanian examples in (13).

(13) a. Benit i-u thye një vazo.
BenDAT himCL-NACT break.AOR.3S a vase
(i) 'Ben unintentionally broke a vase.'
(ii) *'Ben felt like breaking a vase.' (Albanian)

b. Benit i thy-hej një vazo.
BenDAT himCL break-NACT.P.IMP.3S a vase
(i) 'Ben felt like breaking a vase.'
(ii) *'Ben unintentionally broke a vase.' (Albanian)

The Albanian sentences in (13a) and (13b) constitute a minimal pair formally; they differ only with respect to their grammatical aspect. As is obvious from the glosses of these sentences, Albanian has two forms for the past tense, which differ in their aspectual value: Aorist, which is aspectually perfective, and Imperfective. Only the perfective sentence in (13a) but not the imperfective in (13b) can get an unintended causation reading. On the other hand, with imperfective aspect only the involuntary

[7] The other possible readings are a possessor reading ('A vase of Ben's broke'), and an affected (in the sense: benefactive/malefactive) reading ('A vase broke on Ben'). I have shown in Kallulli (2006) that the unintended causation reading is not due to pragmatic factors but is really part of the semantics of the verb (root), that is, the sentence in (11) is not vague but truly ambiguous. Therefore I will not dwell on this issue here specifically.

[8] Indeed the construction has sometimes been referred to as the 'feel-like construction' (Dimitrova-Vulchanova (1999), Marušič and Žaucer (2004, to appear)). Marušič and Žaucer (2004, to appear) also provide an extensive survey of previous analyses of this construction across several languages.

state reading but not the unintended causation reading obtains. That is, the semantic complementarity in (13a) vs. (13b) is effected solely by the choice of the aspectual morpheme. Note, however, that the verb in (13a) and (13b) is what Levin and Rappaport Hovav (1995) refer to as an external causation verb.

Consider now the Albanian examples in (14).

(14) a. Benit i-u hëngër një mollë.
BenDAT himCL-NACT ate.AOR.3S an apple
(i) 'Ben felt like eating an apple.'
(ii)*'Ben unintentionally ate an apple.' (Albanian)

b. Benit i ha-hej një mollë.
BenDAT himCL eat-NACT.P.IMP.3S an apple
(i) 'Ben felt like eating an apple.'
(ii)*'Ben unintentionally ate an apple.' (Albanian)

Formally, (14a) and (14b) differ from each other in exactly the same way that (13a) and (13b) differ, that is, with respect to their grammatical aspect only: (14a), which is a repetition of (12), is aspectually perfective, whereas (14b) is aspectually imperfective. However, in spite of this difference, only the involuntary state reading but not the unintended causation reading obtains. That is, the semantic complementarity observed in (13a) vs. (13b) does not replicate in the examples in (14), despite the fact that morphologically (14a) is identical to (13a) and (14b) is identical to (14b). The question then arises as to why the semantic complementarity in (13a) vs. (13b) does not replicate in (14a) vs. (14b). The only possible explanation must be that non-active morphology interacts differently with different (feature) primitives. That is, the (lexical, and consequently, syntactic) feature composition make-up of eat must be different from that of *break*. In fact, one such difference is already argued for in Levin and Rappaport Hovav (1995), who distinguish between internal and external causation as a syntactically relevant meaning component. According to Levin and Rappaport Hovav (1995), *break* but not *eat* is an external causation verb. Capitalizing on this difference, I will assume that *break*-type roots differ from *eat*-type roots in that the former project a cause feature, whereas the latter an activity feature in the syntax. In other words, the features [+cause] and [+activity] represent two syntactic primitives that reflect an ontological event-type difference.[9]

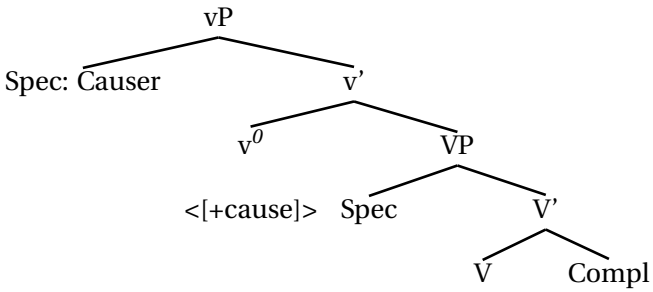
Since both (14a) and (14b) have an involuntary state reading, naturally the question arises what the difference (if any) is between them. In other words, does aspectual morphology effect a difference between (14a) and (14b)? Indeed it does. The difference between (14a) and (14b) has to do with the temporal anchoring of the event. While (14a) describes a disposition that is over at the utterance time, (14b) describes a disposition holding at reference time but not necessarily at utterance time. That is, the disposition in (14a) is under the scope of the aorist operator.

Adopting the basic structure in Chomsky's (1995) shell theory, where the "internal" arguments of a verb occupy the positions of specifier and complement of V, with the external argument occupying Spec of vP, the difference between a causative predicate and an activity predicate can be depicted structurally as in (15) vs. (16). That is, *break*-type verbs project a [+cause] feature in v, as in (15), whereas eat-type verbs project a

[9]See also Wunderlich (1997, 56) and Doron (2003).

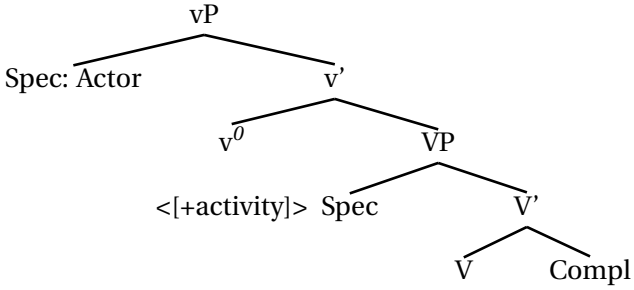
[+activity] feature in v, as in (16).[10] In other words, I contend that v contains at least one (lexical-semantic) feature encoding the ontological event type of the verb, and further, that it is precisely the need of this feature to be saturated, or checked off, that makes Spec of vP an argumental position. Therefore, (non-oblique) argument realization proceeds because of the need to check off lexical-semantic features in a predicate structure (here: v and/or other heads involved in predication). Consequently, when v contains a [+cause] feature, the argument in Spec of vP will be interpreted as Cause(r), whereas when v contains a [+activity] feature in v, the argument in Spec of vP will be interpreted as an Actor.

(15) The basic structure of a causative verb



break

(16) The basic structure of an activity verb



eat

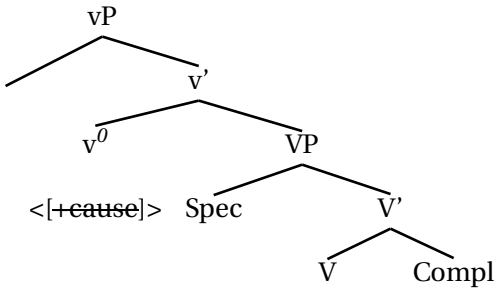
In Kallulli (2006), I define non-active (and/or reflexive) morphology as an operation that suppresses a feature in the syntactic structure of a predicate.[11] Building on this proposal, I claim that while the passive is derived from an activity predicate through suppression by special (e.g., non-active) morphology of a [+activity] feature in v, the anticausative is derived from a causative predicate through suppression of a [+cause] feature in v. If non-active morphology suppresses a feature in v that encodes the ontological event type of the verb, as I claim, when operating on the structures in (15) and (16), it will suppress the [+cause] or the [+activity] feature, respectively. If, as I suggest, (non-oblique) arguments are realized in the specifier positions of verbal projections whose heads have at least one (lexical-semantic) feature that encodes the ontological

[10] The tuple notation of the features in v in (15) and (16) is motivated in section 5.

[11] In Kallulli (2006) I argue that non-active (and/or reflexive) morphology suppresses the first feature in the structure of a predicate, but since in (15) and (16) there is only one feature in v, the linear order and/or hierarchical structure does not matter for my purposes here. I return to this point in section 5 though.

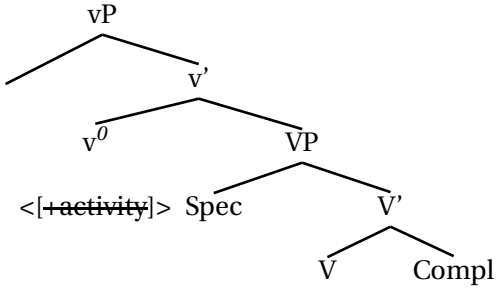
event type of the verb, it follows that no arguments can be realized in Spec of vP once the feature [+cause] or [+activity] in v is stricken out by non-active morphology.[12] That is, the resulting structures will be strictly monadic (that is, containing only one internal argument), as in (17).

(17) a. Deriving the anticausative



break

b. Deriving the passive



eat

Assuming that accusative case is assigned in v (that is, that accusative case is checked in Spec of vP only) (Bennis 2004), when Spec of vP is inert (or absent, see note 12) the internal argument will need to have its case features checked by a higher head, namely T, which assigns nominative. 13 Thus, the so-called Burzio's Generalization follows in a straightforward way. In spite of the effect of non-active morphology, namely the suppression of the feature [+cause] or [+activity] in v and the consequence that Spec of vP is in this way rendered inert, both the cause in anticausatives and the actor in passives can be realized obliquely, namely in a *from*-phrase and a *by*-phrase, respectively. The question however arises why languages vary with respect to whether they obscure the distinction between oblique actors and oblique causes, as is the case in Albanian, Latin, MG, English child language (Clark and Carpenter (1989) and Old English, or articulate this difference, as is the case in adult present-day English. One obvious difference between Albanian, Latin, MG on the one hand and adult present-day English on the other is precisely the fact that in English anticausatives and passives are always morphologically distinct, whereas, as already pointed out, in Albanian, Latin and MG passives and anticausatives are often identical morphologically. That is, there might exist some implicational relation between verbal morphology and the ability to distinguish between *by*- and *from*-phrases (i.e., oblique actors and oblique causes). Specifically, the generalization seems to be that languages that collapse the morphological

[12] In fact, since this is unmotivated, it might be stated that there is no Spec of vP position in the structure at all. I leave this point open, however.

distinction between passives and anticausatives also fail to differentiate between *by*- and *from*-phrases.[13]

Consider now how the claim that the distinction passive vs. anticausative boils down to an event-based difference can accomodate the fact that *break*-type (i.e., causative) verbs can passivize, as in (18).

(18) The window was broken by Pat.

Emonds (2000) suggests that due to the fact that English lacks a verbally finite synthetic passive, both verbal and adjectival passives are in a sense "more adjectival" than in languages like Albanian, Latin and MG, which have a (partially) verbal finite synthetic passive. Indeed anticausatives are more eventive than passives in English.[14] This point cannot be made for Albanian, which as discussed above collapses the morphological distinction between passives and anticausatives. The idea then is that the passive in English in a sentence like (18) implies that the breaking event was more sustained, or involved an activity on Pat's part, as compared to the breaking event in an anticausative, which happens spontaneously, or all-at-once. That is, the English passive, whether or not due to its special morphology, induces an implicature of activity, or openendedness, even for external causation verbs, which is obvious when comparing it to an anticausative like the one in (19).

(19) The window broke.

That is, passive constructions across languages can be made compatible by relegating the differences to simple combinatorial properties of verb and (types of) prepositions and their interactions with other event functors, which are in turn encoded differently morphologically across languages.[15] Note that the feature [+activity] entails an actor, that is, animacy. The question then arises how to account for sentences such as (20) where a natural force, namely the earthquake combines with the preposition by.

(20) The window was broken by the earthquake.

[13]The general idea here is that there is complementarity of theta-checking and case-checking, at least for one and the same argument (Bennis 2004). I leave a specific implementation of this idea however open for future research.

[14]One argument for this view comes from *when*-clauses. Specifically, As David Adger (personal communication) has pointed out to me, only the sentence in (ii) containing a passive but not that in (i) containing an anticausative verb has a reading whereby the window-breaking event precedes the getting home event.

(i) The window broke when we got home.

(ii) The window was broken when we got home.

This interpretive difference between (i) and (ii) can be captured straightforwardly in terms of the eventiveness, or punctualness of passive in (ii).

[15]As Kyle Johnson (personal communication) has pointed out to me, one of the properties of the English passive is disjoint reference between the syntactic subject and the implied argument. In other words, a sentence like 'John was burned' cannot mean that John burned himself. However, disjoint reference is possible but not necessary in the Albanian counterpart of this sentence. One obvious source for this difference then is the fact that English uses an analytic form to build the passive, namely *be*, whereas Albanian uses a synthetic one.

I suggest that these forces are conceptualized as animate, as opposed to inanimate forces that can cause breakage such as a construction fault, which is indeed ungrammatical in a *by*-phrase. Interestingly, judgments on a sentence like (21) with a cause like pressure rising in a *by*-phrase seem to vary.

(21) (?)The window was broken by the pressure rising.

My interpretation of this fact is that a cause like the one in (21) could be seen as a very slow but nevertheless animate force, or else as a more stationary force. In the former case it would be acceptable in a *by*-phrase; in the latter it would not.

Turning to the distinction between passives/anticausatives on the one hand and middles on the other, I believe this is due to the presence of a generic operator above the vP in the latter, as has been argued for at length in Lekakou (2005).[16] That is, the middle construction is derived when the verb in the structures in (17) is under the scope of a vP level generic operator.[17]

4 The distribution of purpose clauses and agent-oriented adverbs revisited

Let us now turn to the facts illustrated in (4) and (5), repeated again here for ease of reference, namely that passives but not anticausatives can combine with purpose clauses and agent-oriented adverbs.

(4) a. The boat was sunk to collect the insurance.
b. *The boat sank to collect the insurance. (Roeper, 1987, 268)

[16] Lekakou (2005) argues that while the generic operator in middles attaches at the VP-level (which corresponds to the vP-level in the shell representation that I have assumed here), the habitual operator attaches at the CP-level.

[17] Following Fellbaum (1986), Dowty (2000) and others, Lekakou argues that middles are statements about (properties) of the object, and that suppression of the logical subject in middles and, consequently, promotion of the object to subject position happens in order to license the ascription of what she terms a "dispositional" property on this object. While the term "dispositional" is not a fortunate label since dispositions are properties of animate participants, Lekakou (2005) makes it clear that what she means is the existence of a generic operator that is however different from a habitual generic one, as explicated in the previous note. So, while both (i) and (ii) below have a generic operator in their semantic representation, the nature of this operator in (i) is different from that in (ii). Trivially, (i) – a middle construction – is true also in a situation in which nobody has ever read 'this book'. In contrast, (ii) which is also a generic statement is true if and only if it is the case that Ben walks to school. In other words, "dispositionals" are one specific type of generic statements.

(i) This book reads easily.

(ii) Ben walks to school.

The Albanian counterpart of (i) is given in (iii). As is obvious from the gloss, only non-active morphology is licit.

(iii) Ky libër lexoh-et /* -n kollaj.
thisNOM book read-NACT.PR.3S / -ACT.PR.3S easily
'This book reads easily.' (Albanian)

(5) a. The ship was sunk deliberately.
b. *The ship sank deliberately.

Virtually all existing work on this distinction takes these facts to indicate: (i) the presence of an argument in the passive, which depending on the theory, is either syntactically expressed (Baker, Johnson and Roberts 1989, Emonds 2000) or implicit (Roeper 1987, Grimshaw 1990); and (ii) the lack of such an argument in unaccusatives (Levin and Rappaport Hovav 1995 and references therein). However, all that purpose clauses and so-called agent-oriented adverbs do is identify an intention-bearing (i.e., animate) event participant as the source or initiation of the event named by the verb. Passives, but not anticausatives, control into purpose clauses and combine with agentoriented adverbs because purpose clauses and agent-oriented adverbs simply make reference to participants capable of intentionality (i.e., actors). And as was stated earlier, unlike [+cause], the feature [+activity] implies an actor, that is, a participant capable of wilful agency. However, this does not entail that the animate participant in passives is a non-oblique argument. One obvious alternative is that the animate participant here is not introduced by a non-oblique argument, but by a *by*-phrase, and this may in turn be either overt or implicit. If, as established in section 3.1, animate causers are disallowed with *from*-phrases in English and, anticausatives only license *from*-phrases but not *by*-phrases, then the inability of anticausatives to combine with purpose clauses and agent oriented adverbs follows straightforwardly without further stipulations. Further evidence for the view that it is the animate participant in an overt or implicit *by*-phrase that controls into the purpose clause involves the fact that whenever a purpose clause is licit, a *by*-phrase can be inserted overtly.

Note in this context that agent-oriented adverbs are not incompatible with unaccusative syntax. The Italian examples in (22) show that the unaccusative verbs *cadere* 'fall' and *rotolare* 'roll' continue to exhibit the characteristic *essere* 'be' (vs. *avere* 'have') selection, even in the presence of an adverb like "on purpose".

(22) a. Gianni é caduto /* ha caduto apposta. ((Folli and Harley, 2004, 47))
John is fallen / has fallen on purpose.
b. Gianni é rotolato /* ha rotolato giu (Italian)
John is rolled / has rolled down
apposta.
on purpose.

The example in (23) shows that the same fact holds in German, as witnessed by the fact that the auxiliary sein 'be' and not haben 'have' is selected.

(23) Peter ist / *hat absichtlich eingeschlafen.
Peter is / has deliberately fallen asleep
'Peter fell asleep on purpose.' (German)

To account for the facts in (22) and (23), I suggest that so-called agent-oriented adverbs do not necessarily tell anything about whether the event participants that they modify really act agentively (i.e., intentionally). These adverbs are rather interpreted at the pragmatic interface, that is, they merely provide information on the beliefs of the utterer of the sentences in which they occur.

Finally, as an anonymous reviewer of the abstract for CSSP pointed out, if my claim is correct, that the actor in passives is introduced by the *by*-phrase, which in turn controls the subject of purpose clauses, we expect that no such control is possible in languages where passive does not accept complements analogous to *by*-phrases (the so-called 'short' passives).

5 Deriving dyadic unaccusative constructions

5.1 Intentionality as a primitive

In section 2 and 3 I provided evidence for the primitive status of the features [+activity] and [+cause] in the theory. In this section, I argue for yet another primitive, namely intentionality (shorthanded as [+intent]) that stands for true agency, and detail an account of the derivation of the dyadic unaccusative constructions discussed in section 3, its various readings, and how these readings are in fact expected to arise under my proposal that the features [+activity], [+cause], and [+intent] are relevant for syntactic computation, and the conjecture that unaccusative morphology suppresses a feature in v.

5.1.1 The structure of causative predications

In a series of works on issues relating to argument structure, its projection, and the role of morphological operations on argument realization and interpretation in St'át'imcets, Davis and Demirdache (1995, 2000) and Demirdache (1997) argue that agentive and causative predications are universally derived from distinct frames. The basic idea behind their analysis is that an event participant identifying the instigation (or initiation) of a causative event is an agent if and only if that participant can intentionally bring about such initiation, that is, if the causing participant has control over the event. To illustrate, Demirdache argues that Rosa in (24) is an agent iff "Rosa performs some action of melting which causes the ice to be melted. In contrast, Rosa is a causer (but not an agent) when there is no intrinsic relation between the causing event and the resulting change of state – e.g. Rosa accidentally turns off the refrigerator and the ice melts" ((Demirdache, 1997, 129)).[18]

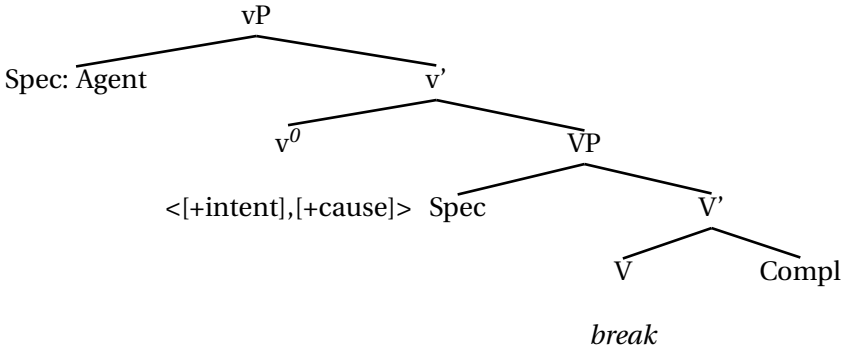
(24) Rosa melted the ice.

While Davis and Demirdache (1995, 2000) and Demirdache (1997) rely on the model of lexical meaning put forth in Pustejovsky (1991, 1995), their idea that agentive and causative predications are cross-linguistically derived from distinct structures can be equally well implemented in terms of vP shells motivated on independent grounds ((Larson, 1988), (Hale and Keyser, 1993, 1998), Chomsky 1995, (Kratzer, 1996), (Marantz,

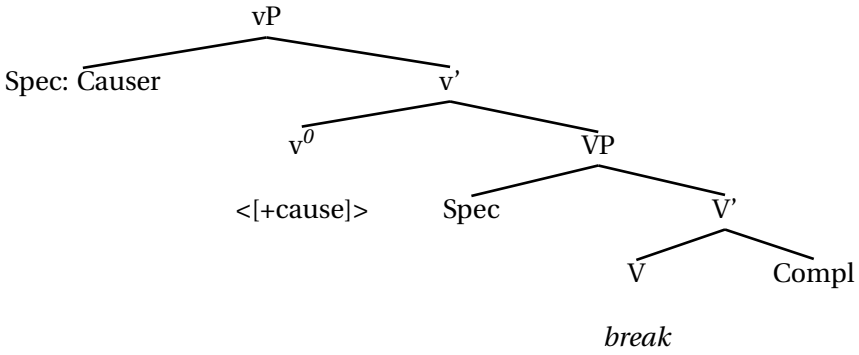
[18] While what is meant by "intrinsic relation" may not be equally intuitive for everyone (i.e. the fact that the instigator of an event is not necessarily an agent or an event participant capable of agency does not make its relation to the event less intrinsic), it is clear what Demirdache means: Rosa is an agent iff she volitionally or intentionally does something in order to obtain a certain result, namely have the ice melt. In this context, note also that, further scrutiny notwithstanding, these two types of causation seem to be different from Kratzer's (2005) notions of direct vs. indirect causation.

1993, 1997, 2005) and much related work). In line with Davis and Demirdache, I maintain that there are two types of causatives, agentive and non-agentive, which differ in their lexical feature composition make-up. Specifically, I argue that while agentive causatives can be defined as containing an ordered tuple consisting of the features [+intent] and [+cause] in v, as in (25), non-agentive causatives contain an ordered tuple consisting of the feature [+cause] only in v, as in (26).[19] Accordingly, when the feature [+intent] is present in v, the argument merged in Spec of vP will be interpreted as an agent, as represented in (25). In contrast, when there is no such feature in v, what the argument merged in the higher specifier position will not be an agent argument, but a causer, as shown in (26). In other words, while the tuple <[+intent],[+cause]> in v makes an agent in Spec of vP, the tuple <[+cause]> in v does not make an agent, but a causer in Spec of vP.

(25) The structure of agentive causatives



(26) The structure of non-agentive causatives



The core idea then is that theta role assignments are tuples of (theta-) features. Suppose that this is in fact a constraint, as in (27). Its relevance will become clear in section 5.3.

[19] As will become clear, the notion ordered tuple is central for the analysis that I put forward here. While this might seem costly, the basic underlying idea is that syntax is only interested in the order(ing) but not in the foundations of this ordering. The latter are part of our conceptual organization. As Manfred Krifka (personal communication) suggests, intention must always scope over causation. That is, there is a semantic reason for the ordering inside the tuple. (Of course I am abstracting away from the tradition that scope is exclusively representable in terms of c-command, i.e. hierarchically rather than linearly. As will be seen, the motivation for this is that a linear formalization in terms of ordered tuples buys us a lot; it is not clear whether and how the same desirable results can be achieved through hierarchical representations.)

(27) **The Tuple Constraint**
Theta role assignments are tuples.

Trivially, a sentence like (28) with an event nominal (i.e., an inanimate causer) will have the structure in (26), not in (25).

(28) The wind / the earthquake broke the window.

Though my account is reminiscent of Reinhart's (2002) approach in that theta-roles are the outcome of features, or feature-combinations (i.e., theta roles do not have the status of primitives in the theory, a desideratum already pointed out in Hornstein (1999), but see also Reinhart and Reuland (1993)), it differs from Reinhart (2002) in several respects. For instance, Reinhart (2002) argues that the agent role is composed of the features [+c] and [+m], which stand for cause and mental state, respectively. Note however that the feature [+intent] which I have proposed as a syntactic primitive cannot be equated with Reinhart's feature [±m], since as noticed independently in Rivero and Savchenko (2004), no feature or feature cluster in Reinhart's system given under (29) can capture an unintentional causer role. While the cluster [+c+m] here expresses the agent role, [+c-m] expresses an instrumental causer role (i.e. an extrinsic instigator, such as a natural or other force).

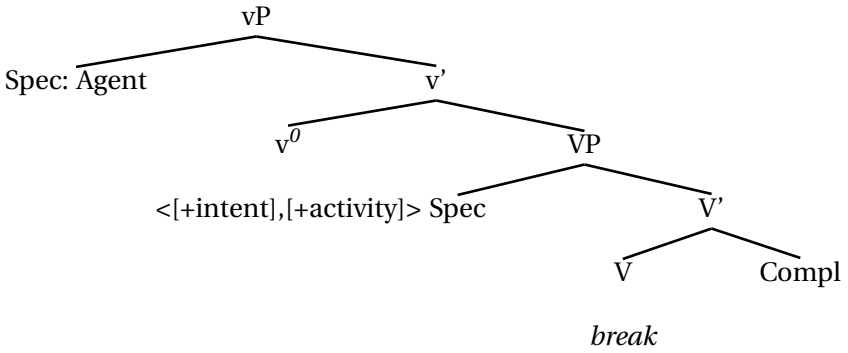
(29) a. [+c+m] - agent
b. [+c-m] - instrument
c. [-c+m] - experiencer
d. [-c-m] - theme / patient
e. [+c] - cause (Unspecified for m); consistent with either (a) or (b).
f. [+m] - ?
g. [-m] - (Unspecified for c): subject matter /locative source
h. [-c] - (Unspecified for m): goal, benefactor typically dative (or PP).

Likewise, the feature animacy suggested in Folli and Harley (2005), while necessary, is not sufficient, because animate participants can still bring about or engage in events without intending to do so. On the other hand, intentionality entails animacy, so the validity of the insights presented in Folli and Harley is still maintained.

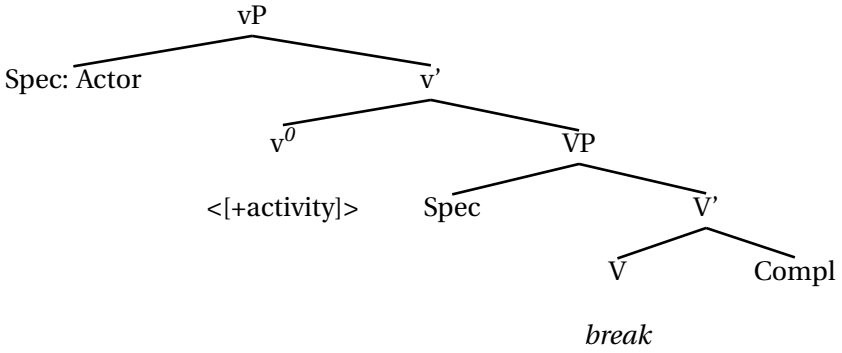
5.1.2 The structure of activity predications

I claim that, like causative predications, activity predications fall into two different types: agentive and non-agentive. Agentive activities differ from non-agentive activities in terms of their feature composition: agentive activity predicates contain an ordered tuple consisting of the features [+intent] and [+activity] in v, as in (30), whereas nonagentive predicates contain an ordered tuple consisting of the feature [+activity] only in v, as in (31). Accordingly, the tuple <[+intent],[+activity]> makes an agent in Spec of vP, as in (30). In contrast, the tuple <[+activity]> makes an actor, not an agent, in Spec of vP, as in (31).

(30) The structure of agentive activities



(31) The structure of non-agentive activities



In other words, I contend that a sentence containing an activity predicate as in (32) is ambiguous between an agentive and a non-agentive reading.

(32) Rosa screamed.

Specifically, Rosa in (32) is an agent if and only if she intends or is in control of her action (e.g. she could stop screaming if she so willed). In contrast, Rosa in (32) is an actor but not an agent if she does not intend her screaming activity (for instance, if she has taken drugs that make her scream, and potentially even unaware of what she is doing).

5.2 Defining unaccusative morphology: deriving the various readings of the dyadic unaccusative construction

Much research has maintained that certain morphological operations apply either in the lexicon or in the syntax. To wit, passivization, and/or reflexivization have commonly been treated as operations that suppress either an argument position (external or internal), a theta role in the thematic grid of the verb, or some element in the lexicalsemantic structure of a predicate (depending on the theory) (Roeper 1987, Grimshaw 1990, Levin and Rappaport Hovav 1995, 1998, Reinhart and Siloni (2004), among others). Similarly, non-active and/or reflexive morphology has been treated as an operation that suppresses the external argument position in Massey (1991), or the subevent in an event structure that projects an external argument in syntax (Kallulli 1999a,b). In this spirit, here I also analyse non-active morphology, and more generally unaccusative morphology, as a suppression operation. However, unlike in the previous works just

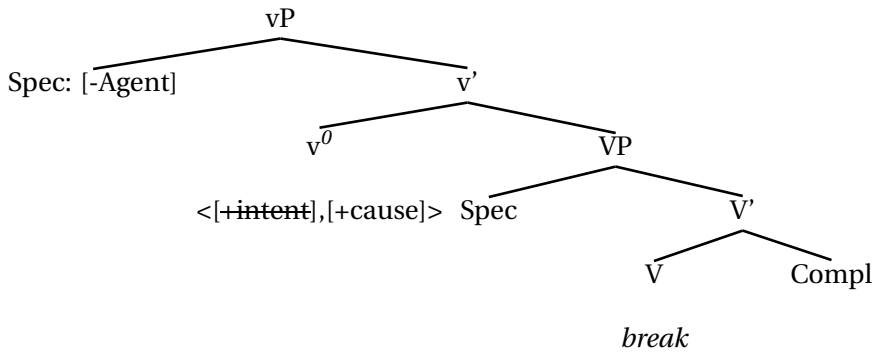
mentioned (though see Kallulli 2006), I contend that unaccusative morphology of all shapes (e.g. non-active, reflexive, passive and/or phonologically null) operates in the syntax proper. That is, unaccusative morphology does not operate in the lexicon, contrary to views expressed in Chierchia (1989, 2004), Grimshaw (1990), Levin and Rappaport Hovav (1995), Reinhart (1996), Reinhart and Siloni (2004), among others. Specifically, I define unaccusative morphology as in (33).

(33) **Definition of unaccusative morphology**
Unaccusative morphology suppresses the first feature in v.

5.3 Deriving the unintended causation reading

I contend that the unintended causation reading of the dyadic unaccusative construction in (12a) is derived from (dyadic) agentive causative predications, whose structure was given in (25).[20] Specifically, if the definition in (33) is applied to the structure in (25), the outcome is the representation in (34), since the first feature in v in (25) is [+intent]. Consequently, due to the suppression of the feature [+intent], no agent argument can be realized in Spec of vP, since as I argued in section 5.1, an agent theta-role is a function of the tuple <[+intent],[+cause]> in v (for cause verbs), or of the tuple <[+intent],[+activity]> in v (for activity verbs).

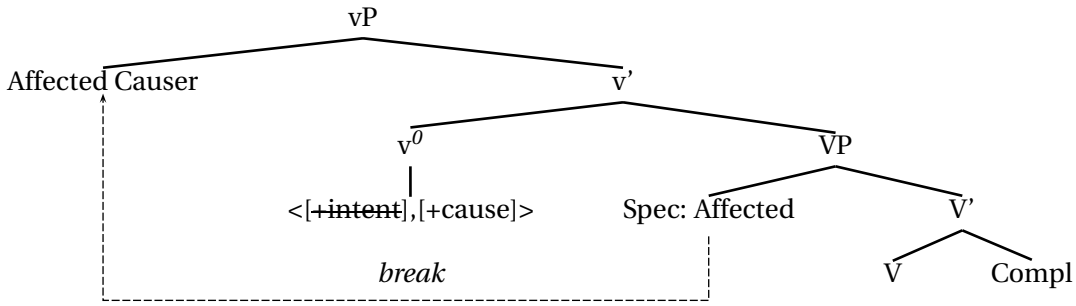
(34)



Since theta-role assignment is subject to the Tuple Constraint (which was given in (27)), once the [+intent] feature is suppressed, no theta role can be assigned to Spec of vP because the integrity of the tuple has been destroyed. On the other hand, for the derivation to converge the remaining feature [+cause] in the tuple in v has to be saturated. The only way for this feature to be licensed is by another argument moving to the specifier of vP. I claim that the next closest argument, that is, the dative (or in Greek, genitive) in the Spec of VP is the one that fulfills this role. Let us assume that what motivates the realization of (the dative/genitive argument in) Spec, VP is a feature such as [+affected] of the verb (in V), which is why dative (or genitive) arguments are interpreted as affected participants. When unaccusative morphology suppresses the feature [+intent], the dative (or genitive) argument moves from Spec of VP to Spec of vP so as to license the [+cause] feature, as diagramed in (35). Consequently, once in Spec of vP, the theta-role of the dative/genitive will be something like an affected causer, which is nothing more than an unintentional causer.

[20] By "dyadic agentive [...] predications", I mean structures like (25) where all three argument positions (i.e., Spec of vP, Spec of VP, and Compl) are filled.

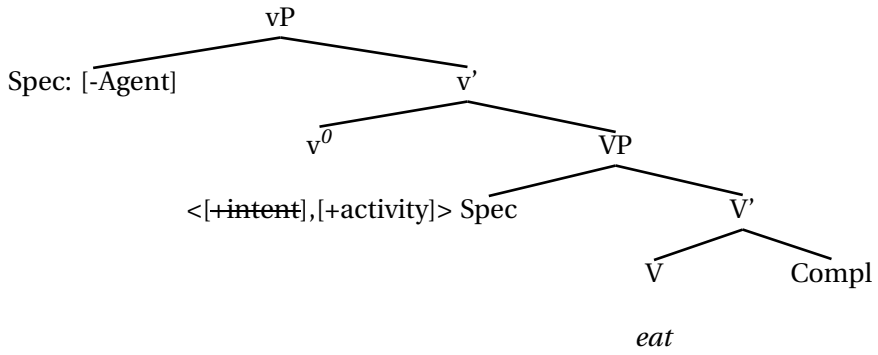
(35)



5.3.1 Deriving the involuntary state reading

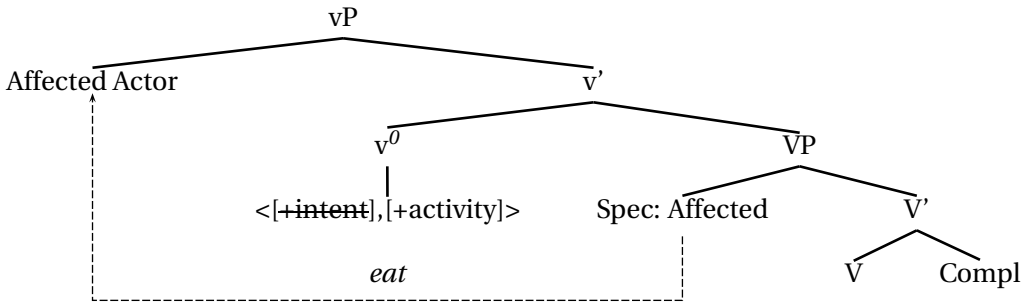
In close analogy with the discussion on the derivation of the unintended causation reading from dyadic agentive causative predications, I contend that the involuntary state reading of the sentences in (14) is derived from dyadic agentive activity predications, whose structure was given in (30). If the definition in (33) is applied to the structure in (30), the outcome is the representation in (36), since the first feature in the structure in v in (30) is [+intent]. As in the previous case, due to the suppression of the feature [+intent] in v, no agent argument can be realized (specifically: merged) in Spec of vP.

(36)



Again, the feature [+activity] on its own is not sufficient to assign a theta-role to Spec of vP in (36), since suppression of [+intent] here violates the Tuple Constraint in (27). On the other hand, for the derivation to converge this remaining feature (i.e., [+activity]) in v has to be saturated. This can only be done by another argument moving to the specifier of vP. As in the previous case, I claim that this is done by the dative argument in the Spec of VP. When unaccusative morphology suppresses the feature [+intent], the dative argument moves from Spec of VP to Spec of vP so as to license the [+activity] feature, as shown in (37). Consequently, once in Spec of vP, the theta-role of the dative will be something like an affected actor.

(37)



However, obviously more than what is depicted in (37) is needed to yield the involuntary state reading of the sentences in (14). I suggest that the involuntary state reading is due to the presence of a dispositional operator (DispP) above the vP. Specifically, I claim that the head of this phrase hosts a strong activity feature, which is not surprising in view of the fact that only participants capable of performing activities (i.e., animate participants) have dispositions. That is, Disp^{0} triggers movement of the ActivityP (i.e., the vP in (37) as opposed to the vP in (35)) to its specifier position, yielding (38).

(38) [$_{\text{DispP}}$ vP$_{\textit{activity}}$ Disp^{0}]

While the analysis that I have laid out here accounts for data like (14), the question arises whether and how the semantic complementarity in terms of the unintended causation vs. involuntary state reading between (13a) and (13b), repeated here for ease of reference, can be captured by this analysis.

(13) a. Benit i-u thye një vazo.
BenDAT himCL-NACT break.AOR.3S a vase
(i) 'Ben unintentionally broke a vase.'
(ii) *'Ben felt like breaking a vase.' (Albanian)

b. Benit i thy-hej një vazo.
BenDAT himCL break-NACT.P.IMP.3S a vase
(i) 'Ben felt like breaking a vase.'
(ii) *'Ben unintentionally broke a vase.' (Albanian)

As discussed earlier, (13a) and (13b) differ only with regard to aspectual morphology, but crucially, they contain the same verb (root), namely *break*, which as I argued earlier projects a [+cause] feature in v. While the unintended causation reading of (13a) is straightforwardly derived as detailed in the previous section, the analysis of the derivation of the involuntary state reading developed in this section cannot readily explain how the involuntary state reading of (13b) comes about if *break* projects a [+cause] feature in v. In other words, in order to be able to derive the involuntary state reading of (13b) through the analysis put forth here, we need *break* in (13b) to project a [+activity], not a [+cause] feature in v. Though I assumed that the features [+cause] and [+activity] in v have the status of syntactic primitives, in principle, one could also be derived from the other through morphological operations that take place before the projection of these features in syntax. That is, under some version of the lexicalist hypothesis, one of these features could be the outcome of lexical (de)composition. A

concrete proposal here would be that though the verb *break* is a cause verb and will therefore project a [+cause] feature in v, due to a procedure such as event composition (Pustejovsky, 1991), it might project an [+activity] feature in syntax. Specifically, if imperfective morphology is an event functor that invariably shifts the event type of a lexical item into an activity, then we could explain how *break* projects the feature [+activity] and not [+cause] in syntax. So the idea is that re-iteration of a causative event (e.g. breaking) will yield an (e.g. breaking) activity.[21] Obviously this idea cannot be maintained under a non-lexicalist view of morphosyntax such as Distributed Morphology. However, the idea that imperfective morphology has an impact on the features in v could in principle be made compatible with a non-lexicalist view of morphological operations. Crucial for the case at hand is the order of operations. In other words, if imperfective morphology operates prior to the merging of v, then it is expected that it influences the type of the features in v. Though beyond the scope of this article, one way of implementing this idea would be by assuming that the terminal node associated with imperfective morphology is what provides the verbal (i.e., the category defining) context for the root *break*; in other words, that the (functional head related to the) imperfective morpheme is lower than v.

Let us now turn to the difference between (14a) and (14b), repeated here for ease of reference.

(14) a. Benit i-u hëngër një mollë.
BenDAT himCL-NACT ate.AOR.3S an apple
(i) 'Ben felt like eating an apple.'
(ii)*'Ben unintentionally ate an apple.' (Albanian)

b. Benit i ha-hej një mollë.
BenDAT himCL eat-NACT.P.IMP.3S an apple
(i) 'Ben felt like eating an apple.'
(ii)*'Ben unintentionally ate an apple.' (Albanian)

As I pointed out earlier, the difference between (14a) and (14b) can be described in terms of a difference in the temporal anchoring of the eating disposition described by these sentences. More specifically, (14a) but not (14b) describes a past disposition relative to the utterance time. I contend that the difference between (14a) and (14b) is due to an aorist aspectual operator located above DispP in the structure of (14a). That is, DispP is in the scope of the aorist operator. Assuming that accusative case is assigned in v (that is, that accusative case is checked exclusively in Spec of vP) and, that the complementarity of theta-checking (here: theta-feature-checking) and case-checking (at least for one and the same argument) is a general property of the theory (Bennis (2004)), then Burzio's Generalization follows trivially: the internal argument will need to have its case features checked by T, which assigns nominative – hence the absence of the accusative case on the internal argument.

In concluding this section, note that the analysis that I have laid out here is very much in line with and provides further support for Hornstein's (1999) view that theta roles are not primitives and that, consequently, the theta-criterion has indeed no place

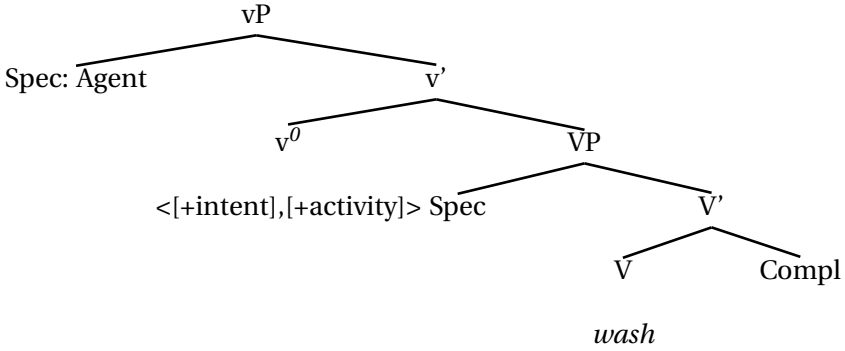
[21] Interestingly, Davis (1997) and Demirdache (2005) argue that in St'át'imcets all activity predicates are morphologically derived from causative predicates.

in the theory.[22] In this vein, the Tuple Constraint that I have postulated in (27) is clearly a condition on Merge. However, as I have argued here, argument realization is not exclusively an outcome of Merge but can be effected also by Move.

6 Deriving reflexives

As was already pointed out at the beginning of this paper, reflexive verbs often exhibit identical morphological marking as passives, middles and unaccusatives. This has been one of the reasons why in many works reflexives are treated as sharing the syntactic structure of passives, unaccusatives and middles (Bouchard (1984), Marantz (1984), Grimshaw (1990), Pesetsky (1995), Sportiche (1998), Steinbach (2002, 2004)). That is, the subject of reflexives is an underlying object which has raised to subject position for Case reasons. While maintaining a version of the unaccusative analysis of reflexives, I contend that reflexives are derived from transitive agentive activities, that is, a structure only minimally different from the one given in (30), in that Spec of VP is empty, or (alternatively) not present in the structure.[23] In other words, reflexives are not derived from di-transitive agentive activities, but from mono-transitive agentive activities whose structure is given in (39).[24]

(39) The structure of (mono-)transitive agentive activities



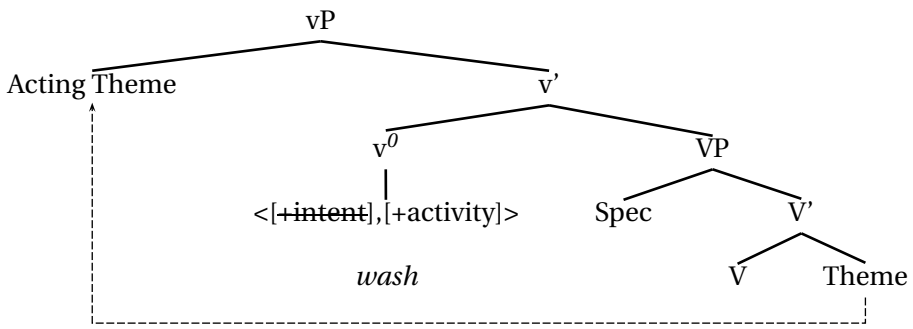
When unaccusative morphology applies to the structure in (39), it will strike out [+intent], as this is the first feature in v. Since the remaining feature (i.e., [+activity]) in v cannot assign a theta-role to Spec of vP as the Tuple Constraint in (27) has been violated due to suppression of a feature in the tuple, [+activity] has to be saturated by another argument moving to the specifier of vP. The closest (and only) argument available in the structure is the one realized in the Compl position of V (i.e., the internal argument). Therefore it will move to Spec of vP to license the feature [+activity] in v, as represented in (40). As a result of its feature composition, once it lands in Spec of vP it will be interpreted as an affected (theme) actor.

[22] As pointed out in note 3, Marušičand Žaucer (2004, to appear) treat the 'feel-like' construction as an obligatory control structure with a lexically null matrix verb FEEL-LIKE. While there is little point in rerecapitulating here Marušič and Žaucer's arguments, or Kallulli's (2006) and Rivero's (2005) arguments against their biclausal analysis, it is relevant to note that Hornstein (1999) explicitly argues that obligatory control structures are invariably derived from movement (not merge).

[23] In section 5.2.1 I proposed that the realization of the dative object in Spec of VP depends on the feature [+affected] of the verb in V. However, if the verb in V does not contain such a feature, then no dative argument will be merged in Spec of VP.

[24] Note again that (39) differs from (30) only in that there is no indirect object present.

(40)



Note that under my analysis, movement of the Theme argument upwards is not what it is in run-of-the-mill analyses of unaccusativity. That is, the internal argument does not move for case reasons. Movement here is motivated by the need to pick up features that assign theta-roles and, theta-roles can be picked up partly, which is what bundling is (Pylkkänen 2002, Reinhart and Siloni 2005).

7 Conclusion

A range of constructions with unaccusative morphology (to wit, the dyadic unaccusative construction and its various interpretations, anticausatives, passives, middles and reflexives) can be formally and uniformly derived by combining the idea that agentive (both causative or activity) predications and non-agentive (both causative or activity) predications are universally derived from distinct frames and that unaccusative morphology is a feature-suppression operation in syntax.

I have discussed a variety of – to my knowledge – new empirical arguments, which show that the picture depicted for the passive in English is quite idiosyncratic, and that the properties that have attained the status of identificational criteria of the passive are simply not revealing or even maintainable when looking at other languages. In particular, unlike generally assumed, neither *by-phrases* nor purpose clauses or agent oriented adverbs witness the presence of a non-oblique argument (either implicit or syntactically encoded, depending on the theory). In contrast, the analysis that I have laid out here derives the properties of the passive and anticausative both in Albanian and English uniformly. An important conclusion here is that universally anticausatives and passives differ only with respect to the (ontological event type) feature (in v), which can be affected by morphological operations in the syntax. The distinction between *by-* and *from*-phrases in English is a simple reflection of this feature: a *by*-phrase introduces an oblique actor upon suppression of the [+activity] feature in v and a *from*-phrase an oblique causer. I have shown that the English verbal passive can be made more compatible with its Albanian (and Latin and MG) cousin by relegating the differences with respect to the licensing of *by*-phrases in to simple combinatorial properties of verbs and types of prepositions.

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Configurational and Linearization-based Approaches to Negative Inversion

Takafumi Maekawa *

1 Introduction

It has been suggested in mainstream syntactic frameworks such as Minimalism and Principles-and-Parameters theory that the only information contained in tree diagrams is that of constituent structure, and not of linear order since the latter can be predicted from constituent structure (e.g., Kayne 1994). An important consequence of this view is that all syntactic operations must be sensitive to hierarchical structure, and cannot refer to word order. The standard framework of Head-Driven Phrase Structure Grammar (HPSG; Pollard and Sag 1994), following GPSG (Gazdar et al. 1985), has separate immediate dominance (ID) and linear precedence (LP) constraints. Linear order is a property of phonology (represented as a value of PHONOLOGY attribute), but it is closely related to constituent structure: the phonology of a set of sisters cannot be separated by the phonology of a non-sister. Let us call this type of view on linear order 'configurational'.

On the other hand, recent years have seen an emergence of a view that linear order is to a considerable extent independent from constituency. Such an idea is most clearly manifested in a version of HPSG, so-called linearization HPSG. In this framework, a linear sequence is analyzed in terms of a level of 'order domains', which is an ordered list of elements that often come from several local trees (see, e.g., Pollard et al. 1993; Reape 1994; and Kathol 2000, 2001). An important consequence of this approach is that syntactic constraints can be sensitive to linear order, not only to hierarchical structure; thus, it is possible to give a 'linearization-based' approach to certain syntactic phenomena.

With these two conceptions of linear organization in hand, it is important to consider what sort of analyses each approach can provide for various constructions. In this paper we will look at one specific construction, the negative inversion (NI) construction. The sentences in (1) are typical examples.

(1) a. *Under no circumstances* will he eat raw spaghetti.

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b. *No race* could Lewis win.
c. *With no job* would Mary be happy.

The most plausible approach to NI constructions in a configurational approach is to analyse the initial negative expression as a sister of the rest of the clause: negative expressions can be a modifier of the rest of the clause, as in (1a), or they can be a sister of a constituent containing a gap/trace, as in (1b,c). In the latter case the relationship between the negative expression and the gap/trace is represented in terms of movement (Minimalist/Principles-and-Parameter approaches) or the SLASH feature (HPSG), in the same way as in *wh*-interrogatives (2a) and topicalization sentences (2b) (Culicover 1991; Haegeman 2000a,b; Rizzi 1997; etc).

(2) a. *What* did they handed to the baby?
b. *That toy*, they handed to the baby.

In the linearization framework, on the other hand, it is possible to analyze negative preposing in terms of the linear sequence, irrespective of constituency.

I will consider the possibility of providing a detailed analysis of negative preposing in NI constructions within these two views on linear order. I will argue that there is a body of data which are problematic to configurational approaches, but linearization-based HPSG can provide a fairly straightforward account of the facts.

The organization of this paper is as follows. In the next section we will outline the configurational type of approach to NI constructions, and then we will look at data that is problematic to the configurational approach. Section 3 will outline the framework of linearization-based HPSG. Section 4 presents an analysis of NI constructions in terms of linearization. Section 5 is the conclusion. focalized

2 Configurational approach

In much previous work it has been argued that the initial negative expression is in a specifier position of a certain functional category and establishes a spec-head configuration with a verb that moves to the head position (Culicover 1991; Haegeman 1995, 2000a,b; Haegeman and Guéron 1999; Haegeman and Zanuttini 1991; Rizzi 1996, 1997; Rizzi and Roberts 1996; and Roberts and Roussou 2002). In 2.1 we consider how this type of approach might work. 2.2 and 2.3 will then provide pieces of data which are problematic for the configurational approach.

2.1 The outline

Rizzi (1997) proposes the following articulated structure for the left periphery of clause structure.

(3) $[_{\text{ForceP}}\ \text{Force}^0\ [_{\text{TopP}^*}\ \text{Top}^0\ [_{\text{FocP}}\ \text{Foc}^0\ [_{\text{TopP}^*}\ \text{Top}^0\ [_{\text{FinP}}\ \text{Fin}^0\ [_{\text{IP}}\ \ldots$

The traditional CP is first decomposed into two functional projections, ForceP and FinP: ForceP encodes the illocutionary force of the clause, and FinP is a projection

whose head carries the features for (non-)finiteness.[1] He also argues for the existence of other functional heads and projections between these two: FocP and (recursive) TopP. The specifier of FocP hosts a focalized constituent and its head hosts the focus feature. The specifier of TopP hosts the fronted topic and its head hosts a topic feature. Within this view, *wh*-questions are given something like the following analysis.

(4) $[_{\text{FocP}}$ which book$_i$ $[_{\text{Foc}}$ will$_j$ $[_{\text{IP}}$ you t_j read $t_i]]]$

The *wh*-phrase moves out of IP to the specifier of FocP. The movement of the auxiliary to Foc is then triggered by the WH-criterion, which checks a feature of the *wh*-expression with a verb in a spec-head configuration (see, e.g., Rizzi 1996, 1997; Haegeman 2000a,b).

The positioning of negative expressions and the accompanying subject-auxiliary inversion in NI are seen as parallel to the positioning of *wh*-expressions and the accompanying subject-auxiliary inversion in interrogatives. It is assumed that the initial negative expression is in [Spec,FocP] of a functional head Foc (Rizzi 1997: 317; Haegeman 2000a: 126; Haegeman 2000b: 26; see also Culicover 1991: 12, 15).[2] NI constructions are given something like the following representation.

(5) $[_{\text{FocP}}$ Not a single paper$_i$ $[_{\text{Foc}}$ did$_j$ $[_{\text{IP}}$ he t_j finish t_i on time]]]

In (5) the negative expression is in [Spec,FocP], and the auxiliary verb carrying the NEG-feature has moved to Foc^0 to satisfy the Negative Criterion (Haegeman 1995, 2000a, 2000b; Haegeman and Zanuttini 1991; Rizzi 1996: 73–74; Rizzi 1997: 315–318).[3] Thus, NI constructions are analyzed in the same way as *wh*-questions: the *wh*-phrase in (4) and the negative expression in (5) are in [Spec,FocP] and they are in a spec-head configuration with the auxiliary in Foc.

Unlike main clauses, NI constructions do not look so much like *wh*-questions in subordinate clauses. Compare the following examples.

(6) a. * I wonder what did Robin see.
b. I said that not once had Robin raised his hand.

(6) shows that *wh*-questions do not involve subject-auxiliary inversion in subordinate clauses while NI constructions do. Since the subordinate questions are selected by a matrix predicate, the highest head of the CP domain, Force, is associated with the *wh*-feature (Culicover 1991; Rizzi 1997; Haegeman 2000a,b). In embedded *wh*-questions, therefore, the *wh*-element moves to [Spec,ForceP] to establish a spec-head relation with the *wh*-feature. This makes the auxiliary inversion unnecessary. On the other hand, the embedded NI clauses are not selected by a matrix predicate, so Force is

[1] What Force really deals with is sentence type, such as declarative, interrogative, and so on (Bob Borsley, p.c.).

[2] Haegeman (2000a: 126) assumes that a focus feature associated with the negative expression triggers preposing.

[3] The Negative Criterion is defined as follows (Haegeman 2000a: 123; Haegemann 2000b: 23):

(a) A NEG-operator must be in a Spec-Head configuration with an X-[NEG]

(b) An X-[NEG] must be in a Spect-Head configuration with a NEG operator.

not associated with the NEG feature (Haegeman 2000a: 135). As is the case for main clauses, the negative expression occupies [Spec,FocP], and the Negative Criterion triggers movement of the auxiliary to Foc^0. The complementizer *that* can cooccur with the element in [Spec,FocP] since the former is in Force^0.

To summarise, the configurational analysis outlined above gives a parallel analysis to main *wh*-questions and NI sentences: the initial *wh*- and negative expression occupy [Spec,FocP].

(7) a. *Wh*-question: [$_{\text{FocP}}$ which book$_i$ [$_{\text{Foc}}$ will$_j$ [$_{\text{IP}}$ you t_j read t_i]]]
b. NI: [$_{\text{FocP}}$ Not a single paper$_i$ [$_{\text{Foc}}$ did$_j$ [$_{\text{IP}}$ he t_j finish t_i on time]]]

In the following two subsections, we will look at a body of data which are problematic for this analysis.

2.2 Contrasting behaviour of *wh*- and negative expressions

The analysis outlined above predicts that initial negative expressions in NI constructions always behave like *wh*-expressions in *wh*-interrogatives. However, a body of data illustrates the contrasting behaviour of *wh*-expressions and negative expressions.

First, *wh*- and negative expressions can co-occur in main clauses, as long as the former precedes the latter.[4]

(8) a. What under no circumstances would John do for Mary?
b. * Under no circumstances what would John do for Mary?
c. Where under no circumstances would John go for a holiday?
d. * Under no circumstances where would John go for a holiday?

The assumption that they are in a single position [Spec,Foc] leads to the prediction that they should not co-occur (Haegeman 2000a: 134; Haegeman 2000b: 46). This is not borne out, however, as the examples cited above illustrate.[5]

Second, the unbounded extraction of *wh*-phrases is grammatical, but unbounded extraction of a negative phrase is unacceptable for many speakers (Sobin 2003: 184–185). Let us consider the pair in (9).

(9) a. *What* did Bill say that Mary remembered to bring.
b. ?? *Not a penny* did I say that Mary remembered to bring. (Sobin 2003: 185)

[4] I would like to thank Bob Borsley and Neal Snape for the grammaticality judgements of these sentences.

[5] Haegeman (2000a,b) cites the following examples as evidence that the *wh*-phrase and the negative expression compete for the same position [Spec,FocP]. However, my informants do not find the (b) examples ungrammatical.

(i) a. * In no way, why would Robin volunteer?
b. * Why, in no way would Robin volunteer? (Haegeman 2000a: 134)

(ii) a. * On no account where should I go?
b. * Where on no account should I go? (Haegeman 2000b: 46)

The sentences in (9) are the same except for the initial elements, which are extracted out of the embedded clause. The unbounded extraction of *wh*-phrases, as in (9a), is grammatical, but as (9b) illustrates, the unbounded extraction of a negative phrase is very difficult. If *wh*-interrogatives and NI constructions have parallel analysis, the sentences in (9) should elicit similar judgements. However, this is not the case. The pair in (10) illustrates the same point.

(10) a. I said [that *never again* will Mary eat clams].
b. *Never again* did I say [that Mary will eat clams]. (Sobin 2003: 184)

If the unbounded extraction of a negative expression were grammatical, (10b) should be able to have the same meaning as (10a). However, this is not the case.

These pieces of data show that there is no reason to think that negative preposing in NI should be given a parallel analysis with *wh*-fronting, and that the configurational analysis of NI outlined in section 2.1 is dubious. This suggests that an alternative analysis is needed in which NI sentences and *wh*-interrogatives are treated rather differently.

2.3 Information structure in NI

We saw above that in the configurational approach, the initial negative expression in NI occupies the specifier position of a functional head Foc. Many proponents of this approach assume that the preposed element in the sentences of the following type occupies the same position (Culicover 1991; Rizzi 1997; Haegeman 2000a,b).

(11) To ROBIN I gave a book. (Culicover 1991: 34)

The preposed element with focus stress (in capitals) is assumed to be in the [Spec,FocP] position. It is important to note the fact that (11) can be used to answer the question (12a), but cannot be used to answer (12b).

(12) a. To whom did you give a book?
b. What happened?

The question in (12a) requires an answer with constituent focus on a recipient PP, and (12b) requires an answer with the whole-sentence focus. The fact that (11) can only answer (12a) indicates that the initial constituent in [Spec,FocP] is the only possible scope of focus.

If the initial negative expression in NI sentences occupies the position [Spec,FocP], it is expected to have the same scope of focus as the preposed element in (11). The following data, cited by Culicover (1991: 34) and Haegeman (2000b: 34), might appear to give evidence to this.

(13) a. Did you see anyone?
b. No, *not a single person* did I see. (Culicover 1991: 34)

An answer to a *yes-no* question serves as a test for focushood of a constituent (e.g., Chomsky 1971; Jackendoff 1972; Rochemont 1986). The fact that an NI sentence serves as an answer for the *yes-no* question (13a) indicates that the initial negative expression is focused and has new information.

However, there is also evidence that NI sentences as a whole can convey new information (Sobin 2003: 205ff). Let us consider the following examples from Sobin (2003: 206).

(14) a. * Because never again will I endure such a speech, I left.
b. I left because never again will I endure such a speech
c. * That rarely does Mary eat seafood will surprise everyone.
d. It will surprise everyone that rarely does Mary eat seafood.
e. * That never again would Mary eat seafood was inferred by everyone.
f. Everyone inferred that never again would Mary eat seafood.
g. * Since never does Mary eat seafood, Bill served chicken.
h. (?) Bill served chicken, since never does Mary eat seafood.

In English, an element with new information normally follows old information. Thus, if a subordinate clause comes before a main clause, it means that the subordinate clause is associated with old information; if a subordinate clause comes after the main clause, it means that the subordinate clause provides new information. In ungrammatical sentences in (14a,c,e,g), an embedded NI clause comes before a main clause. The ungrammaticality of these sentences is due to the fact that an NI construction is not compatible with an old information position. In the sentences in (14b,d,f,h), an NI clause is in a new information position. They are grammatical since NI constructions convey new information.

To summarise, NI sentences are ambiguous with respect to the domain of focus: they have either a narrow focus on the initial negative expression as in (13b), or a wide focus on the whole sentence as in (14b,d,f,h). This fact is problematic for the configurational approach since it predicts that only the constituent in [Spec,FocP] is focused; it does not predict the wide focus pattern.

2.4 Preposing of preverbal adverbials

There is another problem for the assumption that both the initial negative expression in NI and the preposed focus as in (11) occupy the specifier position of a functional head Foc.

The following pair might appear to show that the adverb *never* moves to the [Spec,Foc] position from the preverbal position in NI constructions.

(15) a. I *have never* seen a ghost.
b. *Never* have I seen a ghost.

If the movement from the preverbal position to [Spec,Foc] were possible, nothing would prevent other preverbal adverbs, such as *merely* and *almost* in (16), from moving to the same position, in the form of focus movement as in (11).

(16) a. Kim *merely* opened the door.
b. Kim *almost* found the solution.

(17) shows, however, that preverbal adverbs cannot be preposed (Jackendoff 1972; Bouma et al. 2001; Kim and Sag 2002).

(17) a. * *Merely* Kim opened the door. (Kim and Sag 2002: 386)
b. * *Almost* Kim found the solution. (Adapted from Bouma et al. 2001: 45)

This contrasting behaviour of *never* and other preverbal adverbials means that the assumption that both the initial negative expression in NI and the preposed focus move to [Spec,FocP] is problematic.

3 Theoretical assumptions

The analysis to be presented below will assume a version of HPSG. In HPSG, signs, which include words and phrases, are represented as a complex of syntactic, semantic and phonological information. Well-formed phrases are licensed by immediate dominance (ID) schemata. Constituent structure is represented as a value of the DAUGHTERS (DTRS) attribute.

The version of HPSG assumed here, however, departs from standard HPSG with respect to linear representation. In the version adopted here, linear order is independent from constituency. In the rest of this section we will outline the fundamental assumptions of this framework, which is often referred to as 'linearization-based HPSG'.

3.1 Order domains

In standard HPSG, linear order is represented as a property of the phonology of a phrase, computed from that of its daughters. In the framework adopted here, however, linear order is determined in a level of 'order domains'. This is an ordered list of elements that contain at least phonological and categorical information (see, e.g., Pollard et al. 1993; Reape 1994; and Kathol 2000, 2001). The list may include elements from several local trees. 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 or the elements of the daughter's order domain may just become elements in the mother's order domain. For example, let us consider the composition of an English inverted clause (18), given in Figure 1 (Borsley and Kathol 2000).

(18) Is the girl coming?

We assume that the combination of a head with a phrasal argument or filler will give rise to a new domain in which the argument or filler is compacted and inserted as a single element into the mother's domain. The VP *is coming* has two daughters and its domain contains two elements, one for *is* and one for *coming*. The top S node also has two daughters, but its order domain contains three elements. This is because the VP's domain elements have just become elements in the S's order domain, whereas the NP is compacted into one single domain element, which ensures the continuity of the NP. Discontinuity is allowed if the domain elements are not compacted: *is* and *coming* are discontinuous in the order domain of the S.

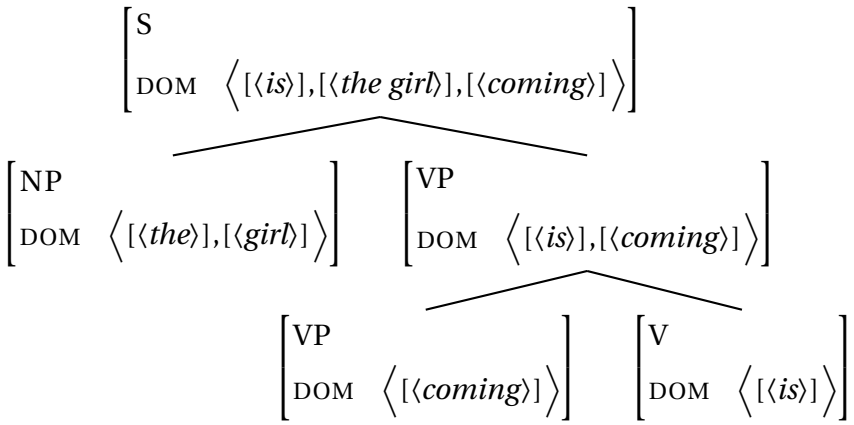

Figure 1: Structure for (18)

3.2 Position classes

We further assume that each element of a clausal order domain is uniquely marked for the region that it belongs to (Kathol 2000; see also Borsley and Kathol 2000; Chung and Kim 2003; Kathol 2002; and Penn 1999).[6] In our approach, the positioning of an element in a particular region is encoded as *first* through *fifth* on that element. There is a total order on these positional classes, enforced by the linear precedence (LP) constraint in (19).

(19) $first \prec second \prec third \prec fourth \prec fifth$

The top S node of Figure 1, for example, has a more elaborated representation for its order domain, which is something like the following.

(20) $\left[\text{DOM} \left\langle \begin{bmatrix} second \\ \langle is \rangle \end{bmatrix}, \begin{bmatrix} third \\ \langle the\ girl \rangle \end{bmatrix}, \begin{bmatrix} fourth \\ \langle coming \rangle \end{bmatrix} \right\rangle\right]$

The finite copula verb *is* is in *second* position when it is inverted. The non-finite verb *coming* is assigned to *fourth*. We assume that subjects in general are assigned to *third* position. We will introduce constraints determining the position of elements in order domains in 3.3.

3.3 Constructional Constraints

In order to formulate generalizations about the shared properties of diverse expressions, the version of HPSG assumed here includes a cross-classifying multidimensional hierarchy of constructional types with associated constraints, following the recent development of HPSG (Ginzburg and Sag 2000; Green and Morgan 1996; Kathol 2000, 2001, 2002; Kim and Sag 2002; Sag 1997); each type inherits constraints from its supertypes. In Kathol's version, clausal expressions are classified with respect to two dimensions: 'internal syntax' and 'clausality', which will be adopted in this study.

[6] In the case of German, this partitioning of the clausal domain directly encodes the notion of traditional German grammar of 'topological fields'. See Kathol (2000) for details.

The internal syntax dimension is related to the placement of the finite verbal head in linear structure. The constraints are organized as in Figure 2.[7]

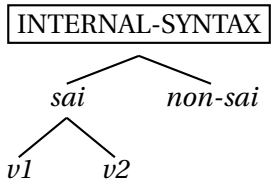

Figure 2: Classification of English clauses in terms of their internal syntax

Each type of clause in English is first of all classified according to whether or not they involve subject-auxiliary inversion. A clause of the type *subject-auxiliary-inversion* (*sai*) satisfies constraint (21).

(21) $$sai \rightarrow \begin{bmatrix} \text{S}[fin] & \\ \text{DOM} & \left\langle \ldots, \begin{bmatrix} second & \\ \text{V}[fin] & \\ \text{AUX} & + \end{bmatrix}, \ldots \right\rangle \end{bmatrix}$$ (Kathol 2002; cf. Kathol 2001: 57)

(21) states that a clause of the type *sai* is a finite clause and its second position is filled by auxiliary finite verb. The specification that the second element is an auxiliary verb is justified by the ungrammaticality of sentences such as the following, in which the second element is a finite non-auxiliary verb.

(22) a. * At no time went John to London.
b. *Where went John?

Each subtype of clause of the type *sai* is classified according to whether or not it includes a particular kind of element in *first* position. A *v1* clause does not include such an element, while a *v2* clause does, constrained by the following constraint.

[7] The classification in Figure 2 is different from the one proposed by Kathol (2000, 2001) for German clauses: he classifies each type of the clause first as root-clause or subordinate-clause. In German the positioning of the finite verb is largely correlated with the root/subordinate distinction: the verb-second placement is restricted to root clauses. In English, however, there is no such strict correlation since the verb-second order can occur in the subordinate clause as well as in the root clause.

(i) a. Gestern hat er ihn gesehen.
b. * Er ihn gestern gesehen hat.

(ii) a. * . . . dass gestern hat er ihn gesehen.
b. . . . dass er ihn gestern gesehen hat.

(iii) a. Never again will Mary eat clams.
b. * Never again Mary will eat clams.

(iv) a. I said that never again will Mary eat clams.
b. * I said that never again Mary will eat clams.

(23) $v2 \rightarrow \left[\text{DOM} \quad \left\langle [first], \ldots \right\rangle \right]$ (Kathol 2000: 147)

(23) states that a *v2* clause has a domain element which is assigned to *first* position.

In the dimension of 'clausality', clauses are classified in terms of their semantics; i.e., sentence modes such as declarative, interrogative, and imperative. The constraints are organized as in Figure 3.

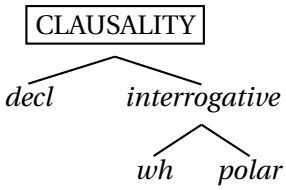

Figure 3: Classification of English clauses in terms of their clausality

Each type of clause in English is first of all classified depending on whether it is interrogative or declarative. The former is further classified into *wh*-interrogative and polar interrogative. Clauses of the latter type, *decl*, are constrained by (24).

(24) $decl \rightarrow \left[\text{CONT} \quad proposition \right]$ (Kathol 2001: 59)

Following Kathol (2000, 2001, 2002), each maximal clausal type inherits both from an 'internal syntax' type and from a 'clausality' type (see also Sag 1997 and Ginzburg and Sag 2000). Thus, a clause type *v2-decl* is a subtype of both *decl* and *v2*.

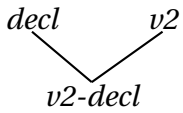

Figure 4: Multiple inheritance from *decl* and *v2*

In addition to all the constraints imposed on its superytpes *decl* and *v2*, a clause of the *v2-decl* type satisfies the following constraint.

(25) $v2decl \rightarrow \left[\text{DOM} \quad \left\langle \begin{bmatrix} first & \\ \text{WH} & \{\} \end{bmatrix}, \ldots \right\rangle \right]$ (Kathol 2001: 59)

(25) states that a *v2-decl* clause does not have a *wh*-expression in *first* position.

4 A linearization approach to NI

We now return to the English NI constructions and show how they can be analyzed within linearization-based HPSG.

4.1 Constraints for NI constructions

We argued in section 3.3 that the type *v2-decl* is a subtype of both *v2* and *decl* (Figure 4). *V2-decl* in turn has a number of subtypes, including those listed below.

(26) a. So slowly did the workmen get on with their work that they were dismissed. (Hawkins 1986: 169)

b. Abby can play more instruments than can her father. (Merchant 2003)

c. When Bill smokes, all the more does Susan hate him.

d. ? The more Bill smokes, the more does Susan hate him.

(c and d from Culicover and Jackendoff 2005: 515)

We assume that NI constructions are among those subtypes of *v2-decl*, as shown in Figure 5.

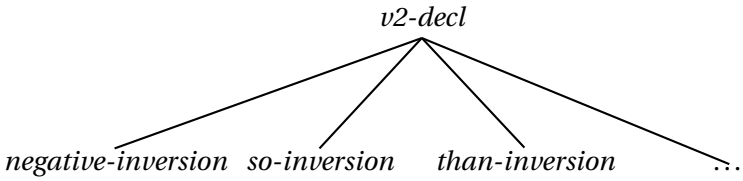

Figure 5: Subtypes of *v2-decl*

These subtypes are classified according to what kind of element occupies *first* position. A *negative-inversion* clause satisfies the constraint in (27), in addition to all the constraints imposed on its supertype *v2-decl*.

(27) $$\textit{negative-inversion} \rightarrow \left[\text{DOM} \quad \left\langle \left[\begin{array}{ll} \textit{first} & \\ \text{STORE} & \left\{ \textit{neg-quant} \right\} \end{array} \right], \ldots \right\rangle \right]$$

This constraint states that a clause of the type *negative-inversion* has a negative quantifier in storage in the expression in *first* position.[8]

For example, an NI sentence (28) is given the structure in Figure 6.

(28) *On no account* will I write a paper.

The non-finite verb *write* is combined with the object NP *a paper* and the PP *on no account* to form a VP.[9] The resulting VP combines with the finite auxiliary verb *will* to form the highest VP, which in turn is combined with the subject *I*. Each domain element occupies the appropriate position in the order domains according to the constraints given in section 3. Of significance here is that the negative expression *on no account* is a sister of the non-finite verb in the constituent structure. Although it is in such a low position on the tree, it is assigned to *first* position in the order domain of the top S due to constraint (27). The initial placement of a negative expression in NI sentences is thus dealt with here as a linearization phenomenon in a clausal order domain.

[8] Following de Swart and Sag (2002) we assume that negative expressions are quantifiers.

[9] Here adjuncts are assumed to be complements (See, e.g., Abeillé and Godard 1997; Bouma et al. 2001; Kim and Sag 2002; van Noord and Bouma 1994; PrzepiÚrkowski 1999a, 1999b).

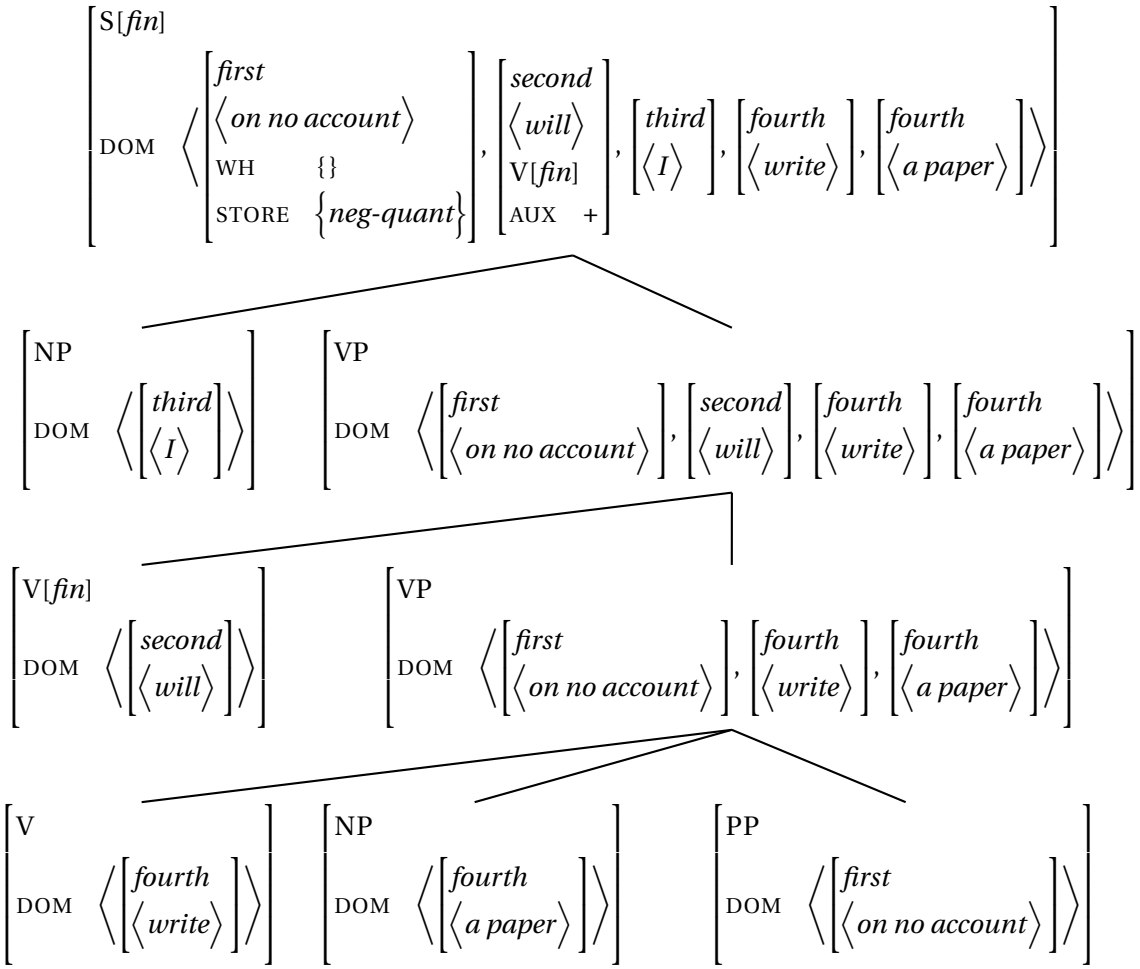

Figure 6: Structure for (28)

4.2 An account of the facts

We will now look at how the constraints introduced above can accommodate the properties of the NI construction outlined in sections 2.2 to 2.4, which are problematic for the configurational analysis.

4.2.1 Clause-boundness

In our treatment of NI sentences, the positioning of negative expressions is determined in clausal order domains. This means that NI sentences follow the general properties of clausal order domains. As discussed earlier, an embedded clause is totally compacted when it is combined with the higher clause. This captures the fact that negative preposing in NI is clause-bound (9-10).

Our analysis of this phenomenon is shown in Figure 7. The NI clause is compacted at the point where it combines with the complementizer *that*. Since the NI clause constitutes a single domain element in the upper S, the negative expression *never again* cannot be extracted out of it.

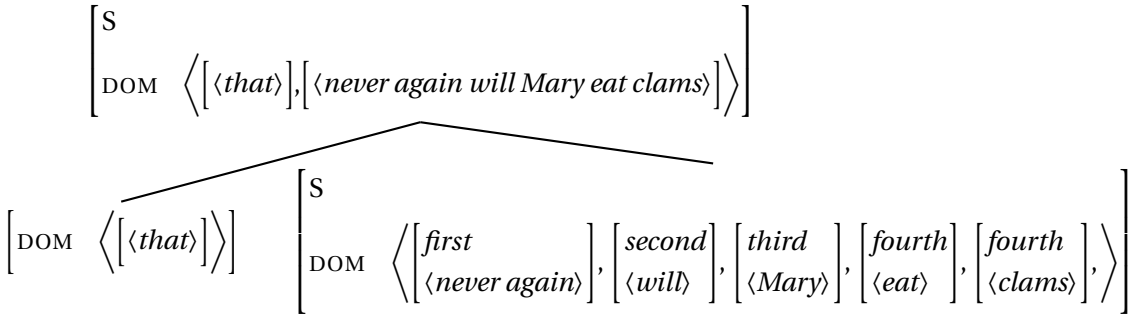

Figure 7: Total compaction of an embedded clause

4.2.2 Co-occurrence of a *wh*- and negative expression

Let us turn to the next set of data problematic for the configurational analysis discussed in section 2.2. The data in (8) shows that the fronted *wh*-element and negative expression do not show a complementary distribution.

This fact would be surprising if the fronted *wh*-element and negative expression occupied one and the same position, as the configurational analysis assumes.

Here we must draw attention to one of the differences between German and English: only one element is allowed in the initial position in German verb-second clauses while more than one element is allowed in English counterparts. The examples in (29), cited from Hawkins (1985: 166), show the German cases; (29a) is ungrammatical since it contains two elements before the finite verb.

(29) a. * Gestern das Auto verkaufte Fritz an einen Händler.
yesterday the car sold Fritz to a dealer

b. Gestern verkaufte Fritz das Auto an einen Händler.
yesterday sold Fritz the car to a dealer

c. Das Auto verkaufte Fritz gestern an einen Händler.
the car sold Fritz yesterday to a dealer

In English, on the other hand, it is possible to have two elements before the finite verb, as illustrated by examples in (8) above. We will capture this difference between the two languages by cardinality conditions on the *first* and *second* positions. The LP statements in (30a) ensure that in a given domain in German, only a single element may occupy *first* and *second*, respectively. We assume that a cardinality condition is imposed only on *second* position in English and there is no such condition on *first*. The LP statement (30b) is for English.

(30) a. German
i. $first \prec first$
ii. $second \prec second$

b. English
$second \prec second$

The absence of cardinality condition on *first* means that more than one element can occupy this position in English. (8a) is represented as in (31).

(31)
$$\left[\text{DOM} \left\langle \begin{bmatrix} \textit{first} \\ \langle \textit{what} \rangle \end{bmatrix}, \begin{bmatrix} \textit{first} \\ \left\langle \begin{matrix} \textit{under no} \\ \textit{circumstances} \end{matrix} \right\rangle \end{bmatrix}, \begin{bmatrix} \textit{second} \\ \langle \textit{would} \rangle \end{bmatrix}, \begin{bmatrix} \textit{third} \\ \langle \textit{John} \rangle \end{bmatrix}, \begin{bmatrix} \textit{fourth} \\ \langle \textit{do} \rangle \end{bmatrix}, \begin{bmatrix} \textit{fourth} \\ \langle \textit{for Mary} \rangle \end{bmatrix} \right\rangle\right]$$

In the clausal order domain in (31), *what* and *under no circumstances* are both in position *first*. This is allowed since there is no cardinality restriction on *first*. We assume that an LP rule ensures that a *wh*-phrase precedes a negative phrase.

4.2.3 Information structure of NI

We now turn to the ambiguity of NI sentences discussed in 2.3: they may have a narrow focus on the initial negative expression as in (13b), or they may have a wide focus on the whole sentence as in (14b,d,f,h). We argued that the configurational approach can capture only the narrow focus pattern.

In the present approach this ambiguity can be accommodated quite easily. We propose the following as an additional constraint on the *negative-inversion* type.

(32)
$$\textit{negative-inversion} \rightarrow \left(\begin{bmatrix} \text{SYNSEM|CONT} & \boxed{1} \\ \text{INFO-STR|FOC} & \boxed{1} \end{bmatrix} \vee \begin{bmatrix} \text{DOM} & \left\langle \begin{bmatrix} \textit{first} \\ \text{SYNSEM|CONT} & \boxed{1} \end{bmatrix}, \ldots \right\rangle \\ \text{INFO-STR|FOC} & \boxed{1} \end{bmatrix} \right)$$

(32) states that the FOC value of *negative-inversion* is structure-shared with either the CONT value of the sign or the CONT value of the domain element in *first* position. Here it is assumed that a sign has information structure, which is represented as a value of its INFO(RMATION)-STR(UCTURE).[10] Its feature geometry reflects a focus-background structure of a sign. We assume, following Engdahl (1999: 186–187), that each of those features takes *content* objects (i.e., values of the CONT feature) as its value.[11] The FOC(US) feature is among those appropriate for INFO-STR, and its value is structure-shared with the FOC value of the focused part of the sign. The first disjunct of constraint (32) captures the wide focus pattern in (14b,d,f,h), and the second disjunct accommodates the narrow focus pattern in (13b).

4.2.4 Preposing of preverbal adverbials

As we saw in 2.4, preverbal adverbials cannot be preposed, as illustrated by (33), but (34) shows that *never* can be in the initial position of an NI sentence.

(33) a. (**Merely*) Kim (merely) opened the door.
b. (**Almost*) Kim (almost) found the solution.
c. (**Never*) I have (never) seen a ghost.

(34) *Never* have I seen a ghost.

[10] See Engdahl and Vallduví(1996), Alexopoulou and Kolliakou (2002), De Kuthy (2002), and De Kuthy and Meurers (2003).

[11] See also De Kuthy (2002: 162) and De Kuthy and Meurers (2003: 103).

Recall that our analysis of NI sentences does not include any specification about the status of the negative expressions in constituent structure. *Never* is a negative adverbial and constraint (27) allows it to be in the initial position in the order domain of the NI sentence. The constituent structure and order domain of (34) are provided in Figure 8. The preverbal adverb *never* combines with the VP *seen a ghost* as ordinary preverbal adverbials. Due to its positional assignment, it occurs in the initial position in the order domain of the top S.

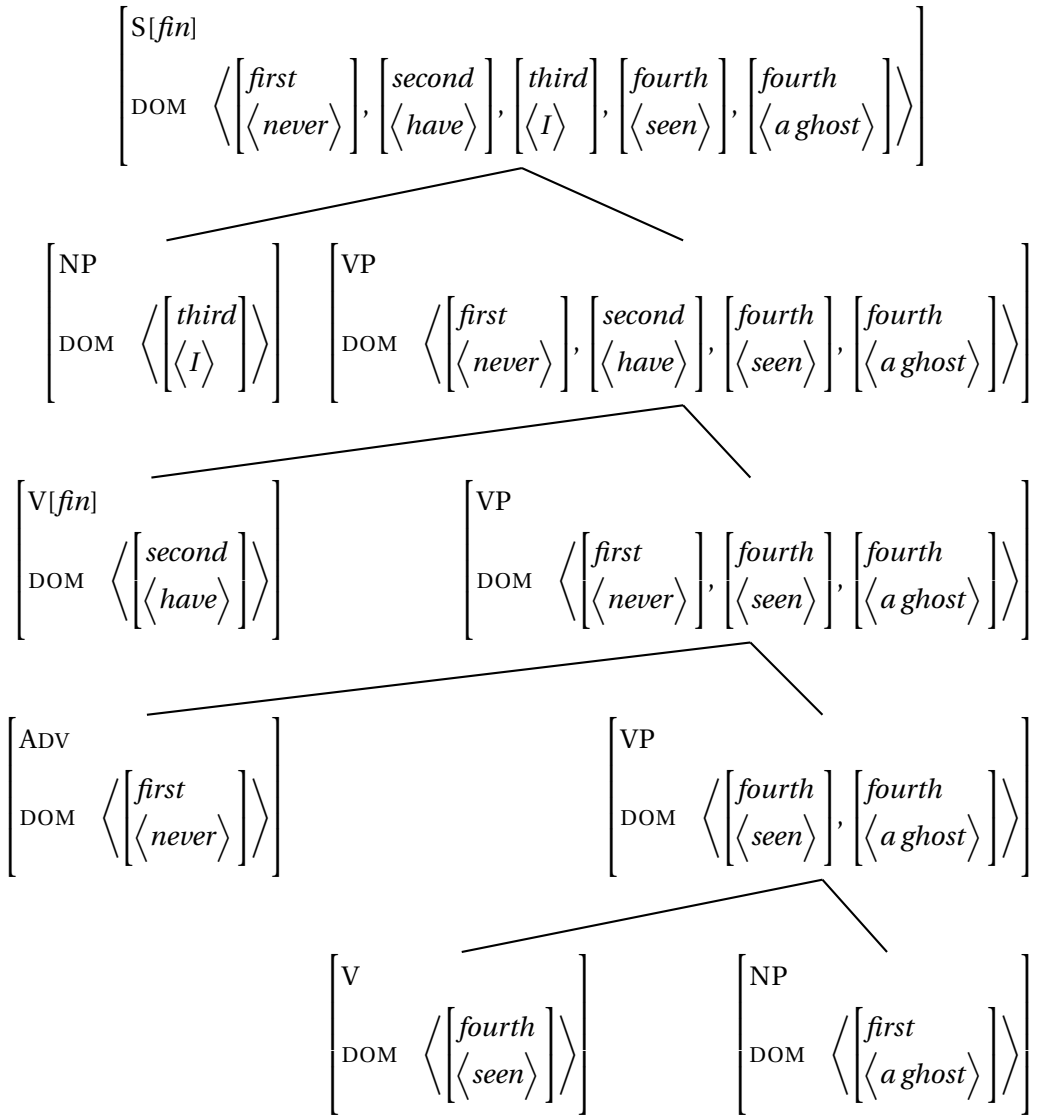

Figure 8: Structure for (34)

4.3 Other facts

In this subsection we will see that the present proposal is compatible with other facts of NI sentences.

4.3.1 Sentential negation

Our approach can accommodate the well-known fact that NI sentences always have a sentential negation (Klima 1964: 271ff, 306ff; Haegeman 1995: 72ff, 2000a,b; Rudanko 1982). This property will become clear if we compare NI sentences with sentences with constituent negation. First, the NI sentence in (35a) admits *neither* tags, while the constituent negation sentence in (35b) does not.

(35) a. *Not often* does Jack attend parties and neither does Jill.
b. * *Not long ago* Jack attend a party and neither did Jill. (Rudanko 1982: 350)

Second, the NI sentence in (36a) takes non-negative tags, while the constituent negation sentence (36b) takes negative tags.

(36) a. *Not often* does Jack attend parties, does he/*doesn't he?
b. *Not long ago* Jack attended a party, didn't he/*did he? (Rudanko 1982: 350)

Third, the initial negative expression *not often* in the NI sentence in (37a) license the negative polarity item *any*. (37b) shows that the constituent negation does not license *any*.

(37) a. *Not often* does Jack attend any parties.
b. * *Not long ago* Jack attended any parties. (Rudanko 1982: 350)

Fourth, the NI sentence cannot be coordinated with tags introduced by *so*, while the constituent negation sentence can.

(38) a. * *Not often* does Jack attend parties, and so does Bill.
b. *Not long ago* John bought a house, and so did Bill. (Haegeman 1995: 73)

These pieces of data show that NI sentences have a sentential negation.

We can formalise the requirement of sentential negation in NI as an additional constraint to the type *negative-inversion*.

(39) $$\textit{negative-inversion}\rightarrow \begin{bmatrix} \textsc{quants} & \langle \boxed{1} \rangle \\ \textsc{store} & \{\} \\ \textsc{dom} & \left\langle \begin{bmatrix} \textit{first} \\ \textsc{store} & \left\{ \boxed{1}\textit{neg-quant} \right\} \end{bmatrix}, \ldots \right\rangle \end{bmatrix}$$

(39) states that in a *negative-inversion* clause, the negative quantifier in storage in the initial negative expression should be structure-shared with one of the elements in the QUANTS list at the immediately containing clause.[12]

[12]This constraint is compatible with quantifier retrieval either at lexical or phrasal level.

4.3.2 NI with the conjunction *nor*

As illustrated by (40), the initial negative expression in NI constructions can be the conjunction *nor*.

(40) a. Mary neither spends her vacations at the seashore *nor* does she go to the mountains. (Culicover 1999: 55)

b. He did not receive any assistance from the authorities *nor* did he believe their assurance that action would soon be taken.

c. The house could hardly be called red, *nor* was brown the right word.

d. The little creature cried and laid down, *nor* could all our breathing raise it.

e. I remained silent, *nor* did he speak a single word.

((b-e) from Mazzon 2004: 104–105)

The configurational analysis assumes that the initial negative expression in NI is in [Spec,FocP]. As a conjunction, however, *nor* is not involved in an unbounded dependency relation. Therefore it would be difficult to assimilate it to *wh*-expressions, which are always in an unbounded dependency relation.

In our treatment of NI sentences outlined in section 4.1, the initial positioning of negative expressions is constrained only in terms of the linear sequence. This means that there is no specification about the status of the negative expressions in constituent structure. Another feature of our treatment of NI is that there are just a few constraints on the internal property of the initial negative element: (25) stating that it should not contain a *wh*-expression and (27) stating that it should contain a negative expression. Other aspects of the internal structure are underspecified. This means that any syntactic category can in principle be allowed in the *first* position in NI. For example, (1a) contains an adverbial phrase, (1b) an NP and (1c) a PP.

The absence of any restriction on constituency and the underspecification of the internal structure allow the occurrence of *nor* in position *first* as in (40), although it is a conjunction and is not involved in an unbounded dependency relation. The *nor*-clause in (40a) is given the following order domain representation.

(41) $\left[\text{DOM} \quad \left\langle \begin{bmatrix} \textit{first} \\ \langle \textit{nor} \rangle \end{bmatrix}, \begin{bmatrix} \textit{second} \\ \langle \textit{does} \rangle \end{bmatrix}, \begin{bmatrix} \textit{third} \\ \langle \textit{she} \rangle \end{bmatrix}, \begin{bmatrix} \textit{fourth} \\ \langle \textit{go} \rangle \end{bmatrix}, \begin{bmatrix} \textit{fourth} \\ \langle \textit{to the moutains} \rangle \end{bmatrix} \right\rangle \right]$

The conjunction *nor* is a negative expression, so constraint (27) licenses its occurrence in *first* position of the clausal domain, in whatever fashion it combines with the rest of the clause in constituent structure.[13,14]

[13] We will not discuss the combinatorial relation between the conjunction nor and the rest of the clause in constituent structure since it is of little importance to the discussion in the present paper.

[14] It is assumed that the clause after *nor* is uncompacted although other conjunctions are different in this respect.

5 Summary and concluding remarks

Let us summarise the present study. We first looked at how the configurational analysis within Minimalism/Principles and Parameters theory deals with NI constructions, and then provided some pieces of data that are problematic to the approach. After introducing the theoretical framework of linearization-based HPSG in section 3, we provided the linearization-based approach to NI in section 4. In 4.1 we proposed that NI sentences are of the clause type *negative-inversion*, and that it is a subtype of a type *v2-decl*, which in turn is a subtype of both *v2* and *decl*. Thus NI sentences should satisfy all the constraints on these clause types. Of considerable importance here is that these constraints concern just the sentence type and the internal syntax of the clause, so NI does not impose any restriction on constituent structure. The initial placement of a negative expression is thus treated as a linearization phenomenon in a clausal order domain.[15] 4.2 showed that this approach can accommodate all the problematic data to the configurational approach.[16]

The present analysis accommodates not just the construction-specific properties of NI sentences but also the regularities that they share with other constructions. The use of hierarchically organized network of clausal types allows us to have constraints of any level of generality. The present approach can thus capture the distinctive properties of NI sentences without missing any generalizations.

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[15] Culicover (1999: 162–165) suggests that NI should be analyzed in terms of the linear sequence, but he does not offer an actual analysis.

[16] The present approach is somewhat similar to Sobin's (2003) analysis within Minimalism in that the initial positioning of the negative expression does not involve an unbounded dependency. Sobin (2003) posits the clause structure shown in (i), which includes a simpler CP layer. The negative expression associated with NI constructions is located in [Spec,NegP]. Thus, an NI construction is given an analysis such as (ii). There is no attraction of the verb to the negative expression (i.e., no Negative Criterion). The apparent inversion is impeded movement where the elements involved (verb and subject) fail to arrive at the normal declarative surface positions. In this approach, [Spec,AgrP] in NI constructions is empty, which violates the Extended Projection Principle. Sobin provides a couple of possible solutions, but the mechanisms involved require further development.

(i) $[_{CP} \ldots [_{AgrP} \ldots [_{NegP} \ldots [_{TP} \ldots [_{VP} \ldots$

(ii) $[_{CP}\ [_{AgrP}\ [_{NegP}$ never again $[_{Neg}\ \emptyset_{Neg}]\ [_{TP}\ [_{T}$ will $]\ [_{VP}$ he $[_{V'} \ldots$

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Linearizing sets: *each other*

Alda Mari

1 Introduction

It is has been well known since Fiengo and Lasnik (1973) and Langendoen (1978) that *each other* presents a high degree of contextual variability. In a tradition that goes back to Langendoen (1978) and later to Dalrymple et al. (1998), theoreticians have tried to list different truth conditions and to establish a criterion for determining which one holds in which particular context. Along the lines of a competitive tradition going back to Fiengo and Lasnik (1973) and Heim (Lasnik and May), authors have tried capture the contextual variation of *each other* by a unique rule. Along this line of thought, Beck (2001) has recently provided convincing arguments for reducing the possible known and attested meanings to four basic interpretations three of which can be analyzed in the light of a unique rule. These interpretations are, ordered by strength: strong reciprocity, weak reciprocity, partitioned reciprocity, and linear orderings. The last configuration, illustrated in (1), however, escapes the unifying account and seems hardly reconcilable with strong and weak reciprocity.

(1) The tables are stacked on top of each other

In this paper we propose a new account for *each other*, which we consider to be a function from sets to orders, rather than a function from sets to sets.

The paper is structured as follows. In section (2) we consider the reasons for the incompatibility between linear orderings on one hand and strong and weak reciprocity on the other hand, arguing for the need of a new account. In section (3), we briefly recall the foundational notions introduced by Heim (Lasnik and May) that are usually agreed upon by theoreticians of the notion of reciprocity and must be integrated in any analysis of *each other*. In section (4), we discuss the account proposed by Schwarzschild (1996), who treats reciprocity in relation to a larger theory of plurality introducing the *Part* and *Cov* variables that we will also be using in our account. We fill in the details of the definition the author proposes for the function *EachOther*, the problems it solves and those it leaves open.

Section (5) is devoted to the presentation of a new semantic account for the function *EachOther*. We start from the well-known fact that *each other* expresses a relation between members of a group and themselves. However, it establishes an order in this relation, differently from reflexives. We argue that *EachOther* is a linearizing function that takes an unordered set as its argument and has a set of sequences as its value. After an informal presentation of the new definition of the function *EachOther* (in section (5.1)), we provide specific rules for the linearization and consider three cases: the

cover provides one cell that presents no internal structure (5.2), the cover provides more than one cell (5.3), and the cover provides one cell whose internal structure is non-homogeneous (5.4). We finally present a unified rule for *each other* in subsection (5.5).

Section (6) is devoted to the pragmatics of the notion of permutability, which underlies that of sequence. We argue that permutability involves the corollary notions of interchangeability and unboundedness, and consider the facts presented above in turn: comparatives (section (6.1)), "normal" symmetric relations (section (6.2)), directionality (section (6.3)), and cases involving two-membered pluralities (section (6.4)). We conclude the paper in section (7).

2 A unified account for *each other*. The problem of linear orderings

Assume for now, for simplicity's sake, the following structure for a simple reciprocal sentence in which A is the antecedent group and R the reciprocal relation.

(2) A R each other

Strong reciprocity (3a) is an all-all interpretation. The weakest of the weak reciprocity relations in context, what is called "one way weak reciprocity," is an all-some interpretation (3b) Dalrymple et al. (1998), Beck (2001). The weaker the relation, the more suitable it should be for capturing linear orderings.

(3) a. Strong reciprocity $\forall x \in P\ \forall y \in P\ (x \neq y \rightarrow Rxy)$

b. (One-way) weak reciprocity $\forall x \in P\ \exists y \in P\ (x \neq y \wedge Rxy)$

For (4), the strong reciprocal interpretation (5a) states that every boy in the antecedent group is looking at every other boy in the same group. The weak reciprocal interpretation for *each other*, (5b), is that every boy in the antecedent group looks at a different boy in the same group. The rule does not require that every boy looking at some other(s) boy be looked at in turn.

(4) The boys are looking at each other

(5) Let $\|$ the boys $\|^{M,g} = \{\{j\},\{r\},\{b\}\}$

a. $\forall x \in \{\{j\},\{r\},\{b\}\}\ \forall y \in \{\{j\},\{r\},\{b\}\}\ (x \neq y \rightarrow \text{look at } xy)$

b. $\forall x \in \{\{j\},\{r\},\{b\}\}\ \exists y \in \{\{j\},\{r\},\{b\}\}\ (x \neq y \wedge \text{look at } xy)$

Neither strong nor weak reciprocity can capture linear orderings since the last element of a linear order has no other element with which it stands in the relation provided by the predicate. Consider a pile of tables and the relation *be on top of*. The last table in the pile has no other table with which it stands in relation R.

On the other hand, the rules for linear orderings cannot capture strong and weak reciprocity. Consider (6a). Assuming that relation R can be analyzed into two converse relations, R^+ and R^-, this rule states that for every entity of type R^+, there is an entity

of type R^-, and that these two entities stand in relation R. (6b), more common in the literature (e.g. Langendoen (1978), Dalrymple et al. (1998), Beck (2001)) states that for every x there is a y such that they stand in an asymmetric relation.

(6) a. $\forall x \in P\ ((R^+(x)) \rightarrow \exists y \in P\ ((R^-(y)) \wedge Rxy)$

b. $\forall x \in P \exists y \in P(x \neq y \wedge (Rxy \vee Ryx))$

For (1), the relation *be on top of* can be analyzed into two converse relations (*be above* and *be below*). (6a) rule states that for every table that is on top, there is a table beneath it. Similarly, (6b) states that for every table x there is a table y such that either x is on top of y, or y is on top of x.

(7) Let, for (1) $\|$ the tables $\|^{M,g} = \{\{a\},\{b\},\{c\}\}$

a. $\forall x \in \{\{a\},\{b\},\{c\}\}\ ((be\ above(x)) \rightarrow \exists y \in \{\{a\},\{b\},\{c\}\}\ ((be\ below(y)) \wedge\ be\ on\ top\ of\ x\ y)$

b. $\forall x \in \{\{a\},\{b\},\{c\}\} \exists y \in \{\{a\},\{b\},\{c\}\}(x \neq y \wedge\ be\ on\ top\ of\ x\ y \vee\ be\ on\ top\ of\ y\ x)$

(6a) and (6b) cannot be generalized to weak and strong reciprocity since they do not force the relation to be symmetric whenever there are only two elements and the predicate is non asymmetric. Indeed, symmetry is mandatory whenever there are only two entities and the predicate is non-asymmetric.

Consider (5) and a situation in which there are only two boys, John and *robert*. Assuming that the relation *look at* can be analyzed into two converse relations *looker* and *lokee*, (6a) and (6b) yield (8a) and (8b) respectively.

(8) Let $\|$ the boys $\|^{M,g} = \{\{j\},\{r\}\}$

a. $\forall x \in \{\{j\},\{r\}\}\ ((looker(x)) \rightarrow \exists y \in \{\{j\},\{r\}\}\ ((lokee(y)) \wedge\ look\text{-}at\ x\ y)$

b. $\forall x \in \{\{j\},\{r\}\} \exists y \in \{\{j\},\{r\}\}(x \neq y \wedge\ look\text{-}at\ x\ y \vee\ look\text{-}at\ y\ x)$

In both cases, the sentence is truthified in a situation where either John or *robert* looks at the other, exclusively. Consequently, given the model in (8), neither (8a) nor (8b) appropriately represent (4).

One option to achieve a unified account is to get rid of linear orderings. It has been argued that linear orderings are a case of weak reciprocity for which the context is benevolent (Fiengo and Lasnik (1973), Sauerland (1998)), or has provided enough information to retrieve a weak reciprocity schema (Schwarzschild (1996)). They have also been considered a minor configuration that shows up in well definable contexts that can be studied individually (Beck (2001)).

However, it has also been convincingly argued that linear orderings are a common configuration that must receive a semantic account (Dalrymple et al. (1998), Langendoen (1978) and also Beck (2001)).

To our knowledge, there is no unified account *each other* that can grasp, simultaneously, weak reciprocity and linear orderings (e.g. Fiengo and Lasnik (1973), Heim (Lasnik and May), Beck (2001) among others). This paper is a further attempt in this direction.

This attempt is not to undermine the role of the context, however. We will show that its role is not that of reducing linear orderings to other cases. Nonetheless, as we will argue in detail, we recognize that it plays a crucial role in the course of the interpretation, for linear orderings as well as for any other case. Indeed, since we are about to present a unified account there will be no point distinguishing different configurations. One of the major tasks will be, instead, to draw a line between the semantic interpretation of *each other* and the pragmatic constraints attached to its definition.

In relation to linear orderings, it is crucial that the unified account we propose must provide an explanation for the following facts (indicated by Beck (2001)), which have not yet received a comprehensive explanation:

(9) Facts to be explained[1]:

1. For a plurality of two elements, if the predicate is non-asymmetric, strong reciprocity is mandatory.

2. Linear orderings are compatible with the reciprocal relation with the exception of comparatives (in simple sentences) and this, irrespective of whether there the group is small ((10a) and (10b)) or large ((10c) and (10d)).

   (10) a. #The two trees are taller than each other
   b. #The two sets outnumber each other
   c. #The skyscrapers are taller than each other for miles
   d. #These sets outnumber each other

3. "Normal" (i.e., non-comparative) linear orderings are preferable with large groups ((11c) and (11d)):

   (11) a. ??These three people inherited the shop from each other
   b. ??The two men buried each other on this hillside
   c. The members of this family have inherited the shop from each other for generations
   d. The settlers have buried each other on this hillside for centuries

4. There is a preference in directionality. As illustrated in (12) the relations $precede$ and $underneath$ are rejected, but $follow$ and *on top of* are accepted.

   (12) a. #They preceded each other into the elevator
   b. They followed each other into the elevator
   c. #The plates are stacked underneath each other
   d. The plates are stacked on top of each other

5. Only spatial, temporal and spatio-temporal asymmetric relations are acceptable not only with small groups but even with two-membered pluralities.

[1] Facts 2,3,5 are from Beck (2001), pp.126 sqq. The judgments refer to the availability of a linear order interpretation. Fact 4 is from Langendoen (1978).

(13) a. The two books are lying on top of each other
b. The two students followed each other into the elevator
c. You put these two bowls inside each other

Moreover, a proper account of *each other* must capture partitioned reciprocity. This was first identified by Fiengo and Lasnik (1973) and largely studied by Schwarzschild (1996). Lexical items (14) or the context can impose partitioning. A famous case of the latter kind is that of the fiction-non fiction correspondence, in the table (15) Schwarzschild (1996).

(14) a. The men and the women in this room are married to each other
b. The pirates are staring at each other on two different boats
c. Nine boys follow each other in groups of three in three different directions
d. The tables were stacked on top of each other in two in piles

(15) The books in the chart below complement each other

Fiction	Non-fiction
Alice in Wonderland	Aspects: Language (Bloomifield)
Fantastic Voyage	Gray's Anatomy
David Copperfield, Hard Times	Das Kapital, The Wealth of Nations
OEdipux rex, Agamemnon	Freud's intro to psychology
Richard III	Machiavelli's The Prince

In these cases, *each other* links members of subgroups, cutting across the other distinctions. (14a) is a case of partitioned strong reciprocity, in which the relation links members of married couples; (b), assuming that pirates on each boat can only see pirates on the same boat, is a case of partitioned one way weak reciprocity; (14c) is a case of linear ordering partitioned reciprocity, linking members of groups of boys following each other; in (14d), two-membered pluralities are admitted for each partition; finally, pairs of fiction-nonfiction books, standing in the same line of a table are related by a strong reciprocal relation (15). The mechanisms and conditions of this particular type of linking must be worked out in accordance with a more general theory of reciprocity.

The paper is structured as follows. In section (3), we begin by recalling the foundational notions introduced by Heim (Lasnik and May) that are usually agreed upon by theoreticians of the notion of reciprocity and must be integrated in any analysis of *each other*.

In section (4), we discuss the account proposed by Schwarzschild (1996), who treats reciprocity in relation to a larger theory of plurality introducing the *Part* and *Cov* variables that we will also be using in our account. We fill in the details of the definition the author proposes for the function *EachOther*, the problems it solves and those it leaves open.

Section (5) is devoted to the presentation of a new semantic account for the function *EachOther*. We start from the well-known fact that *each other* expresses a relation between members of a group and themselves. However, it establishes an order in this

relation, differently from reflexives. We argue that *EachOther* is a linearizing function that takes an unordered set as its argument and has a set of sequences as its value. We provide specific rules for the linearization and consider three cases: the cover provides one cell that presents no internal structure (5.2), the cover provides more than one cell (5.3), and the cover provides one cell whose internal structure is non-homogeneous (5.4). We finally present a unified rule for *each other* in subsection (5.5).

Section (6) is devoted to the pragmatics of the notion of permutability, which underlies that of sequence. We argue that permutability involves the corollary notions of interchangeability and unboundedness, and consider the facts presented above in turn: comparatives (section (6.1)), "normal" symmetric relations (section (6.2)), directionality (section (6.3)), and cases involving two-membered pluralities (section (6.4)). We conclude the paper in section (7).

3 The foundations

Since Fiengo and Lasnik (1973), Langendoen (1978), and in particular Heim (Lasnik and May), there is a consensus on basic concepts that a proper theory of *each other* must integrate. The meaning of *each other* has been seen as the contribution of two distinct elements: a distributor and a reciprocator:

(16) the *distributor* is that element that picks every element in the antecedent group,

(17) the *reciprocator* is that element that provides, for every element a in the antecedent group, **every/a** different element b, which belongs to the same antecedent group as a, such that a and b stand in relation R.

Heim (Lasnik and May)'s proposal integrates these two elements. The LF proposed by the authors is obtained by two iterations of movement and Quantifier Raising. Consider (18):

(18) The men saw each other

First, the element *each* is removed form its surface position and adjoined to its antecedent (19).

(19) $[_S[_{NP}[_{NP}$the men$]_1$ each$_2]$$[_{VP}$ saw $[_{NP}e_2$ other $]_3]]$

Secondly, by further applications of QR to the subject and the object, (20) is obtained:

(20) $[_S[_{NP}[_{NP}$ the men$]_1$ each$_2]$$[_S$ e_2 $[_{VP}[_{NP}$ e_2 other(1) $]_3[_{VP}$ saw $e_3]]]]$

In this configuration, *each* is interpreted as a universal quantifier over the atomic parts of the referent and functions as the distributor.

$[_{NP}e_2 other(1)]_3$ is the reciprocator. Such an NP (as signalled by (1), which is an argument of *other*) is bounded by coreference to the antecedent group, and by anaphora by *each*. *other* restricts an implicit universal quantifier (a quantifier that is not *each* of *each other*). It also guarantees the distinctness condition: for every element x_2 bound by *each* it provides every other different element x_3 in the antecedent group such that x_2 and x_3 stand in relation R.

Compositionally combining the universal force of *each* with that of *other*, and letting $\cdot\Pi$ be the proper-atomic part relation, the strong reciprocal interpretation is obtained:

(21) $\forall x_2(x_2 \cdot \Pi \text{ the men'}) \forall x_3(x_3 \cdot \Pi \text{ the men'} \wedge x_2 \neq x_3) \text{ saw}(x_2, x_3)$

This account has been criticized on many counts (e.g. Moltmann (1992), Schwarzschild (1996), Dalrymple et al. (1998)). Since the interpretation obtained is strong reciprocity, for our purposes it is not a good candidate for capturing linear orderings and providing a unified account for *each other*.

However, as also often noted, this account provides the foundational concepts for the analysis of *each other* that must be kept in a proper theory of it:

- the meaning of *each other* is the result of the contribution of a distributor and a reciprocator,
- *each* is responsible for quantification over individual members,
- *other* is bounded to the antecedent group,
- *other* guarantees the distinctness condition.

Building on this analysis, Schwarzschild (1996) proposes a weak reciprocity account of *each other* that we cannot adopt as such, since, again, it cannot capture linear orderings. However, since we build on the syntactic framework proposed by the author, and since weak reciprocity is the closest reciprocal interpretation to that of linear orderings, let us now closely consider his proposal, the problems it solves, and those it leaves open.

4 *Part, Cov* and *each other*

Since reciprocity involves reference to a set or group, it is traditionally studied in relation to a general theory of plurality (e.g. Fiengo and Lasnik (1973), Langendoen (1978), and Higginbotham (1981)). Schwarzschild (1996) analysis of reciprocity is also based on that of distributivity.

Consider sentence (22). This sentence has at least two interpretations: a distributive one - each bottle is light enough to carry, - and a collective one - the bottles alltogether are light enough to carry. - These two interpretations are obtained by the interaction of the distributive operator *Part* and the free variable *Cov*, both introduced by the VP.

(22) The bottles are light enough to carry

Formally, the VP is defined as follows:

(23) If α is a singular VP with translation α', then, for any indices i, c, $Part_i(Cov_c)(\alpha')$ is a translation for the corresponding plural VP.

The semiformal representation for (22) is, then:

(24) The bottles [$Part(Cov_c)$are light enough to carry]

The cover variable provides, in a given context, a division for the domain of entities. Since it is valuated contextually, it is indexed to a context (c index). Formally a cover is defined as:

(25) C is a cover of P if and only if:

1. C is a set of subsets of P,
2. every member of P belongs to some set in C
3. Ø is not in C

Members of a cover can overlap. *Partitions* are covers in which there is no such overlapping.

The *Part* operator shares some similarities with the classical distributivity operator D (Bennet (1974) and Link (1983)). The interpretation of the predicate is responsible for the introduction of D. For instance a predicate such as *walk* has a hidden D operator, meaning that each of the elements in its denotation has to satisfy the property of walking. A predicate such as *gather*, instead, is not associated with D. D has scope over individual atoms. Like the distributivity operator, *Part* ensures that the property is satisfied by all relevant members in the domain of quantification. However, *Part* differs from D in two important respects. First, it can quantify over sets. Second, it is not strictly associated with the distributive interpretation. It is also responsible for the collective one. This is possible since its behavior is dependent on the valuation of the cover variable. Its task is to make sure that every member in the cover satisfies the predicate. Consequently, due to its interaction with the cover variable, the elements in the domain of quantification on which it has scope, can be sets. If the cover variable provides only one element, and this element is a non-singleton set, then the interpretation will be collective. If the cover variable provides a division in which each singular atom satisfies the property, the interpretation will be strictly distributive. Finally, intermediate interpretations are obtained in cases where the cover provides more than one member, i.e., non-singleton subsets.

For (22), if the cover variable provides a division in which each bottle occupies one cell, the *Part* operator picks each of these cells and the distributive interpretation is obtained. If, instead, the cover variable provides a division of the domain that contains only one cell, this is quantified over by the *Part* operator, and the collective interpretation is obtained. Intermediate interpretations are less likely in this case, but are not completely excluded. The bottles might be arranged in groups of three, each group occupying a separate box. One can utter (22) meaning that each relevant group in the context, if taken separately from the others, is light enough to carry.

The mechanics underlying the interpretation of reciprocal sentences is based on that of distributivity. Consider example (26) and the representation in (27):

(26) The cows and the pigs talk to each other

(27) (The cows and the pigs)$_j$ $Part_i(Cov_c)$(talk to $EachOther(x_i)(x_j)$)

(26) has (at least) two interpretations.

(28) The cows talked to the pigs and the pigs talked to the cows

(29) The cows talked to the cows and the pigs talked to the pigs

In the first case, (28), *each other* applies distributively to the group of cows and the group of pigs, with a resulting reading according to which the cows talked to the cows and the pigs talked to the pigs. This interpretation is called *partitioned reciprocity*, and we return to it in section (5.3). The *each other* relation holds among the members of each subcell. The other interpretation, (29), the one we are interested in this section, and which has motivated Schwarzschild's account, is that the two groups (that of cows and that of pigs) talked to each other. The *each other* relation holds among two subgroups.

For the purposes of the reciprocal interpretation, *Part* functions as the distributor. This task is not fulfilled by the floating *each*, which, instead, stays in place.

Again *Part* acts on the value of *Cov*.

The interpretation process is the following: the cover variable provides a contextual division of the domain. Since the *Part* operator quantifies over sets, it picks every member in the cover. It also functions as a variable binder.

The pronoun *each other* is the reciprocator. For a valuation function g, the interpretation of *each other*, in a model M, is $g(\textit{each other}) = \textit{EachOther}$. *EachOther* is treated as a Cooper pronoun Cooper (1979). It takes two variables that correspond to the contrast and range argument. The contrast variable (x_i) is bound by the *Part* operator, the value of the range argument (x_j) is determined by coreference with the antecedent of *each other*. When compared to Heim (Lasnik and May)'s account, we note that the double anaphoric and coreference binding of the pronoun are thus kept within the account. However, as we have already mentioned, *each* stays in place and is not treated as a quantifier.

As given in (30), the free variable *EachOther* provides, for each subplurality v in the cover, (at least) a different subplurality with which it stands in relation R, which is part of the same antecedent group u.

The value of the free function *EachOther* is determined contextually: which subplurality stands in relation R to which other subplurality is determined by the utterance situation.

In this account, the context plays a crucial role at two times. First, it determines the value of *Cov*, providing a division of the domain of quantification. Second, it determines the value of the function *EachOther*, providing for each subplurality (at least) a different subplurality with which it stands in relation R.

(30) for all M,g

a. $\forall u \forall v [\|\textit{EachOther}\|^{M,g}(u)(v) \subset u]$

b. $\forall u \forall v [\|\textit{EachOther}\|^{M,g}(u)(v) \neq v]$

c. $\forall u \forall v [\|\textit{EachOther}\|^{M,g}(u)(v)]$ is undefined if $v \not\subset u$

For (27), this yields the interpretation according to which the cows talked to the pigs and the pigs talked to the cows. The *Cov* variable provides two cells, and for each cell there is a different cell with which it stands in relation R. The weak reciprocal relation concerns two "operative subpluralities:" that of the cows and that of the pigs. Crucially, nothing is said about interspecies individual talkings.

Consideration of operative subpluralities is justified on the basis of cases such as the following.

(31) The prisoners on the two sides of the room could see each other

The intended interpretation is one in which the prisoners on the left side of the room could see the prisoners on the right side and vice versa. The two groups of prisoners, those on the left and those on the right side of the room, represent two "operative subpluralities." These are made available by the *NP*, explicitly.

Let us mention the argument for considering subpluralities. Assume a situation in which the two groups of prisoners are separated by an opaque barrier preventing those on the left side from seeing those on the right and vice versa. A standard account of weak reciprocity without subpluralities (which does not involve quantification over sets) would predict that, in this situation, since the prisoners could see each other on each of the sides of the room, the sentence could come out true. For every prisoner, in fact, there would be another prisoner that s/he can see, one that stays on his/her same side of the room. However, since this situation does not truthify (31), and since it is compelling that the prisoners on the two sides of the room see each other, one must consider sets. Again, what matters, are not the individual seeings, by the relation among operative subpluralities.

This appealing analysis tumbles over linear orderings (32).

(32) The red trays and the blue trays were stacked on top of each other

The sentence is taken to have two interpretations. The first one is given in (33):

(33) There is a stack of alternating blue and red trays.

The second interpretation is given in (34) where (32) is presented as the conjunction of (34a) and (34b):

(34) a. the red trays were stacked on top of the blue trays, and

b. the blue trays were stacked on top of the red trays.

Solution (34) is relegated outside the domain of reciprocity. According to (Schwarzschild (1996), p. 126), either (34a) or (34b) is enough to retrieve the alternation of red and blue trays.

To capture the interpretation (33), Schwarzschild suggests considering subcells of the cell of red and of blue trays, further elaborating the initial division provided by the subject *NP*, between red and blue trays. Let Rd be the set of subcells of red trays $Rd = \{rd_1, rd_2\}$, and Bl the set of subcells of blue ones $Bl = \{bl_1, bl_2\}$.

Without further elaborating the initial division, *EachOther* would require that, at the same time, the red trays as whole stay on the blue ones as a whole and vice versa, a situation physically impossible since an entity (below, the set of red trays) cannot be at the same time on top of and below another entity (35).

(35) # $Rd \downarrow Bl \downarrow Rd$

Subcells of the cell of red trays and subcells of the cell of blue trays are taken to provide individual contributions. In particular, considering individual contributions for the sake of the groups allows one to solve the problem of the last (bottom) element.

(36)
$$\begin{array}{c} rd_1 \\ \downarrow \\ bl_1 \\ \downarrow \\ rd_2 \\ \downarrow \\ bl_2 \end{array}$$

Since rd_1 and rd_2 collectively contribute for the whole set Rd and bl_1 and bl_2 collectively contribute for the whole set Bl, the function *EachOther* is satisfied. Rd (as set) stands in relation "be on top of" with Bl, and Bl (as a set) stand in relation "be on top of" with Rd. Since individual contributions are considered, differently from (35), in configuration (36), the set of red trays is both on top and below the set of blue trays, and vice versa.

Moreover, it is clear that if the contribution of subcells of red and blue trays were not collective, the problem of the last element would not be solved. The last element in the pile (bl_2, in (36)), would have no other element with which it would stand in relation R.

The only possible solution is that there is an alternation as in (36), and that the contribution of subcells of red and blue trays is for the sake of red trays as a whole and blue trays as a whole.

This solution appeals to an intermediate cover, which is not that provided by the NP, explicitly. The treatment is thus different from both that of (26) and (31). One must assume that there are different subcells of red and different subcells of blue trays. This cover is not made available by the structure of the NP, but the context is taken to be responsible for it. Since the final prediction is the intended one, one can indulge in the fact that the treatment of (32) differs from that of (26) and (31), and that the relevant structure of the cover may, in some cases, be revealed by the context, and, in other cases, be made salient by the structure of the NP itself. That the context contributes a relevant division of the domain is not really surprising. However, what is surprising here is that this structure contravenes a more simple division between Rd and Bl somehow unexpectedly, and that a near at hand solution must be overcome by a more complex one (in which one considers subcells of Rd and Bl). Let us be indulgent, however, and accept the solution.

If this were the final solution, though, it should also apply to comparatives, and cases like (37), which, in fact, as pointed in section (2), are always unacceptable.

(37) *My relatives are taller than each other

Given a cover comprehending subcells of maternal and paternal relatives, it can be true that some maternal relatives are taller than some paternal relatives and vice versa. As for (32), subcells of the initial partition between maternal and paternal relatives could collectively contribute to making the sentence true. Schwarzschild notes,

in fact, that both (32) and (37) present the same kind of linear interpretation. Consequently, there should be no difference in the acceptance, and the problem needs a solution.

The same difficulty is faced by Dalrymple et al. (1998). They propose a theory that involves six different truth conditions for *each other*. The context selects the appropriate one, according to the "strong meaning hypothesis:" the strongest condition compatible with contextual information is chosen. A reciprocal sentence, consequently, is not ambiguous in a given context, but *each other*, *per se*, can be truthified by different contextual conditions. The weakest of the reciprocal relations is what Dalrymple et al. (1998) call Intermediate Alternative Orderings, illustrated in (6b). This rule should apply to (37). The strongest meaning hypothesis, however, rules out all but the weakest and allows that meaning as the predicted meaning for (37) that, consequently, cannot be ruled out.[2]

The problem of comparatives is not an isolated case. In section (2) we have mentioned four more kinds of facts that still must receive an explanation. None of them can be enlightened by a theory of weak or strong reciprocity, no matter whether singularities or operative subpluralities are taken into account. Concerning "normal" reciprocal relations (11), namely non-comparative relations, no explanation is provided for the distinction of the behavior between small and big groups. Differences related to directionality remain a mystery (12). Finally, a theory of weak reciprocity cannot state why, in some particular but widespread cases, two-membered pluralities are compatible with linear orderings (13). As it stands, an all-some based theory has no way to solve these issues.

Keeping under consideration the foundational concepts for reciprocal interpretation as well as the analysis of reciprocity based on that of plurality and distributivity in the format proposed by Schwarzschild, we elaborate a new definition of the free function *EachOther*. This definition crucially rests on the notion of order and permutability.

5 Linearizing sets

5.1 A new definition for the free function variable *EachOther*

We begin our discussion by presenting the most important features of the function *EachOther* informally, adopting for simple sentences the structure proposed by Schwarzschild with the binding relations slightly made more explicit.

As usual, the *Cov* variable provides a division for the domain of quantification. There is a discussion on whether *Cov* gets assigned a cover of the whole domain and not just a cover of the plurality of which the VP is predicated. Restriction of the domain of quantification, for the distributive interpretation, would allow one to avoid pathological values for *Cov* (as indicated by Lasersohn to Schwarzschild; see Schwarzschild (1996), p. 77). Consider *John and Mary left*. In an unrestricted perspective, the cover

[2] A related problem that we do not discuss here, since it has occupied most of the opponents of Dalrymple et al. (1998) theory, is why, in fact, the strongest possible configuration is not always realized in a context, a problem at which the authors themselves point.

could provide a division in which John is in a cell with a person different than Mary, and the truth of the sentence would depend on whether this third person left. Instead of posing a semantic restriction of domain of quantification, Schwarzschild suggests to leave the solution to pragmatics, which is taken to be responsible for avoiding this kind of cases.

It follows that *Part* picks out a subplurality that belongs to the antecedent group, and the function *EachOther* deals with such a group, without any further consideration of external elements.

Along this line of thought, we also assume such a restriction in the account. We make this restriction explicit, and *Cov* results being doubly bounded. The index j signifies the domain restriction to the antecedent group, and is added to the already existing indexing c to the reference situation. Again, the division of the antecedent group is relevant in the utterance situation.

Part functions as argument binder and distributor. It binds the argument of the function *g(each other)*, i.e. any free d_i in its scope, and picks every member of the division provided by *Cov*. For any indices j, i, c, we obtain:

(38) $A_j\ Part_i(Cov_{j,c})\alpha'\ EachOther_j(d_i)$

Quantification and coreference, associated with *each* and *other* respectively in the account of Heim (Lasnik and May), are now dependent on the interpretation of the VP on which the interpretation of *EachOther* relies. The first move was made by Schwarzschild who proposes to attribute the selection of relevant members to *Part* and not to *each*. The second move follows from this and consists in making explicit the fact that the group on which *EachOther* has an effect, is the group denoted by its antecedent; it is also the group of which the VP is predicated.

What this is intended to express is that the selection of relevant individuals by the *Part* operator concerns the antecedent group A. The valuation of the function *EachOther* rides on this: *EachOther* has an effect on each relevant member of A.

According to Heim (Lasnik and May), *other* was also responsible for the distinctness condition. As for Schwarzschild, this depends on the definition of the function *EachOther*. Let us first consider the new definition for *EachOther*, and then make clear where the distinctness condition comes into play.

We assume that *EachOther* is a function that takes only one argument. This argument is each subplurality provided by the cover variable.

EachOther does not provide for each subplurality a another subplurality b such that a and b stand in relation R. It is a function that has an effect on the subplurality it takes as an argument: it provides a linearization for it.

The linearization rule is specified for three cases, presented in (39): the cover variable provides only one element: the set. The cover variable provides more than one element (partitioned reciprocity)[3]. The cover variable provides one element, and this is the union of two (or more) sets (cases such as (26), (31) and (32)).

(39) $$Cov\,(D) = \begin{cases} \{D\} \\ \{d^1, d^2, d^3, ..., d^n\},\ \forall i \# d^i \geq 2 \\ \{X \cup Y\} \end{cases}$$

[3]We use # for the cardinality of a set

Whenever the cover provides only one cell, the set denoted by the antecedent of *each other* is the argument of the function. If the cover provides more than one cell, the function will be applied to each of the subcells in turn. The value of the function, however, is not a particular subplurality, but a linearization of the set it takes as an argument. If the cover provides only one cell, the function provides a linearization for the whole set. If the cover provides more than one cell, the function will provide a linearization for each subcell. As developed in section (5.3), cases in which the cover provides more than one cell are cases of partitioned reciprocity Fiengo and Lasnik (1973), and not cases of the type of (26), (31), and (32). We go through those in detail in section (5.4).

The main claim for which we are arguing, is that *each other* relates members of sets it takes as arguments, with themselves. It imposes an order on this relation, differently from reflexives.

The semantics of *EachOther* consists of a set of constraints that the linearizations must satisfy. The contribution of the context is crucial: it determines the value of *Cov* as well as the choice of a certain linearization (provided the constraints are satisfied).

Moreover, the notion of linearization crucially rests on that of permutability, whose semantic-pragmatic behavior explains the facts listed in (9). We begin by considering the semantics of *EachOther* in the following subsections, and then turn to a deep analysis of permutability in section (6).

In the three following subsections we consider the cases listed in (39) in turn, and for expository reasons, we repeat the rule.

5.2 Case 1: d is the set

We begin by considering the case in which the cover provides only one cell, and this is the denotation of the antecedent group. g(*each other*) = *EachOther* is the function whose argument is the set, and whose value is a set of subsequences. We first present the formal rule, and then consider some examples.

5.2.1 Rule for case 1

In the formula that follows, the superscripts refer to a particular subsequence; the subscripts refer to a particular element in that subsequence. x_2^1 means that that particular x is the second element of the first subsequence.

(40) *Each Other*$(d) = \{\underbrace{[x_1^1, x_2^1, ..., x_{n^1}^1]}_{U^1}, \underbrace{[x_1^2, x_2^2, ..., x_{n^2}^2]}_{U^2}, ..., \underbrace{[x_1^N, x_2^N, ..., x_{n^N}^N]}_{U^N}\}$ s.t.:

Constraints:

For each $j = 1, ..., N$ (for each subsequence),

i. the sizes n^j of the subsequence is ≥ 3 entity-types (plus amendment for cases (13), see section (6.4))

for each $i = 1, ...n^j - 1$ (for each element of the subsequence, except the last one),

ii. $x_i^j \neq x_{i+1}^j$ (every two subsequent elements are different)

iii. for $1 \leq i \leq n^j - 1$, x_i^j is of type R^+ and x_{i+1}^j of type R^- (hence x_1^j is of type R^+ and $x_{n^j}^j$ of type R^-) (any element on the left side of a comma is of type R^+ and any element on the right side of a comma is of type R^-),

iv. the majority of the members have to be involved in R[4].

A metarule of permutability (41) holds for all cases we are about to consider.

(41) **Permutability.** Any decomposition in sequences verifying the conditions of rule (40) is possible.

5.2.2 Comments and examples

One of the foundational concepts of the notion of reciprocity is that the reciprocator, given the presence and the meaning of *other*, introduces a distinctness condition (Heim (Lasnik and May)). According to (40), every two subsequent x_i,x_{i+1} form a pair that stands in relation R, and since they must be different, they stand in *other* relation.

As already noted in the informal presentation of the function *EachOther*, the indexing guarantees that only the antecedent group is concerned. For Schwarzschild (1996), the double binding to the contrast argument and the antecedent group was to guarantee that the value of the function be picked among the members of the same group as the contrast argument. (40ii) is a rule that states what the effect of the function *EachOther* is, when applied to the antecedent group (index k). *EachOther* has the set as its argument, and, in the case under consideration, the situation provides no particular division for it.

(40) requires that the minimal size of a cell be of two members (see Dalrymple et al. (1998)). Whenever there are two singularities (individual or group atoms, Landman (1989a)), the cover considered is that in which these are gathered in one cell. There is no possible linearization of a singularity. Note, in fact that a linearization for a singular atom a would be $[a, a, a]$, violating (40i). Hence the minimal size of the cell that is the argument of the function *EachOther* is of two members.

The size of the resulting subsequence, instead, will be of at least three entity-types. This translates the intuition that the reciprocal relation is different from the transitive one. An important amendment must be added, though. Only for asymmetric predicates that express a spatial, temporal or spatio-temporal relations, a sequence of two entity-types is allowed (see Beck (2001), and (13)). In section (6.4), we will argue that there is in fact an underlying sequence of three entity types, but that the existence of such a subsequence requires that some constraints related to permutability be realized. (41) must then be made more explicit, a task to which we dedicate the second part of the paper (section 6).

[4]The last constraint (40iv) states that the cardinality of the majority (40iv) is contextually determined (*robert*s (1987), Schwarzschild (1996)). For large groups, some members happen not to be involved in the relation. Since we are using covers, we can easily integrate Brisson (1998) treatment of exceptions, as suggested by (Beck (2001)). Exceptions do not need a separate treatment for *EachOther* and are a purely contextual side effect that must receive a specific treatment.

Let us, however, make a minimal statement about the nature of subsequences. As for Schwarzschild (1996), *EachOther* is a free function whose value is contextually determined. The linearization it provides - the order of the subsequences and of the elements within each subsequence - depends on the context. Stated otherwise, there is an underlying notion of randomness: every possible configuration is available and *EachOther* provides a particular one in the utterance situation. Consequently, in order for every possible order of subsequences and of members in each of the subsequences to be available, all the elements must have identical status with respect to R: they are interchangeable. As we go through in detail in section (6), this is of crucial importance to explain the facts presented in (9).

In order to make these observations clearer, let us introduce some examples.

Let us consider (5) repeated in (42) and the situation where there are only two boys, John and *robert*.

(42) The boys are looking at each other

$\|$ the boys $\|^{M,g} = \{\{j\},\{r\}\}$

Since there are only two elements, there is only one cell to consider. According to (40), we obtain (43):

(43) $g(EachOther)(\{\{j\},\{r\}\})$ = [j,r,j]

R^+ entity type = *seer*

R^- entity type = *seen*

In the sequence [j,r,j], the entities on the left of the commas are of type R^+ ("seers"), and those on the right of type R^- ("seen"). The sequence [j,r,j] is well-formed since r is of both types R^+ and R^- and the sequence contains three different entity-types.

Note that by conditions (40i) and (40ii) respectively, we cannot obtain the sequences in (44a) and (44b). In the first case, there are only two entity-types. In the second, the distinctness condition is not respected.

(44) a. *[j,r], *[r,j]

b. *[j,j,r], *[r,r,j]

Consider (1) repeated in (45).

(45) The tables are stacked on top of each other

For asymmetric predicates, the requirement (40i) can be satisfied if the plurality is composed of three elements. Let us for the moment leave aside sequences (46a) and (46b) and again defer the discussion to the second part of the paper (section (6)).

(46) a. [a,b] (to be explained, see section (6.4))

b. [b,a] (to be explained, see section (6.4))

Without amendment, rule (40) states that there must be at least three different tables (sequences (47)).

Indeed, linear orderings don't allow an element to appear twice in the sequence as in (48b) and (48c), which are out, and the cardinality of the sequence is the same as the cardinality of the argument of the function.

(47) [a,b,c] or [b,c,a] or [c,a,b] or [a,c,b], or [c,b,a], or [b,a,c]

(48) a. [a,b,c]

b. *[a,b,a]

c. *[a,b,c,b], *[a,b,c,a], ...

Rule (40) captures every reciprocal configuration in context. Indeed, all can be represented by a set of sequences satisfying the constraints. In particular, let p be the cardinality of set $\{d\}$; each member appears:

(a) for strong reciprocity, $p-1$ times (every member stands in relation R with every other members but itself);

(b) for weak reciprocity, at least once (every member must stand in relation R with at least another member);

(c) for linear orderings, exactly once.

For weak reciprocity, constraint (40i) ensures that, for a group A of boys looking at each other, it is not possible to have a subset of "lookers" on one side and of "lokees" on the other, such that for every "looker" there is one different "lokee," since this would require that every subsequence be of two entity-types. (Again, spatial, temporal and spatio-temporal predicates represent an exception that must be explained.)

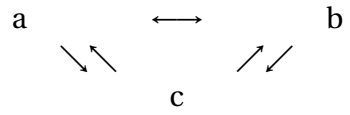
Moreover, all configurations well known in the literature can be decomposed in one or more sequences that satisfy the conditions given in (40). In (49) we present the interpretations of *each other* discussed in Dalrymple et al. (1998) under the form of sequences. The label *DalRule* is prefixed to the rule proposed by the authors. Beck (2001) provides arguments to reduce these rules to those of strong reciprocity, weak reciprocity, and partitioned reciprocity, which we discuss in section (5.3). This reduction is convincing in a perspective where there is no notion of order associated with *each other* or of permutability.

In what follows, we aim to show that any contextual configuration can be captured in terms of subsequences. Linear orderings (here below: Intermediate Alternative Orderings) can also receive proper representation in agreement with that of strong and weak reciprocity, a task that cannot be fulfilled if a more standard account of *each other*, which does not integrate a notion of ordering, is maintained.

(49) Cases discussed in Dalrymple et al. (1998).

1. *Strong reciprocity*

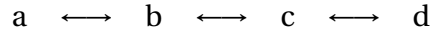
   DalRule: $|A| \geq 2$ and $\forall x, y \in A(x \neq y \rightarrow Rxy)$



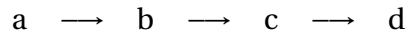
Sequence: [a,b,c,a,c,b,a]

2. *Intermediate reciprocity*

DalRule: $|A| \geq 2$ and $\forall x, y \in A(x \neq y \rightarrow$ for some sequence $z_0, ..., z_m \in A(x = z_0 \wedge Rz_0z_1 \wedge ... \wedge Rz_{m-1}z_m \wedge z_m = y)$



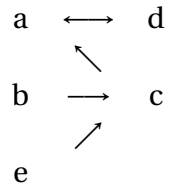
Sequences: [a,b,c,d],[d,c,b,a]



Sequence: [a,b,c,d]

3. *One-way weak reciprocity*

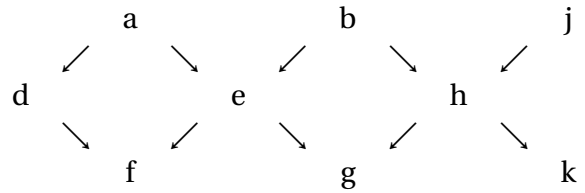
DalRule: $|A| \geq 2$ and $\forall x \in A \exists y \in A(x \neq y \rightarrow Rxy)$



Sequences: [a,d,a],[b,c,a],[e,c,a]

4. *Intermediate alternative reciprocity*

DalRule: $|A| \geq 2$ and $\forall x, y \in A(x \neq y \rightarrow$ for some sequence $z_0, ..., z_m \in A(x = z_0 \wedge (Rz_0z_1 \vee Rz_1z_0) \wedge ... \wedge (Rz_{m-1}z_m \vee Rz_mz_{m-1}) \wedge z_m = y)$



Sequences: [a,d,f],[a,e,f],[a,e,g] ....

5. *Inclusive alternative ordering*

DalRule: $|A| \geq 2$ and $\forall x \in A \exists y \in A(x \neq y \rightarrow (Rxy \vee Ryx))$

a b c
↓ ↓ ↓
d e f
↓ ↓ ↓
g h i

Sequences: [a,d,g],[b,e,d],[c,f,i]

5.3 Case 2: the cover provides more than one element and *d* is one of these

It has been well known since (Fiengo and Lasnik (1973)) that lexical (50) or contextual factors (51) can impose partitioning. Consider (14) and (15) repeated below in (50) and (51):

(50) a. The men and the women in this room are married to each other
b. The pirates are staring at each other on two different boats
c. Nine boys follow each other in groups of three in three different directions
d. The tables were stacked on top of each other in two in piles

(51) The books in the chart below complement each other

Fiction	Non-fiction
Alice in Wonderland	Aspects: Language (Bloomifield)
Fantastic Voyage	Gray's Anatomy
David Copperfield, Hard Times	Das Kapital, The Wealth of Nations
OEdipux rex, Agamennon	Freud's intro to psychology
Richard III	Machiavelli's The Prince

In these cases, *each other* links members of subgroups, within each subgroup (members of different subgroups bear no relation to each other): married couples (50a); groups of pirates (b); groups of boys forming a line (50c); piles of tables (50d); pairs fiction non-fiction books, standing in the same line of a table (51). As we have already noted in section (2), different configurations can be obtained within each partition: strong reciprocal relation (50a) and (51); weak reciprocity (50b); linear ordering (50c) and (50d).

In a perspective of a unified account for *each other*, we apply to each of the members of the partition (a partition is a cover with non-overlapping elements) rule (40). So, the same rule that we had for the set applies to each member of the partition. This results straightforwardly from the definition of *Part*, *Cov* and the way they interact with *EachOther*. This function applies to each *d* bound by *Part*, which is in the restricted domain of quantification and is a member of the division provided by *Cov*.

As for (40), the superscripts refer to a particular subsequence; the subscripts refer to a particular element in that subsequence.

(52) $\textit{Each Other}(d) = \{\underbrace{[x_1^1, x_2^1, ..., x_{n^1}^1]}_{U^1}, \underbrace{[x_1^2, x_2^2, ..., x_{n^2}^2]}_{U^2}, ..., \underbrace{[x_1^N, x_2^N, ..., x_{n^N}^N]}_{U^N}\}$ s.t:

Constraints:

For each $j = 1, ..., N$ (for each subsequence),

i. the sizes n^j of the subsequence is ≥ 3 entity-types

for each $i = 1, ...n^j - 1$ (for each element of the subsequence, except the last one),

ii. $x_i^j \neq x_{i+1}^j$

iii. for $1 \leq i \leq n^j - 1$, x_i^j is of type R^+ and x_{i+1}^j of type R^- (hence x_1^j is of type R^+ and $x_{n^j}^j$ of type R^-) i.e. any element on the left side of a comma is of type R^+ and any element on the right side of a comma is of type R^-,

iv. the majority of the members has to be involved in R.

Rule (52) applies to each member of the partition in turn. Permutability, then, is only possible within each d, but not toward the ds.

Assuming for (50a) a situation where there are two couples (let j, r, p, c stand, respectively for : *jane, robert, paula, chris*): $\{\{\{j\},\{r\}\}$, and $\{\{p\},\{c\}\}\}$, the application of the function *EachOther* to each of these subpluralities of P, $\{\{\{j\},\{r\}\},\{\{p\},\{c\}\}\}$, yields two subsequences: $\{[j, r, j]\}$ (or $\{[r, j, r]\}$), $\{[c, p, c]\}$ (or $\{[p, c, p]\}$), both of which satisfy the constraints for (52).

(53) $P = \{\{jane\},\{robert\},\{paula\},\{chris\}\}$

$Cov(P) = \{\{\{jane\},\{robert\}\},\{\{paula\},\{chris\}\}\}$

$EachOther(\{\{jane\},\{robert\}\}) = \{[jane, robert, jane]\}$ or $\{[robert, jane, robert]\}$

$EachOther(\{\{paula\},\{chris\}\}) = \{[chris, paula, chris]\}$ or $\{[paula, chris, paula]\}$

(Fiengo and Lasnik (1973)) note that stative predicates such as $know$ do not allow partitioning.

(54) The boys know each other

(54) is true only in a situation where all possible pairs of boys know each other.

The authors argue that states can be iterated - cars can be bought and sold, and then bought and sold again -, but they also do not partition in time, as (55) is taken to show.

(55) *John was owing a car

>From there, Fiengo and Lasnik (1973) conclude that the linguistic entity 'state' is defined as non-partitionable.

We explain this by the fact that 'states' are situation independent (e.g. Krifka et al. (1995)), and as such, non only temporal partition is not allowed, but also any other kind of partitioning. Since *EachOther* provides a set of subsequences in a given context, and since the intersection of all possible contextually-given subsequences is a strong reciprocal configuration, this is the only one that can be obtained if context-independence is required.

5.4 Case 3: d is the set which is the union of two - or more - sets

We come now to the configuration where d is the set, and is explicitly given as the union of two - or more - sets. For readability, we explicitly write it as $(X \cup Y)$. The following rule concerns cases such as (26), (32) and (31), repeated in (56), (57), and (58):

(56) The cows and the pigs talked to each other

(57) The prisoners on the two sides of the room could see each other

(58) The red trays and the blue trays were stacked on top of each other

Intuitively, we aim to express that the set of xs and the set of ys are in relation R with each other. Consequently, there must exist a linearization that involves them. If X and Y were separately bound by *Part*, we would obtain a partitioned reciprocity reading. The rule we are about to present specifies the conditions that the linearization must satisfy. We begin by presenting it and then consider some examples in detail.

5.4.1 Rule for case 3

(59) $EachOther(X \cup Y) = \{\underbrace{[x^1_1, y^1_1, x^1_2, y^1_2, ..., x^1_{X_{n^1}}, y^1_{Y_{n^1}}]}_{U^1}, \underbrace{[y^2_1, x^2_1, y^2_2, x^2_2, ..., y^2_{Y_{n^2}}, x^2_{X_{n^2}}]}_{U^2}, ...,$

$\underbrace{[x^N_1, y^N_1, x^N_2, y^N_2, ..., x^N_{X_{n^N}}, y^N_{Y_{n^N}}]}_{U^N}\}$ s.t:

(Notation: subscripts refer to the numbered element in a subsequence; superscripts refer to a particular subsequence. For instance, x^1_2 means the second element belonging to X in the first subsequence; y^2_1 means the first element belonging to Y in the second subsequence. In a given subsequence there could be a different number of elements belonging to X and Y, $x^1_{X_{n^1}}$ means the n^{th} element of X, in the first subsequence; $y^1_{Y_{n^1}}$ means the n^{th} element of Y, in the first subsequence. The numbers of xs and ys in the first subsequence can be, not only different from each other, but also different from those of the other subsequences. For instance, if we have piles of alternating red and blue trays, we do not expect to have the exact numerbs of red and blue trays in each subsequence. $x^2_{X_{n^2}}$ means the n^{th} element of X, in the second subsequence, and so on and so forth).

For each $j = 1, ..., N$ (for each subsequence),

i. the number ${}^X n^j$ of elements of X in U^j and the number ${}^Y n^j$ of elements of Y in U^j are ≥ 1 (there is at least one element of each set in each subsequence),

ii. any element on the left side of a comma is of type R^+ and any element on the right side of a comma is of type R^-,

iii. there must be a proportionate amount of sequences beginning with an element of X and an element of Y,

iv. any possible combination of *x*s and *y*s is allowed in each subsequence provided that condition [i] is satisfied,

v. the majority of the members has to be involved in R.

As for the other two cases discussed above, the rule of permutability (41) holds: any decomposition in sequences verifying the conditions of (59) is possible.

5.4.2 Some examples

Recall that Schwarzschild's account was well designed for explaining what the author calls "collective reciprocals." The algorithm he proposes for the interpretation of sentences in (56)-(58): choose relevant subsets according to the description provided by the NP (for all cases above there are two subsets). These subsets stand in *EachOther* relation, i.e. for every subset there is a different one with which it stands in relation R.

However, as we argued in section (4), extending such explanation to (58) weakens the strength of the argument. Let us recall the problem, elaborating on it further. The intended interpretation is again that according to which for each relevant subcell (the red trays and the blue ones), there is another subcell with which it stands in relation R. This interpretation correspond to two different configurations:

(60) Configuration 1: there is a pile of alternating blue and red trays.

(61) Configuration 2:

a. the red trays were stacked on top of the blue trays, and

b. the blue trays were stacked on top of the red trays.

Schwarzschild (1996) relegates the second configuration outside the domain of reciprocity, arguing that either (61a) or (61b) can independently express color alternation.

To capture (61a), the author suggests considering subcells of the cell of red and of blue trays, further elaborating the initial division between the red and blue cells.

These subcells of red and blue trays collectively contribute to the red trays as a whole and the blue trays as a whole. In the schema below, r_1 and r_2 contribute to the cell of red trays, and b_1, and b_2 contribute to the cell of blue ones. Hence for the red trays, there is a subcell with which they collectively stand in relation R, and so for the blue ones. In this way one can assume that for the subcell of red trays there is another subcell with which it stands in relation R (namely the subcell of blue trays), and so the same for the blue ones.

(62)
$$\begin{array}{c} r_1 \\ \downarrow \\ b_1 \\ \downarrow \\ r_2 \\ \downarrow \\ b_2 \end{array}$$

If individual contributions were not for the sake of the collection as a whole, the problem would arise again. The last tray (in this case, a red one), would have no other tray with which it stands in relation R.

As we already noted, in this case, the relevant division of the domain is not that revealed by the NP. This solution raises two concerns. The minor one is that it does not mirror the solutions provided for (56) and (57). The major one, indicated by Schwarzschild himself, is that there is no reason why this solution could not be extended to comparatives.

Before we consider the major concern in detail, in section (6), we apply the new definition of *EachOther* to all cases (56), (57) and (58), removing the minor one.

Rule (59) allows us to consider sets and their members.

There are two interpretations for (56):

(63) Partitioned reciprocity: the cows talked to the cows and the pigs talked to the pigs

(64) Collective reciprocals: the cows talked to the pigs and the pigs talked to the cows

(63) is a case of partitioned reciprocity: two cells are identified, and the reciprocal relation holds within each of these cells, separately. (64) is the interpretation with which we are concerned. This is obtained by recognizing that the cover provides only one cell and this is explicitly presented as the union of the cows and of the pigs.

The form of the set of subsequences is left almost unconstrained by the semantics and leaves a wide room to the context. The semantics states that there must be at least one cow or one pig in each of the subsequences; a proportionate amount of sequences must begin with elements belonging to each subset. The meaning of "proportionate" is to be valuated contextually. Similarly, the context determines the form of the sequences. If contextual information forbids having any two cows or any two pigs talking to each other, this will be mirrored in the form of the subsequences where no two xs or ys will follow each other.

As a possible situation truthifying the sentence under interpretation (64), consider the following:

(65)
$$\begin{array}{ccc} c_1 & \rightarrow & p_1 \\ c_2 & \leftarrow & p_2 \\ & \nearrow & \\ c_3 & \leftrightarrow & p_3 \end{array}$$

For a plurality composed of three cows and three pigs, the value of the function *EachOther* in the depicted situation is:

$\{[c_1, p_1], [c_3, p_2, c_2], [p_3, c_3]\}$

This set of subsequences satisfies all constraints of (59). The rule does not provide any indication of subsequences of two entity types. Constraints (59iii) and (59iv) together allow a situation in which there might be only subsequences of two entity-types, provided that a proportionate number of them begin with members of different sets. It follows that situation (66), but not (67), can truthify (56).

(66)
$$\begin{array}{lll} c_1 & \rightarrow & p_1 \\ c_2 & \leftarrow & p_2 \\ c_3 & \rightarrow & p_3 \end{array}$$
$$\{[c_1, p_1], [p_2, c_2], [c_3, p_3]\}$$

(67)
$$\begin{array}{lll} c_1 & \rightarrow & p_1 \\ c_2 & \rightarrow & p_2 \\ c_3 & \rightarrow & p_3 \end{array}$$
$$\{[c_1, p_1], [c_2, p_2], [c_3, p_3]\}$$

We can now consider (58). First of all, different contextual valuations of *Cov* yield two different interpretations:

(68) Partitioned reciprocity: the red trays were stacked on top of the red trays and the blue trays were stacked on top the blue trays.

(69) Collective reciprocals: the red trays were stacked on top of the blue trays and the blue trays were stacked on top of the red ones.

Again, the interpretation we focus on here is the collective reciprocal one in (69).

This interpretation, in turn, is validated by two configurations, presented in (60) and (61) and repeated in (70) and (71).

(70) Configuration 1: there is a set of alternating red and blue trays;

(71) Configuration 2:

a. the red trays were stacked on top of the blue trays, and

b. the blue trays were stacked on top of the red trays.

Both can be accounted for in our framework. Independently of whether simple collectives (i.e., either (71a) or (71b)) can account for color alternation, we need a semantics for *each other* that expresses the fact that (58) can be interpreted as the conjunction of (71a) and (71b).

The mechanics we have been discussing up to now is the following: the *NP* provides two subpluralities and the cover is chosen in which these are gathered into a unique cell. In this case, d is explicitly given as the union of two sets. Within this cell one can consider the contribution of red and blue trays.

Rule (59) imposes no constraint on the form of the sequence. On the one hand, the xs and the ys can alternate with each other as given in (72a), on the other hand, there might be two (or more piles) one in which all the xs follow each other and then are followed by the sequence of all ys and another in which the reverse is the case, as shown in (72b). The choice of the form of the sequence, again, is left to the context.

(72a) and (72b) illustrate interpretations (70) and the conjunction of (71a) and (71b), respectively:

(72) Examples of sequences:

$Rd = \{r\,d \mid r\,d$ *is a red tray*$\}$

$Bl = \{bl \mid bl \textit{ is a blue tray}\}$

a. $EachOther(Rd \cup Bl) = \{[rd^1_1, bl^1_1, rd^1_2, bl^1_2, ..., rd^1_{Rd_{n^1}}, bl^1_{Bl_{n^1}}]\}$
(There is one subsequence of alternating red and blue trays.)

b. $EachOther(X \cup Y) = \{[rd^1_1, rd^1_2, ..., rd^1_{Rd_{n^1}}, bl^1_1, bl^1_2, ..., bl^1_{Bl_{n^1}}],$
$[bl^2_1, bl^2_2, ..., bl^2_{Bl_{n^2}}, rd^2_1, rd^2_2, ..., rd^2_{Rd_{n^2}}]\}$
(here are two subsequences one of red trays stacked on top of blue trays, the other of blue trays stacked on top of red ones.)

(59) leaves room for any possible arrangement that satisfy the constraints. It leaves out undesired configurations, such as (73) and (74), both forbidden by constraint (59iii):

(73) #
$$\begin{array}{ccc} rd_1 & rd_2 & rd_3 \\ \downarrow & \downarrow & \downarrow \\ bl_2 & bl_3 & bl_1 \end{array}$$

Sequences: $\{[rd_1, bl_2], [rd_2, bl_3], [rd_3, bl_1]\}$

(74) #
$$\begin{array}{c} rd_1 \\ \downarrow \\ rd_2 \\ \downarrow \\ bl_1 \\ \downarrow \\ bl_2 \end{array}$$

Sequence: $\{[rd_1, rd_2, bl_1, bl_2]\}$

Note that (75) is allowed:

(75)
$$\begin{array}{ccc} rd_1 & bl_3 & rd_3 \\ \downarrow & \downarrow & \downarrow \\ bl_2 & rd_2 & bl_1 \end{array}$$

Sequences: $\{[rd_1, bl_2], [bl_3, rd_2], [rd_3, bl_1]\}$

To sum up. In this subsection we have shown that *EachOther* provides a linearization that considers the internal structure of the sets. The cases discussed here are different from partitioned reciprocity in that the *EachOther* takes the whole set as its argument. The definition of the function provided in (59) takes into account the differences among the elements, differently from cases in which sets are given as homogeneous. The permutability condition, however, holds in the same way as for the previous cases (40) and (52). All elements in the argument of the function must be permutable with each other, and all possible sequences are allowed, provided they respect the constraints.

The account we have proposed allows us to treat on par all cases of collective reciprocals, without postulating intermediate covers. It considers simultaneously sets with their internal structure and the individual contributions of their members. With a minimal amount of constraint, it rules our pathological sequences, and leaves it the context to determine the sequence to choose. The contribution of the context, then, is not limited to the choice of the cover, but extends to the selection of a particular sequence among all possible ones.

5.5 A unified rule

In this section we present a unified rule for *each other*. Readers preferring not to bother with technicalities may skip it, in the conviction that the rule is nothing but the generalization to n sets, $n \geq 1$. One idea they might whish to keep, however, is that the argument of the function *EachOther* can be seen as the union of sets. If no different sets are specified by *Cov*, the argument of the function is the union of the set with itself, i.e. the set. This reflects the following intuition: *each other* requires that the members of a set stand in relation with themselves collectively. Even in cases in which this is given as the union of two sets, the relation holds among members of the union, again, the set that results from the union with itself. The specific effect of *EachOther* (differently from reflexives) is that of establishing an order among the members of the set.

Furthermore, this order is chosen among all possible orders, and all possibilities must be available. The contextual valuation of *EachOther* selects a particular one in a particular context.

>From there, another foundational notion fits into the account: strong reciprocity is conceivable under all circumstances (an intuition that has founded the works of Fiengo and Lasnik (1973), Heim (Lasnik and May), Beck (2001), Langendoen (1978) and even Dalrymple et al. (1998) who dedicate to strong reciprocity the highest position in the hierarchy of possible meanings for *each other*, and this certainly corresponds, not only to entailment relations among possible truth conditions, but to a cognitive salience of strong reciprocity). Strong reciprocity is a theoretical possibility even for linear orderings, since the elements must be permutable with each other: the intersection of all possible linear orderings for a set d yields to a strong reciprocal relation.

In (76) we present the unified rule for cases (40), (52), (59).

(76) $$\begin{aligned} &\textit{EachOther}({}^1X \cup {}^2X \cup {}^3X \cup, ..., \cup, {}^PX) = \\ &\{[{}^1x_1^1, {}^2x_1^1, {}^3x_1^1, ..., {}^Px_1^1, {}^3x_2^1, {}^2x_2^1, {}^1x_2^1, ..., {}^Px_2^1, ..., {}^Px_3^1, ..., {}^1x_{1_{n^1}}^1, {}^3x_{3_{n^1}}^1, {}^2x_{n_1}^2, ..., {}^Px_{P_{n^1}}^1], \\ &[{}^2x_1^2, {}^3x_1^2, {}^1x_1^2, ..., {}^Px_1^2, {}^1x_2^2, {}^2x_2^2, {}^3x_2^2, ..., {}^Px_2^2, ..., {}^Px_3^2, ..., {}^2x_{2_{n^2}}^2, {}^3x_{3_{n^2}}^2, {}^2x_{2_{n^2}}^2, ..., {}^Px_{P_{n^2}}^2], ... \\ &[{}^3x_1^N, {}^1x_1^N, {}^2x_1^N, ..., {}^Px_1^N, {}^3x_2^N, {}^2x_2^N, {}^1x_2^N, ..., {}^Px_2^N, ..., {}^Px_3^N, ..., {}^1x_{1_{n^N}}^N, {}^2x_{2_{n^N}}^N, {}^3x_{3_{n^N}}^N, ... \\ &\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad {}^Px_{P_{n^N}}^N]\} \end{aligned}$$

(The left-hand superscripts refer to a particular set, the right-hand superscripts refer to the sequence, the right-hand subscripts refer to a particular element in the sequence.)

For each $j = 1, ..., N$ (for each subsequence),

i. the number ${}^Kn^j$ of elements of each ${}^KX$ in U^j is ≥ 1 (there is at least one element of each set in each subsequence),

ii. any element on the left side of a comma is of type R^+ and any element on the right side of a comma is of type R^-,

iii. there must be a proportionate number of sequences beginning with an element of each ${}^KX$,

iv. any possible combination of *x*s is allowed in each subsequence provided that condition [i] is satisfied,

v. the majority of the members have to be involved in *R*.

6 The semantics and the pragmatics of permutability: comparatives, identity, unboundedness, directionality, and bijection.

With this semantics in place, we can now turn to the three facts pointed at by Langendoen (1978) and Beck (2001) that we have recalled in (9). While considering them in turn, we dedicate the entire section to the investigation of the notion of permutability.

We have pointed repeatedly to the fact that all members of a set that is the argument of the function *EachOther* must be permutable with each other. In particular, metarule (41), repeated in (77), states that it is possible to $permute$ all the elements within each subsequence, and also all the elements of all subsequences with each other, provided that the constraints of the rules are satisfied. Let *d* be the argument of *EachOther*.

(77) **Permutability.** For all *d*s, any decomposition in sequences verifying the conditions of rules (40), (52), (59) is possible.

The rule presents this notion in an abstract way and states that permutability is an iterative mechanism for building sequences. The sequences it produces are infinite strings in which all elements are equivalent with respect to *R*, and in which they can be repeated an infinite number of times, in different orders, provided that the constraints of the rules are satisfied. In what follows, we consider its behavior, under the perspectives of interchangeability, unboundedness, directionality, and time.

6.1 Comparatives

As illustrated in (78), comparatives are not compatible with *each other*, irrespective of whether the entities come in small ((78a) and (78b)) or large groups ((78c) and (78d))[5]

(78) a. #The two trees are taller than each other

b. #The two sets outnumber each other

c. #The skyscrapers are taller than each other for miles

d. #These sets outnumber each other

[5]In romance languages comparative reciprocal sentences are admitted: "Les gratte-ciels sont plus grands les uns que les autres sur des kilomètres" (The skyscrapers are taller than each other for miles.) In these cases, the only possible interpretation is the superlative one: the skyscrapers are all tall. In terms of permutability, this can be stated as follows: no matter what particular skyscraper is picked, it is possibly taller than the others. The superlative interpretation is not available in anglo-saxon languages, and the standard comparative one is incompatible with the function *EachOther*.

Comparatives require that the elements be different from each other. It follows that the positions of the elements along the semantic dimension introduced by the predicate is determined by the characteristics of each element. Consequently, no permutation is possible. This impossibility to permute the entities is responsible for the incompatibility between comparatives and *each other*.

An interim conclusion about the difference between linear orderings and comparatives is the following. It is true that, in both cases, as noted by Schwarzschild (1996), Dalrymple et al. (1998), Beck (2001) among many others, we are facing the same kind of linear configurations.

However, in the case of non-comparative linear orderings, the predicate provides an asymmetric relation, the function *EachOther* provides a specific order among all possible orders, in which all the objects can possibly occupy any position in the sequences.

In the case of comparatives, while the predicate also provides an asymmetric relation, the function *EachOther* is unspecified for its argument, since the elements already come in a fixed order determined by their distinctive properties.

Neutrality of the members for the identification of the sequence seems mandatory. They must be interchangeable with each other and equivalent with respect to R. In other terms, the domain of quantification must be homogeneous with respect to the possibility of occupying any position in the relation provided by the predicate. This does not entail that all the elements must be identical. What matters instead is their capability of being permuted with each other, with respect to R.

Comparatives can be rescued, in some contexts, though. Rule (40), together with (77), predicts that all permutations of the elements and sequences are possible. Indeed, comparatives are compatible with *each other* if the context provides the possibility of a permutation:

(79) They look alternately taller than each other in different scenes

(80) I knew that they were all a year older than each other but I forgot the order... so had to look it up... Rob: is going to be 28, Heath: is going to be 27, and Tyler: is 25. http://www.allisterrock.com/board/

For a property P, the notion of permutability, as explicitly said in (79) - "alternatively" - and (80) - "I forgot the order" - is made possible by the fact that, in speaker's perspective any picked element can be *Per* (*taller*/*older*) than the other(s).

As pointed out by Beck (2001), in some cases, the size of the group matters. We argue that large groups enable permutability, calling into play a complex interaction between identity and unboundability. We also explain why it matters for "normal" linear orderings, but not for comparatives.

6.2 "Normal" asymmetric relations.

The second group of observations pointed out by Beck (2001) is illustrated in (81), and is formulated as follows: there are "normal" asymmetric relations that, unlike comparatives, tend to be unacceptable with small groups ((81a) and (81b)) and acceptable with large ones ((81c) and (81d)).

(81) a. ??These three people inherited the shop from each other

b. ??The two men buried each other on this hillside

c. The members of this family have inherited the shop from each other for generations

d. The settlers have buried each other on this hillside for centuries

Consider (81c). The problem to solve is: similarly to comparatives, identity of the members (in this case, their age) determines the order of the inheritance of the shop; consequently, as in the case of comparatives, this is determined by the properties of the elements. These are also given according to an order. So what is the difference with comparatives, when large groups are concerned?

Two factors co-occur, one related to the semantics of the NP, the other, of the VP. The first one concerns the mode of presentation of the members that must be given as indistinguishable with respect to R.

In (81c), the elements of the sequence are just presented as "members of the family." This mode of identification (as members) does not determine the order of the inheritance relation.

In the case of small groups, this "loss" of identity differentiation does not occur: the smallest the group, the more individuable are its members.

The following fact pleads in favor of the hypothesis of the need of indistinguishablity with respect to R: for large groups too, if the members are presented via the property that determines the inheritance relation, the sentence becomes unacceptable (82):

(82) #The grandparents and grandchildren have inherited the shop from each other for generations

One can argue rightly that this condition is necessary but nonetheless not sufficient, otherwise (78c) could also be acceptable: the description "skyscrapers" does not leave any room for any difference among the members of the domain, and present them as indistinguishable with respect to the relation "be taller than."

The second factor to be taken into account is unboundedness and unboundability of the sequence.

Unboundedness is in strict relation to permutability. The application of the rule of permutability leads to a potential infinite sequence, such that for all i x_i are in X ($\forall i(x_i \in X)$), and such that a given x_i can possibly appear an infinite number of times in the sequence.

Since the linearization forbids repeating elements in the sequence, in order to maintain the possibility of an infinite sequence, a set of unbounded size is needed ($\#X = \infty$).

This is the effect for which "for generations" is responsible in (81c), which becomes unacceptable under a linear order interpretation, if "for generations" is deleted. This is also the case if "for centuries" is deleted from (81d).

In this respect, "normal" linear orderings and comparatives behave differently.

Unbinding is not effective with comparatives (78c). In this example, the PP "for miles" is meant to unbind the sequence such that along the path, the skyscrapers become taller and taller, and the further one goes, the more s/he finds skyscrapers taller

than the preceding ones. However, contrary to expectation, "for miles," in (78c), does not make the sentence acceptable.

It does not because comparatives do not allow it. A truthfully uttered comparative statement could not afford to find a skyscraper smaller than the preceding ones: in order to utter a true comparative sentence the entire sequence must have been checked. This, in turn, requires that the sequence be finite, hence bounded. This is what precisely disable *each other* with comparatives: they compel us to consider all the elements and their order.

To conclude, two factors must meet: the elements must be given as indistinguishable and the sequence must be given as unbounded. For linear ordering denoting predicates, unboundability must be made available by the semantics of R and the difference between the semantics of comparatives and "normal" linear orderings lies in the possibility of leaving the sequence unbounded. Comparatives resist unboundedness since, as we have pointed out above, to utter a true comparative statement means to have checked all the members.

6.3 Directionality and unboundedness

Beck (2001) (quoting Sauerland (1998)) considers case (83a) together with those discussed in the previous section. According to our account, examples in (83) should be unacceptable since there is no room for permutability between mothers and children in relation with "to procreate." The domain, in other terms, is not homogeneous with respect to R.

(83) a. #My mother and I procreated each other

b. #These mothers and their children procreated each other

The explanation for the unacceptability is not the correct one, however.

Consider (84). Being presented as the same (as the *settlers*), and unbinding the sequence ("for centuries"), and being a "normal" linear ordering is not enough. (84) satisfies all these conditions. Still, the sentence is unacceptable.

(84) #The settlers have procreated each other on this hillside for centuries

(84) contrasts with (81d). Here, we must consider another phenomenon: directionality.

Differences in directionality illustrated in (85), (86) and (87) are responsible for different acceptabilities Langendoen (1978). We suggest that directionality is in strict relation with the boundedness / unboundedness distinction and consequently with permutability. Unboundable relations are accepted, non-unboundable ones, are not.

(85) a. #The plates are stacked underneath each other

b. The plates are stacked on top of each other

(86) a. #They preceded each other into the elevator

b. They followed each other into the elevator

(87) a. #The settlers have procreated each other on this hillside for centuries (= 84))

b. The settlers have buried each other on this hillside for centuries (= (81d))

For spatial cases (85), it is easy to conceive the bottom end as bounded. For the spatio-temporal (86) and temporal cases (87), a tentative explanation is the following. If *x follows/ buries y*, then *x* comes after *y*. If *x precedes/ procreates y*, then *x* comes before *y*. Hence, *bury* and *follow* open the sequence toward the future direction (respectively in a temporal and spatio-temporal dimensions), *procreate* and *precede* toward the past.

If we understand the notion of unboundedness as "going toward an hypothetical point", in temporal terms, this means, for the future, "hypothetical since it has not occurred yet". For the past direction, that point is hypothetical since it might not be known. However, since it occurred, it must exist, whatever it is. In other terms, the past is conceived as having an origin and does not allow unboundedness. Consequently, (86a) and (87a) are unacceptable.

This speculation is strengthened by a similar argument that has been proposed in a related domain in which the boundedness / unboundedness distinction plays a role: comparatives (Kennedy and McNally (2005)). The authors distinguish three different structures for scales, based on adjectival modifier distribution: open, closed, lower-bounded and upper-bounded. They also argue that the scale structure of a deverbative *AP* is predictable from the temporal structure of the source verb. The authors argue that no deverbal adjective should be associated with a lower-end open scale (no matter whether this is bounded on the upper end). The reason is that there should exist a minimal event which is homomorphically related to the lower bound of the scale of the adjective and which supports the truth of the adjectival predication. In temporal terms, the existence of a beginning event, binding the lower end of the scale, is mandatory.

As Link (1983), Landman (2000) or Lasersohn (1995) illustrate in great detail, events can be ordered in algebraic structure of increasing size: there must then be a minimal event that supports the structure and consequently the order can be unbounded on the upper end (since there might be as many events as possible), but it is necessarily bounded on the lower end.

Representing past and future direction in the same way (the past as a minimal beginning event and the future as the cumulation of events of increasing size), the same result is obtained: the past must be bounded, the future needs not.

We can conclude that predicates pointing to the past, are bounded and hence unacceptable with *each other*.

6.4 Spatial relations and two-membered pluralities

The last fact we must explain is why, spatial, temporal and spatio-temporal relations are not only compatible with small groups, but even accept two-membered pluralities.

(88) a. The two books are lying on top of each other

b. The two students followed each other into the elevator

c. You put these two bowls inside each other

Methodologically, we have preferred not to loosen rules (40) and (52) (hence in the semantics of *each other*) for such cases, since, as argued by Langendoen (1978) and later by Beck (2001), the possibility of a two-membered plurality concerns a very limited number of relation types.

Rules (40), (52), and (59)[6] require that, for linear orderings, the size of the subsequences be of at least three entity-types. Since in a linear ordered reciprocal relations the elements cannot appear twice in a sequence, it follows that the set that is the argument of the function *EachOther* also contains at least three elements. If more than one sequence is obtained, this constraint amounts to stating that the size of the sum of the subsequences must be the same as the size of the set.

Nonetheless, in spite of being limited in kind, the constructions with two-membered pluralities are very common. A proper account of *each other* must then derive the possibility of such constructions straightforwardly.

Permutability, again, is the key to explain these data. Two-membered pluralities are admitted only when the objects are indistinguishable with respect to the relation and can possibly occupy any position in the relation.

Consider the case of heads and bodies, in a configuration where each head is fixed on a different body and every pair "head+body" is separated from the others, namely, a configuration in which heads and bodies bear an intrinsic relation to each other and consequently are not interchangeable. The impossibility of permuting them with each other explains why, under these circumstances, (89a) and (89b) are unacceptable.

(89) a. #The head and the body are on top of each other

b. (#)The heads and the bodies are on top of each other

We can only accept (89b) if the heads are decapitated and there is a pile of randomly stacked heads and bodies or a bunch of heads and bodies. In other words, heads and bodies must not have an intrinsic relation and must be permutable with each other: any head and any body can occupy any position in the pile, and if there is an alternation of decapitated heads and bodies, it is just a circumstantial arrangement chosen among all possible others.

We have repeatedly pointed out that the elements in d need not be identical, but equivalent with respect to R. In the above-mentioned configuration that truthifies (89b), heads and bodies are indistinguishable with respect to the relation. It is important to note, however, that the size of the groups matters again and there is no way of rescuing (89a) since for one head and one body the representation according to which a head is on a body and not vice versa, is too strongly anchored. No matter whether or not the head has been decapitated.

Let us come return to (88). What (the crude) example (89) is intended to show is that the possibility of permuting the entities, as well as their interchangeability (and, when possible, indistinguishability) with respect to the relation and to one another, plays a role. Geometrical and temporal relations, on their side, facilitate permutability since participants are affected or concerned similarly.

As given in (90), permutability and interchangeability can be represented by a bijective application f from $\{x, y\}$ onto $\{x, y\}$ itself, which is not the identity.

(90) $$f := \begin{cases} x \longrightarrow y \\ y \longrightarrow x \end{cases}$$

Hence, permutation and indistinguishability can be written as in (91)

[6] (59) allows two or more subsequences of two-membered pluralities, provided that the first element belongs to different sets.

(91) $x \xrightarrow{f} y \xrightarrow{f} x$

In this way, again, we obtain a sequence of three entity-types even for two-membered pluralities.

7 Conclusion

In this paper we have presented a new definition of the function *EachOther*. The major aim was to reconcile strong and weak reciprocity with linear orderings and to account for difficult facts related to asymmetric predicates (section (2)).

The foundational observation that has motivated our enterprise is that the task of the reciprocal, unlike the reflexive, is to map an unordered set into an ordered one. The semantics of *EachOther* specifies the constraints that rule this ordering.

From the semantic point of view, our account of reciprocity, inspired by that of Fiengo and Lasnik (1973), Heim (Lasnik and May), and Schwarzschild (1996), is based on a larger theory of plurality which attributes a key role to the contextual valuation of the cover variable. Moreover, along the lines of these previous accounts, the mechanics of the interpretation calls into play the contributions of a distributor (*Part*) and a reciprocator (*EachOther*), respecting the foundational distinctness condition.

In section (5), we have presented a new semantics of *EachOther* that we have analyzed as a function that takes each member of *Cov* as its argument and provides a linearization for it. We have argued that the context plays a role at two moments in the interpretation: it determines the value of *Cov* and selects one sequence among all possible ones.

We have begun the semantic analysis by considering different valuations for *Cov*. We have distinguished cases in which *Cov* provides a unique, homogeneous set (section (5.2)) from those in which it either provides more than one set (section (5.3)), or a unique set which is not homogeneous (section (5.4)).

We have then shown that these three rules can be considered as the avatars of a unique one stating that *EachOther* links a set with itself and imposes an order that is expressed as a linearization of the set (section (5.5)).

The semantic account reconcile linear orderings with strong and weak reciprocity, provides a unified mechanism for all different configurations, and enables us to consider sets and their members simultaneously. It is then no longer necessary to consider either individual or collective contribution, when both are in fact needed.

We have argued that sequences consist of equivalent elements that must be permutable with each other. We have discussed the pragmatics of the notion of permutability in section (6) that we have considered from the point of view of interchangeability and unboundedness. The investigation of these notions has allowed us to explain why comparatives are, under normal circumstances, incompatible with *each other* (section (6.1)), why "normal" asymmetric relations are compatible with *each other* when large groups are concerned (section 6.2), why differences in directionality lead to differences in acceptability (section 6.3), and finally, why spatial, temporal and spatio-temporal configurations allow two-membered pluralities (section 6.4).

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Why Rose is the Rose: On the use of definite articles in proper names

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1 Introduction

The goal of this paper is to examine the use of definite articles with proper names, both cross-linguistically and intra-linguistically and provide a morpho-syntactic analysis of it. The first question to consider is whether article absence or article presence is the default case. The second question is when and how the alternative arises.

I will presuppose here that names in argument positions are definite descriptions (see Geurts 1997, Elbourne 2002, and Matushansky 2005a,b, to appear) and summarize some arguments in favor of this view. As a result, the default is instantiated by languages that do have definite articles with proper names in argument positions:

(1) O presidente nomeou **a** **Maria** ministra.
the-M.SG president named-3SG the-F.SG Maria minister
The president named Mary the minister. European Portuguese

What needs to be explained, therefore, are languages like English, where proper names, despite being definite, are generally not accompanied by a definite article. Within such languages, however, some lexical classes of proper names may require a definite article:

(2) a. the Clintons English
b. the Alps, the Hebrides
c. la Seine, le Rhône French

These lexical semantic classes are not the same across languages: some (countries, weekdays, etc.) require an article in one European language and not in another:

(3) a. *(la) France, *(le) Christ, *(le) nord French
b. (*the) France, (*the) Christ, (*the) North English

(4) a. *(el) lunes Spanish
b. *(le) lundi French

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c. (*the) Monday, (*the) France English

A hypothesis accounting for the distribution of definite articles with proper names cross-linguistically should be applicable intra-linguistically as well, and also account for the appearance of the definite article with certain types of modification (see section 3.1 for details).

Another issue that needs accounting for is morphology: in many languages, the definite article appearing with names of people (the so-called *preproprial article*) differs from the regular definite article (e.g. in Tagalog (cf. Himmelmann to appear), Malagasy and Maori (Campbell 1991), Catalan, some Polynesian languages (cf. Anderson 2002), etc.). For some languages, this fact cannot be explained by syntax alone.

1.1 Naming constructions

It can be argued (Matushansky (2005a,b, to appear)) that with verbs of naming exemplified in (5), proper names function as predicates:

(5) a. Call me Al.
b. I dub thee Sir Lancelot.
c. Long John Silver was nicknamed Barbecue.

Cross-linguistic evidence strongly suggests that verbs of naming appear with a small clause complement. The first argument comes from languages where the definite article is obligatory with proper names in argument positions.[1] Even in such languages, unmodified proper names appear without an article in naming constructions, as in the following examples from Modern Greek (due to Dimitra Papangeli):

(6) **Naming constructions**

a. Vaftisa to Yani Petro
baptised-1SG the-ACC Yani-ACC Petro-ACC
I baptized Yani Petro. Modern Greek

b. O Yanis vaftistike Petros
the-NOM Yanis-NOM baptise-PASS.3SG Petros-NOM
Yani was baptized Petro. (passive) Modern Greek

Whereas the proper names in argument positions (the object in (6a), the subject in (6b)) appear with a definite article, the proper name in the naming construction is bare (unless additional modification is present – the issue that will be discussed in section 3.1). This can be likened to the omission of the definite article in the predicate position in English (Stowell, 1991):

(7) a. The queen appointed her lover treasurer of the realm.
b. Anne's death made George (the) king of England.

[1] I will not discuss here cases where the definite article disappears because a possessive (*our dear Angelina*), a quantifier (*every Fanny*), a demonstrative (*this Rover of yours*) or an indefinite determiner (*a Mr. Smith*) are used; this caveat extends to other instances below where a definite article is said to be required with proper names – I am primarily concerned with definite proper names here.

Other languages where proper names require an article in argument positions but not with naming verbs include colloquial Icelandic, Northern Norwegian and Northern Swedish (see Delsing 1993), Catalan, Tagalog, the Uto-Aztecan language Pima, and Albanian, as well as various dialects of German and Italian (see Matushansky 2005a,b, to appear for details).

This correlation is certainly suggestive, but not much of an argument on its own, given that naming constructions not involving verbs can also force article absence, as in (8b) from Maori (Biggs 1969, 30 via Anderson 2002):

(8) a. Ka hariruu a Mere ki a Rongo
ASP shake-hands ART Mary with ART Rongo
Mary shakes hands with Rongo. Maori

b. Toŋoku iŋoa ko Vero
my name FOCUS Vero
My name is Vero. Maori

Could article absence be correlated with lack of referentiality rather than with predicate interpretation? Alternatively, might definite proper names be for some reason more likely to appear without an article in non-argument positions? Support for the latter view comes from vocative constructions, where the article must be absent in some languages (English) but not in others (French), even if proper names appear without an article in the vocative in both languages. However, case marking in Modern Greek provides further evidence in favor of the view that proper names with verbs of naming are predicates.

In Modern Greek, small clauses with a nominal predicate exhibit Case-agreement: the case on the small clause predicate is the same as that on the small clause subject. Thus, when passivization renders the small clause subject Nominative, this is reflected in the case of the small clause predicate:

(9) a. Theoro to Yani ilithio ECM
consider-1SG the-ACC Yani-ACC idiot-masc-ACC
I consider Yani an idiot. Modern Greek

b. O Yanis theorite ilithios passive
the-NOM Yanis-NOM consider-PASS.3SG idiot-NOM
Yani is considered an idiot. Modern Greek

Examples (9) illustrate Case-agreement in a small-clause complement of an ECM verb. Examples (6) above demonstrate that the proper name in a naming construction behaves like a small clause predicate: the case on it is the same as that on the object of naming.

Modern Greek is not the only language where proper names are subject to case agreement in the naming construction. Other languages in this category include Latin, Icelandic and Albanian.

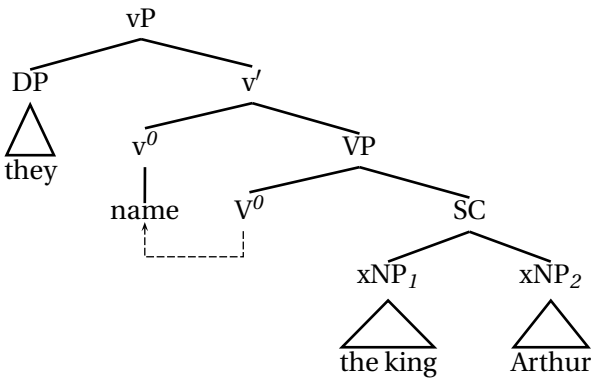
Case-marking in languages without Case-agreement is revealing as well, in that with naming verbs the case on the proper name is the general predicative case, as shown by languages as diverse as Hungarian (data due to Veronika Hegedüs), Syrian Arabic and Russian:

(10) a. **okos-nak** tart-om a laíny-om-at
clever-DAT keep-1SG the daughter-1SG-ACC
I consider my daughter clever. Hungarian: ECM

b. a laíny-om-at elnök-nek jelölt-em
the daughter 1SG-ACC **president-DAT** nominated-1SG
I nominated my daughter president. Hungarian: nomination

We conclude that naming verbs project a small clause structure:

(11)



Other evidence for this conclusion stems from the fact that proper names appear as both primary (ECM, raising) and secondary (depictive) predicates, and the presence of such predication markers in the naming construction as the copular particle in Korean and the particle *yn* in Welsh (see Matushansky 2005a, b, to appear, for details).

A sample lexical entry for a proper name is provided in (12); the argument slot for a naming convention is motivated by (a) the need to distinguish between naming small clauses and all others and (b) the fact that the same person can bear different names in different circumstances – again the reader is referred to Matushansky (2005a,b, to appear) for details:[2]

(12) $[\![Alice]\!] = \lambda x \in D_e.\lambda R.$ x is a referent of alɪs by virtue of the naming convention R

It is easy to see that the meaning in (12) cannot be derived from the meaning of a proper name in an argument position. If *Alice* in an argument position directly refers to Alice (as in the so-called *direct reference* theories, such as Kripke 1980), the meaning in (12) cannot be derived at all. If *Alice* means *the individual named* alɪs (cf. Kneale 1962, Burge 1973, Kleiber 1981, Geurts 1997, Recanati 1997, Pelczar and Rainsbury 1998), then to derive the meaning in (12) we would need a function of the kind in (13):

(13) $\lambda x.\lambda y.\lambda R.y$ is a referent of whatever phonological string used to identify x by virtue of the naming convention R

Leaving aside the fact that it is not clear whether (13) works (it permits for *Alice* in a predicate position to actually mean *Miss Liddell*, if the context is compatible with such a naming convention), it reverses the relationship found between predicate and argument meanings for common nouns: it is standardly assumed that the meaning of

[2]It should be noted that the meaning of proper name predicates in naming constructions allows us to discard the class of hypotheses with artificial predicates making reference to the denotation of a proper name, like $\lambda x.x =$ *Alice* or with abbreviated definite descriptions such as *Aristotle = "the one who Aristotelizes"*. Neither of such artificial predicates gives us the right meaning in naming constructions.

a DP in an argument position is derived from the meaning of the corresponding NP predicate. If proper names can enter syntax as predicates, as do common nouns, then, by Occam's razor, it is preferable to derive the meaning of a proper name in an argument position from the meaning that it has in the predicate position. This means that if names in argument positions are definite (as they are commonly assumed to be; see Geurts (1997) and Elbourne (2002) for further evidence that proper names in argument positions are definite descriptions), their syntax and compositional semantics should not be any different from those of definite descriptions.

We therefore conclude that bare proper names should be treated as (certain) bare nouns (see Stvan 1998 and Carlson and Sussman 2005): it is the absence of the overt definite article that must be explained. Evidence in favor of this view comes from the behavior of definite acronyms and abbreviations as described by Harley (2004).

Acronyms are distinguished from abbreviations in that in acronyms the initials are read out as if they were a word. On the basis of Cannon (1989), Harley claims that while acronyms disallow the article, abbreviations require it:

(14) a. (*the) NATO, (*the) AIDS, (*the) OPEC — acronyms
b. *(the) CIA, *(the) NSF, *(the) LSA — abbreviations

However, some abbreviations, such as names of universities and media networks, take no article:

(15) (*the) MIT, (*the) NBC

As Harley observes, *both of these groups of exceptions are part of a principled, though restricted, category of English nouns which behave, in certain contexts, like full noun phrases.* In particular, they belong to the lexical classes that often appear without an article in the singular (Stvan, 1998):

(16) Categories of bare singular nominals (Stvan, 1998)
a. social or geographical institutions (at school, in camp, on shore)
b. media (on film, in shot)
c. temporal interruption events (at lunch, on break)
d. certain *untethered metaphors* (on target)

In certain lexical classes, both abbreviated proper names and common nouns can appear without the definite article.[3] This provides some indirect support for a theory calling for article omission rather than article insertion: since we do not have a theory of article insertion for common nouns, it is undesirable to postulate one for proper names.

To reformulate the problem, what I claim is that proper names enter syntax with essentially the same semantics as common nouns (modulo an additional argument slot for the naming convention). This means that we expect them to have the same syntax as common nouns – which is in fact the case, with every determiner other than the definite article:[4]

[3]The correlation cannot be directly extended towards non-abbreviated proper names: most lexical semantic classes of regular proper names requiring an article are geographical (in English).

[4]I leave aside here what Gary-Prieur (1991, 1994) calls the metaphoric use of the proper name:

(17) a. There are **relatively few Alfreds** in Princeton.
b. **Some Alfreds** are crazy; some are sane. (Burge, 1973)

(18) a. There are **two Aristotles**. (Elbourne, 2002)
b. **Which Aristotle** do you mean?
c. I meant **that Aristotle**.
d. **The Aristotle** standing over there?
e. No, **the other Aristotle**.

(19) a. There's **a Mr. Smith** to see you, sir.
b. **This Rover of yours** has overturned the garbage again!

The question is then when and why can the definite article (and the definite article only) be omitted with definite proper names. To answer this question we need to turn to environments where proper names must appear with an article in a language like English, which normally doesn't have definite articles with proper names.

2 Conditions on definite article omission

To explain the disappearance of the definite article with definite proper names in certain languages and/or certain environments, we need to first consider cases where definite article omission is impossible. These cases fall into one of three categories:

- If the proper name is restrictively modified
- If it belongs to particular lexical classes (e.g., names of ships or mountain chains require a definite article in English)
- If it contains certain inflectional morphology (e.g., the plural affix)

Before we examine each of these cases in more detail, we must note that a proper name that does not fall into any of these categories may still require a definite article. For example, country names in English generally do not appear with an article, except for a few countries such as *the Ukraine* (*the Matterhorn* is likewise exceptional among mountains). Conversely, a proper name from a lexical semantic class that requires an article may be exceptional in that it does not take one: mountain names in Norwegian usually take a (suffixal) definite article, but some individual peaks (e.g., *Glittertind*) do not (the Linguist List 3.932).

2.1 Modified proper names

A limited survey of languages (English, French, Hebrew, Dutch) suggests that cross-linguistically, restrictively modified proper names force a definite article (on the role of modification in the appearance of an article in English and French see also Sloat

(i) a. She is **a veritable Mary Poppins**.
b. St. Peterburg was considered **the Venice of the North**.

1969, Kleiber 1981, Gary-Prieur 1991, 1994, 2001, Jonasson 1994, Kayne 1994, Paul 1994, Gärtner 2004 and Borer 2005).[5] The contrast in (20) shows that while a restrictive/non-appositive relative clause requires the appearance of an article before the proper name it modifies, a non-restrictive/appositive one disallows it:

(20) a. This is not ***(the) Elisabeth I know**.
b. I was introduced to **(*the) Elisabeth, whom I was already prepared to admire**.

Likewise, non-appositive adjectives generally require the appearance of an article (definite or indefinite), while appositive ones don't:[6]

(21) a. The letter was in fact addressed to ***(the) older Miss Challoner**. restrictive
b. The audience was confronted by ***(a) furious Barbara Smith**.
c. The gifts were sent by ***(the) charitable Miss Murray**.

(22) Il y avait là Marie de Magdala et ***(lÕ) autre Marie**. restrictive
it there was there Mary of Magdala and the other Marie.
'There were there Mary Magdalene and the other Mary.'

(23) a. (*The) Barbara, **furious**, expressed her views with vehemence. appositive
b. Then I ran into (*the) Rosalind, **as unlikely to forgive and forget as ever.**

ÊWhile non-appositive relative clauses are always restrictive, non-appositive APs may be non-restrictive also (i.e., the sister of a non-restrictive relative clause has the same referent as its mother):[7]

(24) **The industrious Chinese** built the Great Wall of China.

The subject can be interpreted as denoting a subset of the Chinese (the restrictive reading of the AP) or the totality of the Chinese people, who are all then presupposed to be industrious (the non-restrictive (and non-appositive) reading). In English, most non-appositive APs force the appearance of an article with proper names. While restrictively interpreted proper names, as in (21a, b), require an article, with a non-restrictive AP, the presence of the article depends on the choice of adjective in ways that I do not yet fully understand:[8]

[5]Kayne (1994) treats the appearance of the definite article on proper names modified by relative clauses as an argument in favor of a head-raising analysis of relative clauses. Paul (1994) and Gärtner (2004) argue for treating this modification in the terms of spatio-temporal parts. Sloat (1969), Gary-Prieur (1991, 1994, 2001), and Jonasson (1994) are largely descriptive. Borer (2005, chapter 3) claims that in all uses of proper names except when singular and bare they are in fact common nouns.

[6]I thank an anonymous reviewer for drawing my attention to the difference between the use of the term (non-)restrictive in application to relative clauses and to APs.

[7]It is important to distinguish restrictive modification from modifiers that form an integral part of a proper name (exemplified by the first proper name in (22)). One way of differentiating between them is (the lack of) semantic import: *New York* is no longer new, and *Li'l Kim* may not be little (at the moment of speech or ever – the name could have been given ironically). The line is difficult to draw in cases like (22), where the proper name appears to be decomposable – I contend that the lack of the definite article shows that no real restrictive modification takes place.

[8]The different behavior of restrictive vs. non-restrictive modification in English but not in French is also observed by Noailly 1991, who suggests that the obligatory appearance of the definite article with

(25) a. ... for neither **young Meltham** nor Squire Green were there. (Anne Brontë, Agnes Grey, p. 189 of the Penguin Classics edition, 1988)

b. Here was a wonderful instance of consideration from **the thoughtless Miss Murray**. (ibid.)

While dropping the article in (25b) results in ungrammaticality, adding a definite article to (25a) would lead to a restrictive interpretation of the adjective. This contrasts with French, where both restrictive and non-restrictive modification require the article (Noailly 1991, but see Gary-Prieur 1994 for some apparent counterexamples).

This difference between English and French requires an explanation – however, it is not the only issue where it comes to non-restrictive modification. There exists a special class of obligatorily non-restrictive APs (such as *dear* or *poor*) that do not force the appearance of the definite article. If a proper name in an argument position is modified by an adjective from this class, the definite article is obligatory in French, ungrammatical in English and a demonstrative must be used in Dutch (in the latter two cases, the definite article is possible if the AP is interpreted restrictively):

(26) a. We will talk to **(*the)/our dear/poor Thomas** about it. English

b. **Le pauvre Paul** était presque aussi pâle que Sophie.
the poor Paul was almost as pale that Sophie
Poor Paul was almost as pale and trembling as Sophie. French

c. **Die/*de/*Ô arme Paul** is zijn baan kwijt.
that/the poor Paul is his job missing
Poor Paul has lost his job. Dutch

The different behavior of English, French and Dutch is the reason why we leave non-restrictive non-appositive modification of proper names aside here.[9] Otherwise, the behavior of modified proper names shows that the internal syntax of the DP containing a proper name plays a role in its ability to drop the definite article: cross-linguistically, a restrictively modified proper name can no longer appear bare.

Interestingly, the distribution of the definite article with modified proper names finds a strong parallel in the behavior of the Danish free-standing (as opposed to affixal) definite article examined by Delsing (1993), Embick and Noyer (2001) and Hankamer and Mikkelsen (2002, 2005). As examples (27) show, in Danish, a definite suffix is used with a bare noun; when the noun is modified by an AP, the free-standing definite article must be used. (Both the definite suffix and the free-standing definite article manifest concord with the number and gender of the head noun.)

(27) a. hest-en

modification in French is purely syntactic – a conclusion that is (unconvincingly) argued against in Gary-Prieur 1994. Noailly 1991 claims that English non-restrictively modified proper names appear without an article, which leaves examples like (25b) unexplained.

[9] A possibly correlated fact is the ability of the French definite article to appear with a proper name to indicate familiarity, contempt, or disdain (Grevisse 1980, Gary-Prieur 1994). Since neither English nor Dutch definite articles have this property, this may explain the grammaticality of (26b) as opposed to the ungrammaticality of (26a, c). However, such expressive adjectives as *damned*, *stupid*, and *bloody* (which are also obligatorily non-restrictive; see Potts (2003) for a discussion) appear to require an (expressive) demonstrative in all the three languages.

horse-DEF
the horse

b. * den hest
the horse

c. den *(rôde) hest
def red horse
the red horse Danish

With proper names, nouns from some lexical semantic classes, deverbal nouns and some singleton exceptions, the use of the definite suffix is blocked (Mikkelsen 1998, Hankamer and Mikkelsen 2002, 2005):

(28) a. en studerende
a student

b. den (stakkels) studerende
the poor student

c. * studerende(e)n
student.DEF
the student Danish: deverbal noun

(29) a. skæg, *skæg-(g)en: fun

b. id, *id-en: deed, action Danish: lexical exceptions (Mikkelsen 1998, 62)

Hankamer and Mikkelsen (2002, 2005) argue that the alternation is morphological in nature and cannot be accounted for by syntactic mechanisms such as head-movement (contra Delsing 1993 and Embick and Noyer 2001). Their actual account consists of a lexical rule (the D-rule) that produces a combination of the noun and the definite suffix, which, they claim, is syntactically a determiner and therefore functions as D^0.

A head-movement analysis is inapplicable also because this process of inflecting a noun for definiteness can be disrupted by modification. If a noun is modified by a restrictive relative clause, the free-standing article is obligatory (for the majority of the speakers), but if it is modified by a non-restrictive relative, only the suffixal article must be used:

(30) a. hest-en som vandt lôb-et
horse-DEF that won race-DEF
the horse, which won the race [all speakers]
the horse that won the race [some speakers]

b. den hest som vandt lôb-et
the horse that won race-DEF
the horse that won the race [all speakers] Danish

Hankamer and Mikkelsen (2002, 2005) propose that this pattern can be accounted for by adopting the general assumption that appositive relatives (and presumably APs) are adjoined to DPs while restrictive ones are adjoined to NPs.[10]

[10]Hankamer and Mikkelsen (2005) propose that some speakers allow a restrictive interpretation of the relative clause in (30) because they have access to a mechanism whereby a relative clause that is

Since the intervention effect is so similar in the two cases (restrictive modification requires a DP-external article), similar analyses are highly desirable. However, while I agree with Hankamer and Mikkelsen in their proposal that the pattern is to be accounted for in the terms of morphology, I disagree with their implementation (see Matushansky 2006). Before proposing an alternative account of both phenomena, I would like to provide some further evidence in favor of the morphological nature of article absence with definite proper names.

2.2 Lexical classes and morphology

As with the Danish definite suffix, the existence of lexical exceptions to the ability of proper names to appear without the definite article also suggests that this ability is not a syntactic phenomenon. First of all, there are such singleton exceptions as *the Gambia* or *the Ukraine*, which do not follow the common pattern of English country names and require the definite article. If Late Insertion (Halle and Marantz 1993, 1994, Marantz 1993) is assumed (as it is here), syntactic processes are not expected to be sensitive to a particular lexical choice (see Embick and Noyer 2001 and Hankamer and Mikkelsen 2002, 2005 for a similar argument).[11]

Then there are lexical semantic classes of proper names that require the definite article. As mentioned above, these classes differ across languages: for example, names of ships require the definite article in English and in French, but names of countries only do so in French:

(31) a. *(the) Lusitania, *(the) Titanic — English
b. *(le) Lusitania, (*le) Titanic — French

(32) a. (*the) France, (*the) Morocco — English
b. *(la) France, *(le) Maroc — French

Lexical semantic classes are not expected to have syntactic idiosyncrasies. What they are known to have are *morphological* idiosyncrasies: for example, in Latin, names of rivers are obligatorily masculine, while names of trees (common nouns) are obligatorily feminine, and that irrespective of the declension class (Bennett, 1918). That the presence or the absence of the definite article depends on the lexical semantic class of the proper name also suggests that we are dealing with a morphological process.

A special kind of a lexical semantic class is a particular biological gender. Thus in French, names of famous singers and actors can appear with a definite article only if they are women (Gary-Prieur 1994) and in some Italian dialects feminine but not masculine proper names must appear with a definite article (Elena Guerzoni, p.c.).

The hypothesis that the behavior of the definite article with proper names is not a syntactic phenomenon is further supported by the fact that the morphological process of pluralization blocks article absence: plural proper names (including *pluralia*

adjoined (at surface structure, or at the end of (overt) syntax) to DP can be interpreted as adjoined to NP for semantic purposes.

[11] A classical exception is the selection by a verb of a particular preposition (*depend on, look at*). It can be argued that a preposition is a functional item composed solely of formal features – preposition selection is then akin to complementizer selection (the selection of the feature [α finite], as opposed to the selection of the lexical item *that* or the lexical item *for*).

tantum ones, as in (33b)) require a definite article (Borer 2005, see also Gary-Prieur 2001).[12]

This means that some lexical semantic classes of proper names with an obligatory definite article (mountain chains, islands, etc.) are exceptional because of the plural suffix rather than their lexical semantics.

(33) a. the Clintons
b. the Alps, the Hebrides

To the best of my knowledge, neither non-inflectional affixation nor case affixes on proper names interfere with the absence of an article.[13]

2.3 Article absence

In sum, there appears to exist a relation between the head of a definite noun phrase and the definite article that can license the absence of the article if the N^0 is a proper name. The article must be overt if the proper name is modified, pluralized or lexically marked as requiring an overt definite article (either a singleton exception or a member of one of language-specific lexical semantic classes).

[12]Borer (2005) also notes that if a name is syntactically and semantically singular, this requirement does not apply:

(i) a. Peaches, my neighbor's cat, is dying/*are dying.
b. Bones, also known as Dr. McCoy, is a good friend of Captain Kirk's.
c. Athens is a nice city.

For English, one could have argued that *-s* is not a suffix here, but such a proposal would lack the generality necessary to explain the fact that the same effect obtains in other languages.

Furthermore, when a modifier is part of the proper name, the appearance of the article is not warranted:

(ii) Long Sally, New York, Little RichardÉ

Such cases as *the White House* and *the Big Apple* could be treated as singleton exceptions, similar to *the Ukraine*.

[13]A suffixal definite article is obligatory in Swedish (feminine) hypocoristics (Teleman et al. (1999) via Björn Rothstein, p.c.; I am also grateful to Elisabeth Engdahl for a discussion):

(i) a. Birgitta – Gittan (Gitta-DEF)
b. Margareta – Maggan (Magg-DEF) Swedish

This suggests that the diminutive suffix can affect the behavior of the definite article – however, in French and Spanish, a proper name appearing with an article (*la Maria*) is generally used pejoratively or familiarly (Grevisse 1980, Gary-Prieur 1994). This latter fact suggests that the presence of the article is related to the hypocoristic use of the proper name rather than to the presence of the affix – a hypothesis supported by the fact that full names used hypocoristically also appear with an article in Swedish:

(ii) Sten-en (Sten-DEF), Björn-en (Bjorn-DEF), Margareta-n (Margareta-DEF) Swedish

Since this paper adheres to the Distributed Morphology approach (Halle and Marantz 1993, 1994), one could object that the diminutive suffix could be introduced in syntax, like the plural one. Even then, article absence would still have to be a lexical property of the suffix, since the diminutive suffix triggers the presence of the definite article in Swedish, but not in English, French or Dutch.

It is easy to see that article absence cannot be conditioned by one of the following:

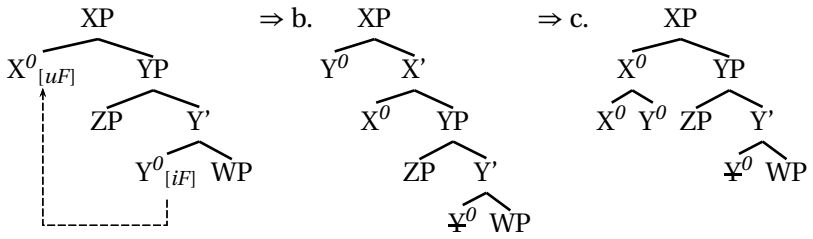
- Linear adjacency, because rightward modification by relative clauses or PPs also disrupts it.
- N-to-D movement (Longobardi 1994, 1999 et seq.), because modification should not disrupt head-movement (or at least it does not do so in clear cases of head-movement in the extended VP). Same for NP-to-[Spec, DP] movement.
- Not c-selection or f-selection, because all proper names are nouns, because modification should not affect f- or c-selection, and because different lexical semantic classes of proper names behave differently.
- Not selection of a (lexical) feature because modification should not play any role and there should not be singleton exceptions.

To determine the mechanism of article absence, we need to take into consideration the effect of both modification and lexical semantics. The influence of the lexical semantics leads us to believe that the omission of the definite article with proper names is morphologically conditioned, as if the article were an affix, while the intervention effect due to modification suggests that syntax must also play a role. In the next section we will see how to reconcile these two apparently conflicting requirements.

3 M-merger

Elsewhere (Matushansky, 2006) I propose that "head-movement" consists of two operations: (a) movement of a head to the specifier of the attracting head, as in (34b), and (b) m-merger, as in (34c):

(34) a.

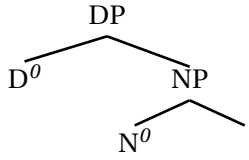


M-merger is a strictly cyclic morphological operation that takes two syntactic heads in a certain configuration and returns one syntactic head. It is subject to strict locality: nothing may intervene between Y^0 and X^0 in (34b): neither a Spec nor a modifier. As a result, the movement of heads is not a special movement operation that is exempt from c-command, but just a case of Move-α, and most of its special syntactic properties are accounted for. Most importantly, m-merger can occur in absence of prior movement if the configuration is right. I propose that the distribution of the definite article with proper names can be explained by m-merger.

3.1 Article absence as m-merger

We observe that a proper name and its article are in the required configuration for the proper name to m-merge with the definite article:

(35)



Let us suppose that in some languages m-merger between the definite article and the noun is obligatory in the presence of the feature [+proper] (to be made more explicit below):

(36) **Preproprial m-merger constraint (English)**
M-merge ($D_{[def]}$, $N_{[+proper]}$)

As a result of m-merger, D becomes an affix on N and thus can be conditioned to become null or to take on a special morphological form. The first process results in the lack of a definite article with proper names (as in English), while the second gives rise to special preproprial articles (as in Catalan).

Under the standard assumption that nominal modifiers such as APs and relative clauses adjoin to N', modification disrupts the very local relation between D^0 and N^0. As a result, m-merger becomes impossible and thus modified proper names require an overt definite article, which appears as the syntactic head D^0.

A constraint such as (36) requires that the feature [+proper] be present in syntax and morphology. Evidence in favor of special morphological properties of proper names (i.e., the morphologically detectable feature [+proper], which can be argued to have as semantic correlate the presence of the naming relation R argument slot) comes from the special behavior of proper names with respect to several morphological processes:

- In Dutch, proper names form part of a small group of nouns that take the Genitive case marking.
- The same happens in German. However, "if a proper name is modified by an inflecting determiner or adjective then the head noun cannot inflect for genitive but appears instead in the basic (nominative singular) form". (Spencer, to appear)
- Vocative case marking is generally restricted to a sub-class of nouns, which must contain (a sub-class of) proper names but may also extend to other lexical semantic classes (such as kinship terms)

Moreover, in Latin special morphology is associated with some lexical semantic classes of proper names (Bennett, 1918):

- Names of towns and small islands (and a small group of other nouns) permit Locative without a preposition (realized as a dedicated case in the 1st and 2nd declensions, as Ablative in others).

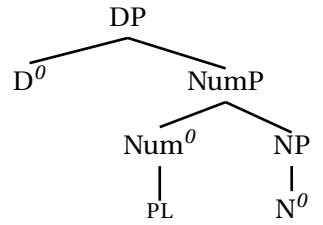
- Ablative of names of towns and small islands (and a small group of other nouns) can be used without a preposition to denote the departure point (others require the preposition *ab*).
- With proper names of towns, small islands, and peninsulas (and two more nouns), Accusative works as the directional case, otherwise *ad* is required.

The first phenomenon is analogous to Dutch and German Genitive. The last two phenomena can be analyzed as m-merger of the directional preposition and the proper name. We therefore conclude that proper names are special with respect to morphology, and this can be achieved while keeping their syntax regular.

3.2 Affixation

Having explained how m-merger provides the mechanism for the absence of the definite article with proper names and how it predicts that modification should block this absence, we can now demonstrate that affixation can also play a role. Assuming that number affixes are heads in the NP projection, they would naturally intervene between the determiner and the noun:

(37)



However, matters are more complicated, since N^0 probably moves to Num^0, which would restore the required locality. Even if it does not,[14] NumP should be present in the singular as well as in the plural – but only the overt plural affix blocks the m-merger of the definite determiner and the noun.

We have to propose therefore that the ability of a morpheme (root or affix) to block m-merger with the article is a lexical property of that morpheme (i.e., certain morphemes are exceptions to the rule of obligatory m-merger between a proper name and the definite article or block the percolation of whatever features on the stem that allow for such m-merger). Since such exceptions to morphological operations are quite common cross-linguistically, nothing special needs to be said about them.[15]

[14] Although N-to-Num movement could explain the combination of the stem with the plural suffix in English, this account cannot be extended to languages where plural suffixes appear on attributive APs and/or articles, as is the case in Romance.

[15] As observed by Borer 2005, in some dialects of Arabic the definite article appears with proper names that are morphologically derived from some types of nouns, such as *al-faDl* (literally, Õthe virtueÕ) and from adjectives. While this kind of exception cannot be directly handled by an appeal to the lexical class of 'bare' proper name, I note that the morphology of a noun is frequently affected by its derivation: for example, Russian nouns null-derived from adjectives retain their original declension pattern (Halle and Matushansky, 2006).

3.3 Constraining the system

As discussed above, some lexical semantic classes of proper names require the definite article. This means that we need either to develop a way for m-merger to be constrained to apply to a sub-class of proper names only, or to prevent it from applying to certain sub-classes. One example of forcing m-merger to apply to a particular sub-class only is the gender restriction on article absence with proper names in some dialects of Italian, where only feminine proper names appear with an article. This can be easily included into the conditions on m-merger:

(38) **Preproprial m-merger constraint (Italian M)**
M-merge ($D_{[def]}$, $N_{[+proper][-F][+person]}$)

Since only [-feminine] proper names trigger m-merger, only [+ feminine] proper names appear with an article. This kind of a constraint is fully expected if m-merger is an operation of the morphological component, as argued by Matushansky (2006): morphological operations may be constrained by morphological features.

The situation becomes more complex if we need to block m-merger from applying to some lexical semantic classes of proper names (and preserve the intuition that something formally unites proper names in a particular lexical semantic class). If there is a feature [+proper] that results in m-merger of the proper name and the definite article, adding another lexically conditioned feature (especially one as odd as [ship]) will not formally block m-merger.

One possibility is to reconsider where the default lies – it might be that the general view is incorrect: it is not that proper names of ships, rivers, etc., are exceptional in that they block m-merger of the definite article, but rather that proper names of people, (in English) countries, etc., are special in that they are subject to preproprial m-merger. If so, constraints on m-merger have the form in (38) rather than (36), and some proper names are not subject to it (singleton exceptions). For this approach to work, it must be the case that proper names that generally appear without an article form congruent classes from the point of view of lexical semantics (e.g., names of people, book, play or movie titles, names of cities, etc.). Since the composition of a full list of entities that have names is beyond the scope of this article we will leave this question open. A major advantage of constraining preproprial m-merger by additional features is that we can easily deal with lexical semantic classes. We have already noted that such subclasses can constrain other morphological rules: while postulating features such as [city] seems somewhat counter-intuitive, some such provision should be made to deal with the Latin cases discussed in section 4.1. Given that m-merger is a morphological operation, there is nothing surprising in that certain stems (and affixes) are subject to it and others should be exempted from it.

3.4 Blocking m-merger

An alternative way of accounting for the fact that some lexical semantic classes of proper names must appear with the definite article, while others cannot do so, is to say that the feature [±proper] is divorced from semantic content, just like gender features can be: e.g., German diminutives in *-chen* are syntactically neuter. Some proper

names can then be viewed as formally [-proper], which would account for singleton exceptions.[16]

One clear disadvantage of this approach is that it cannot link the presence of the definite article with the lexical semantics of the proper name, and thus cannot account for the fact that proper names with an obligatory definite article belong to certain lexical semantic classes. This problem can be resolved if the lexicon contains a list of redundancy rules that mark the relevant lexical semantic classes as exceptional to preproprial m-merger (or subject to it) by assigning the [+proper] feature to them. Under this view, [+proper] becomes a purely formal feature, essentially encoding the presence of the overt definite article.

We will therefore abandon the hypothesis that [+proper] is a lexical property of a given stem, and examine two ways of incorporating the lexical semantics of the proper name into blocking the preproprial m-merger: one assimilated to modification and the other assimilated to affixation. We will demonstrate that both are theoretically inferior to the approach outlined in section 4.3.

3.4.1 Null nouns

Suppose proper names with articles contain an appropriate covert noun (so the *Thames* is underlyingly *the Thames river*, *the Pacific* is *the Pacific ocean*, etc., before spell-out). Since the covert noun is a common noun, it would be marked [-proper]. If it is the head of the entire construction, as in (39a), then the entire complex proper name will be [-proper]; if it is a modifier, as in (39b), it is an intervener in the same way overt APs, PPs and relative clauses are:[17]

(39) a. the Thames ~~river~~, the Titanic ~~ship~~
b. the ~~River~~ Thames, the ~~ship~~ Titanic

The existence of such minimal pairs as *Yucatan* (a Mexico state) vs. *the Yucatan* (Peninsula) lends support to the null noun hypothesis: the overt noun gradually passes from being implied to being null (the Linguist List 3.932).

Further suggestive evidence (due to Giorgos Spathas and Dimitra Papangeli) comes from Modern Greek: river names are masculine (as is the word for *river*), country names are (mostly) feminine (as is the word for *country*):

(40) a. o Axios, o Kifissos rivers
the.M Axios the.M Kifissos

[16]We might therefore expect common nouns to be marked [+proper]. This is not necessarily a problem, since unmodified noun phrases headed by some common nouns can also be bare while being definite in certain contexts (Carlson and Sussman 2005).

(i) Sue took her nephew to college/to prison/to class.

[17]There are two exceptions to the generalization that the presence of an overt common noun results in the overt definite article: the nouns *lake* and *mount* (e.g., *Lake Tahoe, Mount Everest)*. We suggest that both nouns are probably better viewed as part of the proper name. This view is supported by the fact that *mount* is not readily used in isolation.

b. i Elada, i Jalia countries
the.F Greece the.F France
Modern Greek

If there is a covert noun there, the gender on the article is the gender of that noun (under the assumption that the gender of null nouns is constant). Unfortunately, counterevidence to this view comes from French, where river names require articles but their gender is not consistent:[18]

(41) a. la Seine, la Marne
b. le Rhône, le Danube, le Rhin French

This brings us to the second possible hypothesis explaining the use of the definite article with certain lexical semantic classes of proper names. Perhaps the formation of river names in French is done via affixation. Since an affix does not have to be specified for gender, we do not predict a consistent gender for such proper names.

[18]It should be noted that, alongside genuine definite articles with proper names, there are proper names historically containing the definite article that has been reanalyzed as part of the proper name (see fn. 7 for the same effect with modifiers). Such former definite articles are frequently spelled together with the noun they originally modified (Gary-Prieur 1994):

(i) a. Levallois, Viget-Lebrun
b. La Rochelle, le Corbusier, Le Pen French

For masculine proper names preposition contraction allows to verify whether the definite article is a genuine article or part of the name. As is well-known, the prepositions *à* and *de* followed by the definite article *le* or *les* become *au*/*du* and *aux*/*des*, respectively. While *le* in (i) does not undergo contraction with the prepositions *à* and *de*, the definite article required by the lexical semantic class of the proper name must do so:

(ii) a. à/de Levallois vs. *Auvallois/*Devallois proper names with le
b. à/de le Corbusier, *au/*du Corbusier French
(iii) a. * à/de le Maroc vs. au/du Maroc lexical semantic class
b. * à/de le Rhône vs. au/du Rhône French

As noted by an anonymous reviewer, there is some variation with singleton exceptions such as *Le Havre*: both (iv-a) and (iv-b) are permitted:

(iv) a. à/de le Havre, à/de le Mans singleton exceptions
b. au/du Havre, au/du Mans French

This fact suggests that such singleton exceptions can be reanalyzed along the lines of (i), with the sequence *le* progressively becoming a phonological part of the proper name.

However, it is also possible that article drop is sensitive to broader syntactic context, as demonstrated by the following contrasts:

(v) a. pommes de terre du Pas de Calais, persil de la Drôme, carottes des Landes
b. poireaux de Hollande, maïs doux dÕAquitaine, petits pois dÕAllemagne

As discussed above, when in argument positions, names of countries and many geographic regions require a definite article in French. However, while in (v-a) the definite article remains in the description of the vegetableÕs origin, in (v-b) it drops. Clearly, further refinements are necessary.

3.4.2 Null affixes

Since affixation may disrupt article absence (e.g., in the plural), it is possible that the morpheme intervening and blocking preproprial m-merger for names of ships, rivers, etc., is an affix rather than a full noun. Such an affix might or might not introduce a gender different from that of the proper name itself.

Suppose now that some names are morphologically complex, just like plurals, and that the null affix on such a name is [-proper]. As a result, the totality of the name becomes [-proper] (formally, rather than semantically, of course), and the environment for m-merger disappears. If the relevant null affix is specified for gender (like with river names in Modern Greek), the proper name in that category will be marked with a certain gender – otherwise, like in French, the gender will be non-consistent.

One problem with the null noun/affix approach is that it cannot be readily extended to other cases where the lexical semantic class of the noun plays a role. Even if it could, the same information information of belonging to a particular lexical semantic class would be present in two places: on the noun and on the null noun/affix – an obvious redundancy.

Another issue is how to distinguish non-derived proper names from those derived with a null noun/affix that is not marked [-proper]. Too many proper names can have two possible derivations – a clearly undesirable outcome.

Thirdly, this account cannot be easily extended to French nominal modification exemplified in (42). A proper name modified by a bare noun does not require an article unless the modifier is interpreted contrastively (Noailly 1991). It should be noted that the modifier in (42) is restrictive in that it singles out a particular aspect of Cicero:[19]

(42) (*le) Cicéro orateur French
(ok if interpreted contrastively)

Finally, given the conflicting evidence from Greek and French, it seems likely that to make the null affix/noun proposal work, we would need to assume that both options are available – potentially in one and the same language.

We conclude that the approach where the preproprial m-merger is made available by the lexical semantic class of the proper name (rather than blocked by it) is preferable.

3.5 Summary

An analysis based on m-merger permits us to combine syntactic and morphological constraints on the behavior of definite articles with proper names. On the syntactic side, the article can be m-merged with the proper name under strict head-head adjacency, which can be interrupted by modification. On the morphological side, m-merger is like other morphological phenomena in that it can be conditioned by the

[19] One could object that the bare noun in (42) is a DP with a null article (rather than N0) because in the English counterpart of (42), Cicero the orator, a full DP seems to be present. If so, we must conclude that a DP modifier of a proper name is not an intervener for the purposes of article absence. One way of ensuring that it is not would be to have it attached above the DP. This, however, does not seem consistent with its restrictive interpretation and still requires us to explain why the definite article of this putative DP-modifier is absent in French.

lexical semantics of the stem (e.g., country names require preproprial m-merger in English and disallow it in French) and is subject to exceptions for certain roots (e.g., *the Sudan*) and certain affixes (e.g., the plural *-s*). Other morphological rules have the same kind of exceptions: e.g., in Russian, certain nouns (e.g., *kenguru* kangaroo) and morphological classes of nouns (e.g., surnames derived with the (Ukrainian) suffix *-enko*) cannot take any overt case marking, and in Latin, nouns denoting trees are all feminine.

While this view of the matter requires us to demonstrate that proper names that appear without the definite article form congruent sub-classes from the point of view of lexical semantics, the opposing point of view (section 4.4) requires us to postulate either null nouns or null affixes, with undesirable consequences.

Finally, the analysis proposed here has nothing to say beyond a simple statement of the fact about why it is only the definite article that can be m-merged with the proper name. A functionalist explanation is that being definite by default, proper names do not have the need to marked so – however, this view incorrectly leads us to expect proper names to behave the same superlative or ordinal DPs, and cannot readily explain why languages such as Catalan or Pima require a definite article with proper names. I leave the question as a topic for future research.

4 Preproprial articles

The m-merger operation allows us to account not only for the absence of the definite article with some proper names, but also for the fact that the definite article takes on a special form with proper names of people in some languages (most dialects of Catalan, some Scandinavian dialects, Tagalog, some Polynesian languages):

(43) a. Catalan: preproprial *en/na* vs. regular *el/la* the.M/F
b. Northern Norwegian: preproprial *ho/han* she/he
c. Tagalog: preproprial *si/kay/ni* vs. regular *ang/sa/ng* the-SUBJ/LOC/GEN

As far as I have been able to ascertain, definite articles take on a special form with personal names only. This category is generally restricted to people but sometimes, as in Tagalog, also includes pets. A possible hypothesis is therefore that preproprial definite articles c-select (properly speaking, f-select) for [+proper] and [+person] ([+animate], for Tagalog) and m-merger is irrelevant.[20] Once again, modified proper names will permit us to distinguish m-merger from f-selection (and/or covert head-movement): if preproprial articles f-select (or attract) a particular feature ([+ person] or [+ animate]), this requirement should be satisfied despite modification, and a modified proper name should behave exactly like an unmodified one.

In Catalan, modification results in obligatory regularization of the definite article unless the modifier is part of the proper name (Coromina i Pou 2001, data due to Maria Núria Martí Girbau, p.c.):

[20] Alternatively, the special preproprial D^0 attracts a [+proper][+person] N^0 (as per Longobardi's hypothesis). Unfortunately, this would predict the wrong word order, unless the N-to-D raising is covert. To avoid covert head-movement as an unnecessary complication of the theory, we prefer the c-selection hypothesis.

(44) el Pau que vam conèixer a la festa
the Pau that go-1PL meet at the party
the Paul that we met at the party Catalan

Neither f-selection nor head-movement can be disrupted by modification, so we conclude that the special preproprial article in Catalan is conditioned by m-merger. In Tagalog, on the other hand, if a personal name is modified, the definite article may but need not be regularized (Google data due to Norvin Richards, p.c.):

(45) si/ang dating Pangulong Marcos
the former President Marcos
the former president Marcos Tagalog

For those speakers of Tagalog for whom modification results in regularization, we must conclude that in their dialect the preproprial article is conditioned by m-merger. On the other hand, for those Tagalog speakers who use the special preproprial definite article for modified proper names as well, we assume that the special preproprial article f-selects the feature [+animate] in addition to [+proper].

Neither f-selection nor head-movement can be disrupted by modification, so we conclude that the special preproprial article in Catalan is conditioned by m-merger. The same conclusion has to be drawn for those speakers of Tagalog for whom modification results in regularization. On the other hand, for those Tagalog speakers who use the special preproprial definite article for modified proper names as well, we assume that the special preproprial article f-selects the feature [+animate] in addition to [+proper].

The fact that [+ person] or [+ animate] proper names are singled out by special articles lends further support to the theory that preproprial m-merger is constrained by the lexical semantic class, as argued in section 4.3.

5 Conclusion

On the basis of cross-linguistic data we can establish that proper names enter syntax as predicates, just like common nouns (Matushansky, 2005a,b, to appear). This means that the definite article that appears with some proper names in argument positions is a regular definite article with standard semantics. As a result, languages where a regular definite article appears with all proper names are the predicted option. An explanation is required for languages where proper names can appear without an article (such as English) or languages where the definite article appearing with proper names takes on an unusual form (such as Tagalog).

Since (restrictive) modification triggers an obligatory definite article (Sloat 1969), c-selection and head-movement cannot account for its absence. On the other hand, m-merger (Matushansky, 2006) can be blocked by modification, and can yield both the special form of the definite article with proper names and its absence. In addition, being a morpho-syntactic operation, m-merger can have exceptions and be constrained by the lexical semantics of the morphemes involved, as well as by the choice of a particular morpheme. Conversely, we now have evidence that m-merger can occur in absence of prior movement.

Hopefully, this analysis of proper names can be extended to other cases of missing definite articles, including bare singulars (Carlson and Sussman 2005), and possibly bare plurals and mass nouns.

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Meilleurs vœux : Quelques notes sur la comparaison plurielle

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1 Introduction

A première vue, il est impossible de rendre compte des superlatifs pluriels exemplifiés en (1) par la combinaison de la sémantique standard du morphème superlatif et de la sémantique standard des pluriels :

(1) Contexte : Le Tibet possède 8 des 14 sommets les plus hauts du Monde.
   a. L'Everest et le K2 sont les plus grandes montagnes.
   b. L'Everest, le K2 et le Kānchenjunga sont les plus grandes montagnes

Le premier problème, exploré par Stateva (2005 et les travaux précédents), est que la sémantique des superlatifs due à Heim (1999) et généralement acceptée, en combinaison avec les présuppositions standard sur la pluralité (Scha (1981), Link (1987), Landman (1989a,b), Lasersohn (1989), Schwarzschild (1996), etc.) donne lieu au mieux à une interprétation contradictoire (L'Everest et le K2 sont chacun la montagne la plus haute) au lieu de l'interprétation observée (L'Everest et le K2 sont plus hautes que toutes les montagnes autres que l'Everest et le K2). Nous démontrerons ici que la solution de Stateva ne rend pas compte des faits, en ce qu'il existe plusieurs modèles additionnels vérifiant les superlatifs pluriels, qu'elle ne prend pas en considération. Nous montrerons en outre que les diverses lectures des superlatifs pluriels sont aussi possibles pour les comparatifs pluriels, ce qui suggère une généralisation plus profonde que celle qui dérive de la sémantique alternative du superlatif proposé par Stateva (2005).

Le second problème, que nous ne discuterons que brièvement, est le fait que malgré la présence obligatoire de l'article défini, les superlatifs pluriels ne semblent pas donner lieu à une présupposition d'unicité (ou de maximalité). La sémantique de l'article défini est telle que le DP entier est censé dénoter l'individu maximal correspondant à la restriction (le NP). Étant donné que les assertions (1a) et (1b) peuvent toutes deux être vraies dans le même modèle, la description définie *les plus grandes montagnes* ne semble pas dénoter l'individu maximal (et donc unique) correspondant à la restriction *plus grandes montagnes* en (1a). L'autre côté du problème est le fait que les superlatifs (pluriels) n'apparaissent jamais avec un déterminant autre que le déterminant défini (mais voire Herdan and Sharvit 2005).

1.1 Le superlatif

Nous commençons par introduire la sémantique du morphème superlatif (glosé comme *-st* ci-dessous afin d'éviter l'homonymie entre le superlatif et le comparatif en français) due à Heim (1999, 2000). D'après cette approche, le référent d'une description superlative dans une position argumentale entretient une relation particulière de comparaison avec chaque entité de l'ensemble de comparaison pertinent dans le contexte. Ainsi en (2), le référent du superlatif *the most impressive* 'le plus impressionnant' (c'est-à-dire, Fred) entretient une relation avec tous les autres candidats – la relation d'être *impressionnant* à un degré plus grand ; l'ensemble de *ces candidats* est l'ensemble pertinent de comparaison.

(2) All of these candidates are acceptable. But Fred is the most impressive.
Tous ces candidats sont acceptables. Mais Fred est le plus impressionnant (d'entre eux).

L'entrée lexicale pour le morphème superlatif proposée par Heim est donnée en (3) :

(3) ⟦-st⟧ =
$\lambda C_{<e,t>} \lambda R_{<d,<e,t>>} \lambda x_e . \forall z \in C[z \neq x \longrightarrow \max(\lambda d.R(d)(x)) > \max(\lambda d.R(d)(z))]$
⟦-st⟧ (C)(R)(x) n'est défini que si $x \in C \wedge \forall y \in C \exists d : R(d)(y)$

Suivant von Fintel (1994), Heim (1999) propose que le morphème superlatif se comporte comme les autres quantificateurs en ce qu'il contient une restriction du domaine – une variable de prédicat C qui n'est pas réalisée phonologiquement et qui reçoit sa valeur du contexte de la phrase. C est donc le premier argument de l'opérateur superlatif introduisant l'ensemble pertinent de la comparaison :

(4) a. Fred est le [C-st] impressionnant
b. C = {x : x est un de ces candidats}

Le deuxième argument, R, est la relation par rapport à laquelle la comparaison est faite, donnée ici par l'adjectif scalaire *impressionnant*. Cette sémantique du morphème superlatif présuppose que les adjectifs scalaires dénotent des fonctions monotones des degrés aux ensembles d'individus, où la monotonie se trouve définie comme en (5).

(5) Une fonction $f_{<d,<e,t>>}$ est *monotone* ssi
$\forall x \forall d \forall d' [[f(d)(x) \wedge d' < d] \longrightarrow f(d')(x)]$

Par exemple, *grand* dénote une fonction qui assigne à chaque degré un ensemble d'individus qui sont grands à ce degré (ou plus grands). L'opérateur de maximalité est ensuite utilisé en (3) afin de sélectionner le plus grand degré au sein de l'ensemble des degrés associés à un individu. Lorsque l'on met ensemble toutes ces présuppositions, *(the) most impressive* '(le) plus impressionnant' est correctement interprété comme en (6) :

(6) $\lambda x_e . \forall z \in C[z \neq x \longrightarrow$
$\max(\lambda d.\text{impressionnant}(d)(x)) > \max(\lambda d.\text{impressionnant}(d)(z))]$

Il y a deux présuppositions portant sur la description superlative : (1) son référent appartient à l'ensemble de comparaison C, et (2) la propriété par rapport à laquelle la comparaison est faite s'applique à chaque individu dans l'ensemble de comparaison C. Une violation de la première présupposition est exemplifié en (7a) et celle de la seconde en (7b) :

(7) a. # Parmi ces garçons, Eva est la plus intelligente. $x \in C$
b. # Parmi ces gens et ces chaises, Fred est le plus intelligent. $\forall y \in C \exists d R(d)(y)$

Il est facile de voir que l'ensemble correspondant à un prédicat superlatif ne contient qu'un seul membre. Pour un superlatif singulier, ce membre est un individu singulier. Pour les superlatifs pluriels, les choses sont plus complexes.

1.2 Le problème de pluralité pour les superlatifs

Deux lectures sont communément distinguées pour les NP pluriels dans des positions argumentales (Scha (1981), Link (1987), Landman (1989a,b, 2000), Lasersohn (1989), etc.)[1] :

(8) a. Ces étudiants sont une bonne équipe. lecture collective
b. Ces étudiants sont blonds. lecture distributive

La question se pose de savoir si les constructions contenant des superlatifs pluriels permettent aussi ces deux lectures, et si oui, quelles sont leurs conditions de vérité. Stateva (2005) (mais aussi Stateva 2002, chapitre3) soutient que la lecture distributive (9a) et la lecture collective (9b) obtenues compositionnellement conduisent à des conditions de vérité incorrectes. Elle affirme que la seule lecture disponible pour (9) est (9c) :

(9) L'Everest et le K2 sont les plus grandes montagnes.
a. # L'Everest est la plus grande montagne et le K2 est la plus grande montagne.
b. L'Everest et le K2 considérés comme un groupe sont plus grands que toutes les autres montagnes.
c. L'Everest et le K2 sont chacun plus grand que toutes les montagnes autres que l'Everest et le K2.

Nous contestons cette généralisation. En ce qui concerne la lecture distributive, Stateva prétend que comme (9a) est une contradiction, ceci n'est pas ce que (9) veut dire. Cependant, le fait qu'une lecture est contradictoire ne veut pas dire qu'elle n'est pas là. Nous croyons que l'interprétation en (9a) est en fait disponible pour (9) ; cette lecture est naturellement difficile à obtenir pour des raisons pragmatiques, mais elle peut être rendue plus saillante au moyen d'un exemple judicieusement choisi[2] :

[1] Tout comme Stateva (2005), nous ne considérons pas la possibilité d'une lecture cumulative. Tandis qu'un DP superlatif dans une position argumentale peut avoir une lecture cumulative (*Ces bourses seront données aux sept meilleurs étudiants*), et un traitement complet des superlatifs pluriels doit prendre la cumulativité en considération, cette lecture peut être présumée absente dans les structures en considération, sauf en présence de la copule d'identité. Nous nous concentrerons ici sur les superlatifs prédicatifs et laisserons le problème de la cumulativité de côté.

[2] Nous enlevons le marquage pluriel sur le superlatif en (10a) afin de forcer la lecture distributive, qui conduit alors à une contradiction (sauf si l'Everest = le K2). L'absence du marquage pluriel ne doit rien

(10) a. # L'Everest et le K2 sont chacun la plus grande montagne.
b. Isabelle et Georges sont les meilleurs étudiants dans leurs catégories.

Tandis que (10a) est contradictoire, (10b) possède une lecture distributive tout à fait normale (où l'ensemble de comparaison C varie d'un individu à un autre). Nous concluons (contrairement à Stateva) que la lecture distributive ordinaire est en fait disponible pour les prédicats superlatifs, même si ce n'est pas la lecture principale de (9).

En ce qui concerne la lecture collective en (9b), Stateva (2005, section5) suppose que cette lecture exige que la somme des hauteurs de l'Everest et de K2 excède la hauteur des autres montagnes. Ceci n'est pas une lecture possible pour (9) (parmi d'autres problèmes cette analyse prédit qu'aucun sous-ensemble de montagnes ne peut être le plus grand parce que tout ensemble sera moins grand que celui que l'on obtient en lui ajoutant une autre montagne). De plus, il est facile de voir que la comparaison des hauteurs n'est pas du tout basée sur la prise en considération de la somme des hauteurs :

(11) # La maison et la cheminée sont plus hautes que la maison.

Nous soutiendrons ci-dessous que la lecture collective ne doit pas être réduite à une telle sommation ; Stateva conclut pourtant que la seule lecture permise de (9), (9c), ne peut pas être collective, parce qu'elle ne se réduit pas à une sommation – en conséquence celle-ci doit être la lecture distributive ; afin de forcer la distributivité à donner le sens paraphrasé en (9c) et d'éviter la contradiction en (9a), Stateva change la sémantique du superlatif de Heim.

Nous croyons que l'explication de Stateva est incomplète en ce qu'elle permet à trop peu de modèles de vérifier (9). Tout d'abord il existe une lecture distributive, donnée en (9a). Deuxièmement, si la lecture distributive est contradictoire, alors la lecture qui est vraie dans la situation en (9c) doit être la lecture collective[3] ; la lecture collective ne se réduit alors pas aux cas de sommation. Et même en laissant (9c) du côté, l'analyse par sommation n'épuise pas toutes les possibilités de lecture collective ; afin d'avoir une première indication du domaine de situations possibles vérifiant les superlatifs pluriels, considérons (12) :

(12) Les garçons de l'équipe de football sont les plus lourds.

(13) Modèle A :
les garçons de l'équipe de football : 100kg, 60kg, 40kg, 20kg ;

changer pour Stateva, puisque la pluralité ne joue aucun rôle dans sa sémantique – à moins qu'un nom singulier ne force la copule à être interprétée comme la copule d'identité, laquelle n'est pas discutée par Stateva, et ne sera non plus discutée ici.

[3]Une option alternative est que (9c) reflète une seconde lecture distributive résultant de relations de portée différentes pour l'opérateur distributif et l'opérateur superlatif, comme le propose Stateva (2000a,b) ; voir Stateva (2005) pour une discussion. Nous pouvons cependant proposer un argument indépendant en faveur de l'existence des lectures collectives autres que les lectures additives reconnues par Stateva : comme le fait remarquer un commentateur anonyme, la phrase (i) est vraie dans un modèle où ils mesurent tous les deux 1,83998888 m, mais n'implique quand même ni *Marie est la plus grande* ni *Jean est le plus grand* :

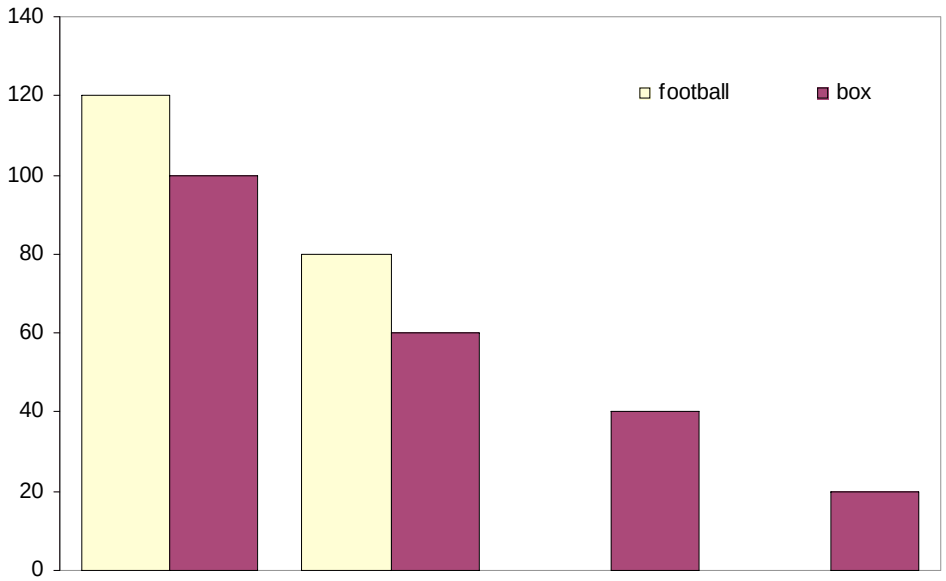
(i) Marie et Jean sont les plus grands.

Le prédicat *grand* ne permet pas de lecture additive, mais (i) n'a néanmoins pas d'implications vers les individus associées à la lecture distributive.

les garçons de l'équipe de boxe : 120kg, 80kg

(14) Modèle B :
les garçons de l'équipe de football : 120kg, 80kg ;
les garçons de l'équipe de boxe : 100kg, 60kg, 40kg, 20kg

La lecture purement distributive (contradictoire) est fausse dans les deux modèles, comme l'est la lecture distributive de Stateva (9c) (que nous considérons comme une lecture collective). Cependant, la phrase (12) peut être vraie dans les modèles A et B. La proposition (12) est vraie dans le modèle A parce que *lourd*, en tant que un prédicat « additif », permet la sommation des poids des individus (ceci est la seule lecture « collective » que Stateva semble permettre). Mais nous jugeons (12) comme vraie aussi dans un modèle de type B, qui représente un type de situation qui n'a pas été encore discuté. Cette intuition peut être étayée par le diagramme suivant (nous l'étayerons aussi par d'autres exemples dans les sections suivantes) :



Nous concluons qu'il existe un grand nombre de modèles qui vérifient (la lecture collective de) (9) et de (12) ; les sections 2 et 3 ci-dessous sont consacrées à un premier inventaire exploratoire et à un essai de généralisation.

Une autre généralisation que nous envisageons de justifier ci-dessous est que les classes de situations qui vérifient les superlatifs pluriels semblent être exactement les mêmes pour les comparatifs pluriels. Ainsi la proposition en (15)

(15) Les garçons de l'équipe de football sont plus lourds que les garçons de l'équipe de boxe.

permet une lecture distributive (chacun des footballeurs pèse plus que chacun des boxeurs), et est vraie, elle aussi, dans les modèles A et B. Si cette généralisation est correcte, une explication qui traite seulement les superlatifs mais pas les comparatifs pluriels ne sera pas suffisamment générale.

Pour simplifier, nous commençons la section 2 par un inventaire des « conditions de comparaison » qui sous-tendent les comparatifs pluriels ; les observations correspondantes pour les superlatifs pluriels seront discutées dans la section 3. La section

4 explore brièvement la manière dont la généralisation que nous proposons peut être mise en oeuvre dans le cadre de la théorie de Heim (1999) ; la section 5 reconsidère la question de la définitude dans le cas des superlatifs pluriels.

2 Les comparatifs pluriels

Comme noté par Scha and Stallard (1988) et Schwarzschild (1996, 87), la proposition en (16) peut être vraie si dans chaque région pertinente les frégates de cette région sont plus rapides que les transporteurs, quelles que soient les relations entre les vitesses des bateaux à travers les régions :

(16) Les frégates étaient plus rapides que les transporteurs.

Scha and Stallard (1988) proposent que les conditions de vérité d'un comparatif pluriel peuvent être dérivées d'une conjonction des comparatifs singuliers. Une telle conjonction est celle d'universel vers universel :

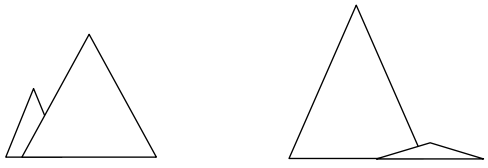
(17) A est plus R que B si $\forall a \prod A \forall b \prod B$ [a est plus R que b] universelle-universelle
où $\prod$ veut dire *être une partie atomique de*

Scha and Stallard (1988) posent que la conjonction universelle-universelle en (17) est trop forte parce qu'elle ne prédit pas le fait que la proposition en (16) soit vraie dans la situation décrite ci-dessus, où quelques frégates sont plus lentes que quelques transporteurs, mais pas dans la même région. C'est pourquoi ils proposent à la place une conjonction moins forte, universelle-existentielle :

(18) A est plus R que B si $\forall a \prod A \exists b \prod B$[a est plus R que b] $\wedge \forall b \prod B \exists a \prod A$ [a est plus R que b]
universelle-existentielle

Il est important de noter que ni la condition en (17) ni celle ne (18) n'est sous une forme biconditionnelle – les deux affirment qu'une relation de comparaison peut être établie entre deux pluralités si certaines relations de comparaison sont observées entre les singularités composant ces pluralités. Ces conditions laissent donc ouverte la possibilité que deux pluralités ne puissent pas toujours être comparées. Un exemple d'une telle impossibilité est fourni par le modèle représenté en (19) :

(19) Les chaînes de montagnes à Hain



les Az les Bukis

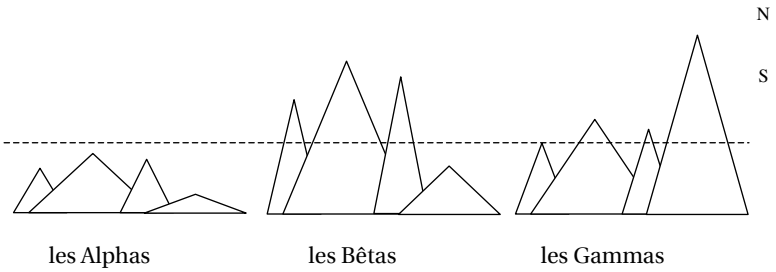
La comparaison entre les Az et les Bukis en (19) échoue : nous considérons les assertions en (20a) et (20b) fausses dans le modèle représenté en (19) :

(20) a. Les montagnes de droite sont plus grandes que les montagnes de gauche.
b. Les montagnes de gauche sont plus grandes que les montagnes de droite.

Néanmoins nous ressentons que la condition universelle-existentielle en (18) est trop faible. Considérons la phrase (21) dans le modèle (22) :

(21) Les montagnes à droite sont plus grandes que les montagnes au milieu.

(22) Les chaînes de montagnes à Jeltad



(18) prédit incorrectement que la proposition en (21) est vraie dans ce modèle, parce que toutes les montagnes Gammas sont plus hautes que la montagne Bêta la plus à droite, et toutes les montagnes Bêtas sont moins hautes que la montagne Gamma la plus à droite. Notre intuition est cependant que la phrase (21) est fausse dans le modèle (22) (encore une fois, la comparaison échoue), ce qui indique que (18) est trop faible.

Plus intéressant est le fait que si le contexte fournit des informations supplémentaires, la comparaison réussit. Imaginons que la comparaison en (21) est faite afin d'établir quelle chaîne de montagnes fournira un meilleur site pour un laboratoire astronomique ; ou bien que le contexte requiert qu'un avion traverse les montagnes dans la direction nord-sud ou bien est-ouest. Dans tels contextes un jugement sur la vérité de (21) est possible. En plus, ce jugement peut ne pas produire le même résultat à travers des contextes, ce qui suggère que les pluralités peuvent être mesurées de façon différente en fonction du contexte.

L'on aurait pu conclure de ces faits que la comparaison entre les pluralités ne se réduit pas à une conjonction des comparaisons entre les singularités dont elles sont composées. Cependant, la phrase (23), où la condition universelle-universelle présentée en (17) est réalisée, est vraie dans le modèle (22), indépendamment du contexte ; notons qu'aucune information supplémentaire ne peut la rendre fausse :

(23) Les montagnes à droite sont plus grandes que les montagnes à gauche.

Nous devons conclure que, dans certaines conditions, la comparaison plurielle n'est pas sensible au contexte. Quelles sont ces conditions ?

2.1 Les conditions de la comparaison plurielle

Un cas particulier où la comparaison plurielle n'est pas sensible au contexte est la condition universelle-universelle en (17), répétée ci-dessous, qui réduit la comparaison entre les pluralités à une conjonction des comparaisons indépendantes du contexte entre leurs parties atomiques :

(17) A est plus R que B si $\forall a \prod A \forall b \prod B$ [a est plus R que b] universelle-universelle

(17) prédit correctement que la proposition (23) est vraie dans le modèle (22) ci-dessus : comme toutes les montagnes Gammas (les montagnes de droite) sont plus grandes

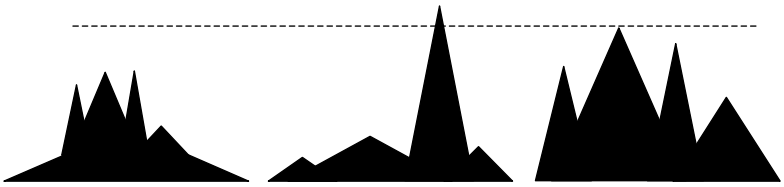
que toutes les montages Alphas (les montagnes de gauche), la proposition en (23) est vraie et aucune information contextuelle ne peut changer ce fait.

Un autre cas particulier de la réduction de la comparaison entre les pluralités à une conjonction des comparaisons entre les singularités qui les composent est le cas où une bijection peut être établie entre les deux pluralités (qui doivent nécessairement être de la même taille) :

(24) A est plus R que B si bijection
il existe une fonction bijective f de $\{a : a \prod A\}$ vers $\{b : b \prod B\}$ telle que
$\forall a \prod A$ [a est plus R que f(a)]

(24) prédit correctement que la proposition en (23) est vraie dans le modèle (25) : une bijection peut être établie entre les Alephs et les Gimels (de droite à gauche, par exemple), où dans chaque paire, la montagne des Gimels est plus grande que celle des Alephs.

(25) Les chaînes de montagnes à Trantor

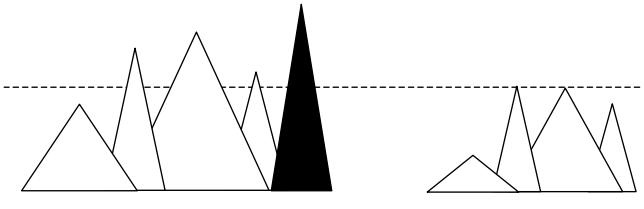


Nous montrons maintenant qu'à part les conditions en (17) et en (24), il existe d'autres conditions, gouvernant la combinaison des deux.

2.2 Récursivité

Considérons la situation en (26), où les montagnes A sont clairement plus hautes que les montagnes B, mais où ni (17) ni (24) à eux seuls ne fournissent le résultat désiré :

(26) Les chaînes de montagnes à Werel



En fait, les conditions de vérité décrites par (17) ne sont pas satisfaites parce que la montagne A la plus à gauche est moins haute que certaines montagnes B. D'un autre côté, les conditions de vérité proposées en (24) ne sont pas non plus satisfaites, parce que le nombre de montagnes dans les deux pluralités n'est pas le même.

Toutefois, nous notons que si la montagne A la plus à droite n'existait pas, nos intuitions sur (26) seraient expliquées par (24). De manière comparable, la montagne A la plus à droite est elle-même plus haute que toutes les montagnes B, et elle satisfait donc la condition en (17). Autrement dit, nous avons besoin d'une combinaison des deux conditions, comme en (27) :

(27) A est plus R que B s'il existe une partition de A en A_1, A_2 telle que A_1 est plus R que B $\wedge$ A_2 est plus R que B

En (26), la montagne A la plus haute joue le rôle de A_2 en (27), et la relation entre elle et les montagnes B est décrite par la conjonction universelle-universelle en (17). Les autres montagnes A sont comparées aux montagnes B en utilisant la conjonction bijective en (24).

De façon plus générale, (27) nous offre une méthode récursive pour construire la comparaison dans les cas où une pluralité est plus grande que l'autre. Les relations entre A_1 et B et entre A_2 et B peuvent à leur tour être vérifiées en utilisant la conjonction universelle-universelle en (17), la conjonction bijective en (24), ou une nouvelle application de (27), par itération du mécanisme récursif.

Naturellement, il existe une condition symétrique de (27), permettant à la seconde pluralité d'être plus grande que la première (un exemple de son application sera donné pour (15) ci-dessous) :

(28) A est plus R que B s'il existe une partition de B en B_1, B_2 telle que A est plus R que B_1 $\wedge$ A est plus R que B_2

Il est important de noter qu'aucune des conditions (17), (24), (27) et (28) n'est sous une forme biconditionnelle. Si aucune d'elle n'est satisfaite dans un modèle en considération, la comparaison des pluralités pertinentes ne peut pas se réduire à la comparaison de leurs parties atomiques, et d'autres critères de comparaison, tels que le but de la comparaison, peuvent être utilisés afin de déterminer la vérité ou la fausseté d'une phrase[4]. Nous pensons que, dans ce cas, la comparaison concerne des entités complexes homogènes comprenant des sous parties (probablement des groupes) plutôt que des pluralités (des sommes).

Nous revenons maintenant à certains exemples mentionnés ci-dessus.

(16) Les frégates étaient plus rapides que les transporteurs.

La proposition en (16) est jugé comme vraie dans le contexte décrit par Scha and Stallard (1988) (une situation dans laquelle il y a plusieurs régions, avec des frégates et des transporteurs dans chacune, et telle que dans chaque région les frégates sont plus rapides que les transporteurs de cette région), parce que le contexte fournit la partition, et dans chaque cellule de cette partition (17), (24), ou leur combinaison décrite par (27) ou (28) est vérifiée[5,6].

[4]Nous ne prétendons pas avoir découvert toutes les conditions sous lesquelles la comparaison entre des pluralités est possible sans information supplémentaire fournie par le contexte.

[5]Notons qu'il est possible de construire des modèles qui montrent que la comparaison ne se fait pas sur la base des valeurs moyennes : il peut y avoir une région où une frégate extrêmement rapide devance un grand nombre des transporteurs très rapides, lesquels portent ensemble la vitesse moyenne des transporteurs à travers les régions à un niveau plus haut que celle des frégates, comme c'est le cas dans le modèle (i) :

(i) Région A : frégates : 10, 10, 10 ; transporteurs : 5
Région B : frégates : 100 ; transporteurs : 90, 90, 90

Dans cette situation, les frégates sont plus rapides que les transporteurs d'après le raisonnement de Scha and Stallard (1988), mais la vitesse moyenne des frégates est moindre que celle des transporteurs.

[6]Il faut pourtant noter que nos conditions (17), (24), (27) et (28) ne sont pas satisfaites dans la situation décrite par Scha and Stallard (1988), d'où le fait qu'ici le jugement sur la vérité ou fausseté de (16)

(15) Les garçons de l'équipe de football sont plus lourds que les garçons de l'équipe de boxe.

(14) Modèle B : les garçons de l'équipe de football : 120kg, 80kg ; les garçons de l'équipe de boxe : 100kg, 60kg, 40kg, 20kg

La proposition en (15) peut être jugée comme vraie dans le modèle (14), répété ci-dessus, parce que nous pouvons partitionner les boxeurs en utilisant la condition (28), avec B_1 = garçon100⊕garçon60 et B_2 = garçon40⊕garçon20 ; les footballeurs sont plus lourds que B_1 du fait de la condition bijective définie en (17), et plus lourds que B_2, en raison la condition universelle-universelle donnée en (24).

3 Les superlatifs pluriels

Considérons maintenant comment les conditions de comparaison identifiées ci-dessus pour les comparatifs pluriels s'appliquent aux superlatifs. Nous devons considérer la lecture distributive (qui nécessite la comparaison des atomes) et la lecture collective (qui nécessite la comparaison des pluralités). Nous montrerons que tandis que la première peut être dérivée directement, la seconde dépend des conditions sur la comparaison des pluralités discutées ci-dessus.

3.1 Les lectures distributives

Comme le thème de cet article est la comparaison plurielle, nous ne consacrons que très peu de temps à la lecture distributive des superlatifs pluriels. Comme Stateva (2005) l'a remarqué, l'entrée lexicale en (3) conduit à une lecture contradictoire pour un superlatif pluriel :

(9) L'Everest et le K2 sont les plus grandes montagnes.

a. # L'Everest est la plus grande montagne et le K2 est la plus grande montagne.

Stateva propose d'éviter la contradiction en excluant tous les atomes contenus dans le sujet pluriel (c'est-à-dire, l'Everest et le K2) de l'ensemble de comparaison C. Comme expliqué ci-dessus, nous pensons que la lecture contradictoire n'est pas en fait impossible. De plus, nous avons démontré que cette lecture ne produit pas de contradiction quand l'ensemble de comparaison C n'est pas le même pour toutes les singularités relativement auxquelles se fait la distribution. Si l'opérateur distributif s'applique au niveau du prédicat, comme on l'admet couramment, l'ensemble de comparaison C peut varier avec les singularités considérés, comme c'est le cas en (29a) :

(29) a. Alice et Isabelle sont les meilleures étudiantes dans leur classes.

b. Alice et Isabelle sont allées au cinéma du quartier.

Une analyse possible consisterait à permettre à l'opérateur distributif de lier une variable figurant sur C comme indice, tout comme il lie une variable associée à *quartier* en (29b) (Heim et al. (1991) ; voir aussi Herdan and Sharvit (2005)). Une fois que

dépend de la partition (ou plus généralement, couverture) fournie par le contexte, comme le propose Schwarzschild (1996).

ceci est pris en considération, cette lecture distributive du superlatif pluriel, qu'elle soit contradictoire (quand la valeur de C reste constante) ou non, peut être dérivée d'une façon compositionnelle.

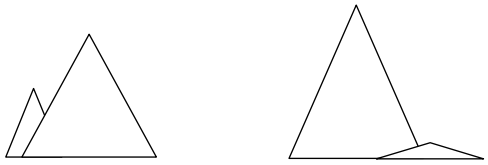
3.2 Les lectures collectives

La lecture collective d'un superlatif pluriel nécessite une comparaison entre des pluralités. Il n'y a pas pourtant de nécessité logique à ce que les mêmes conditions régissent les superlatifs pluriels et les comparatifs pluriels : même si les superlatifs et les comparatifs utilisent les degrés appartenant aux mêmes échelles, les pluralités associées à ces degrés sont introduites de façons différentes dans les constructions superlatives et comparatives. Cependant, dans la mesure où nous avons pu en juger, les effets interprétatifs que nous avons découverts pour les comparatifs pluriels s'observent aussi avec les superlatifs pluriels. Nous illustrons brièvement ce fait.

D'abord, les modèles ci-dessus où la comparaison entre les pluralités échoue ne fournissent pas non plus les conditions de vérité adéquates pour la prédication superlative sur une pluralité : ainsi dans le modèle en (19), répété ci-dessous, nous n'acceptons pas (30a) et dans le modèle en (22), également répété ci-dessous, nous n'acceptons pas (30b) – à moins que le contexte ne fournisse de l'information supplémentaire sur la manière dont la mesure est fait, et sa raison d'être.

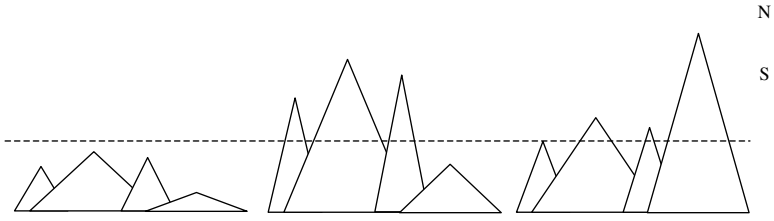
(30) a. Les montagnes de droite sont les plus grands sommets.
b. Les montagnes Gamma sont les plus grands sommets.

(19) Les chaînes de montagnes à Hain



les Az les Bukis

(22) Les chaînes de montagnes à Jeltad



les Alphas les Bêtas les Gammas

Si – comme le suggère Stateva (2005) – seules la lecture distributive et la lecture collective de « sommation » étaient disponibles pour les superlatifs pluriels, ceci aurait rendu compte du (30) aussi. D'un côté, la lecture distributive de Stateva (celle de (9c)) est fausse pour (30a) et (30b) dans les modèles (19) et (22) respectivement. D'un autre côté, le prédicat *grand* (ou *haut*) ne permet pas la « sommation » (voir (11) ci-dessus). Pourtant, suivant cette approche, nous ne nous attendons pas non plus à ce que les superlatifs pluriels soient vrais dans des contextes qui permettent la comparaison plurielle sur la base des conditions (17), (24), (27) et (28), ce qui contredit les faits.

Deuxièmement, dans le contexte où le comparatif en (16) (repris de Scha and Stallard 1988) est considéré comme vrai (plusieurs régions, dans chacune desquelles les frégates sont plus rapides que les transporteurs), nous jugeons le superlatif en (31) comme vrai également :

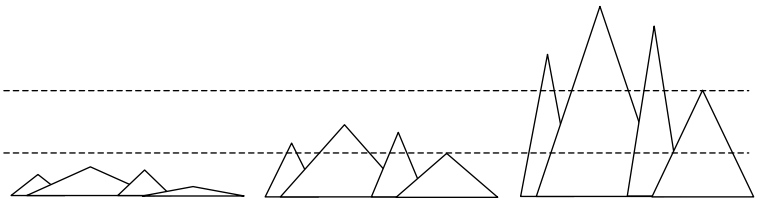
(16) Les frégates étaient plus rapides que les transporteurs.

(31) Les frégates étaient les plus rapides.

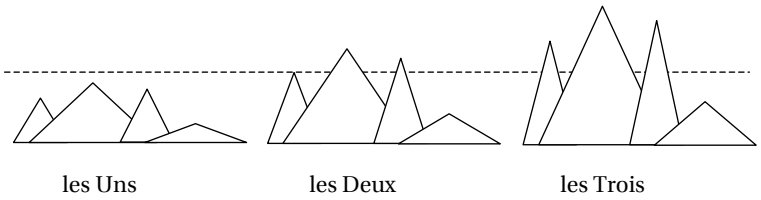
Troisièmement, le comparatif (32a) et le superlatif (32b) sont vrais dans le modèle (33) d'après la condition universelle-universelle (17), et aussi dans le modèle (34), où la condition bijective (24) s'applique.

(32) a. Les montagnes de droite sont plus grands que les montagnes de gauche.
b. Les montagnes de droite sont les plus grands sommets.

(33) Les chaînes de montagnes à Urras



(34) Les chaînes de montagnes à Gethen



Enfin, nous avons déjà discuté la proposition en (12), jugée comme vraie dans le modèle B en (14), grâce à l'application récursive de (17) et (24) aux partitions obtenues par la condition en (28).

(12) Les garçons de l'équipe de football sont les plus lourds.

(14) Modèle B :
les garçons de l'équipe de football : 120kg, 80kg ;
les garçons de l'équipe de boxe : 100kg, 60kg, 40kg, 20kg

La condition (28) partitionne les boxeurs en deux partitions : B_1 = garçon100⊕garçon60 et B_2 = garçon40⊕garçon20 ; les footballeurs sont plus lourds que B_1 du fait de la condition bijective en (17), et plus lourds que B_2 du fait de la condition universelle-universelle en (24).

Les exemples de cette section suggèrent fortement que les mêmes principes s'appliquent à la comparaison plurielle dans les comparatifs et les superlatifs. Pourtant, étant donné que les constructions comparatives en considération contiennent deux DP pluriels, tandis que les constructions superlatives n'en contiennent qu'un seul, la question se pose de savoir comment le parallélisme que nous avons révélé peut être décrit formellement. Cette question est l'objet de la section suivante.

4 La source de la généralisation

Considérons maintenant comment les découvertes des deux sections précédentes peuvent être systématisées au moyen d'une analyse compositionnelle des constructions comparatives et superlatives. Une possibilité qui semble se présenter quand nous considérons les comparatifs avec deux DP pluriels, tels que (15), est que les divers types de modèles les vérifiant correspondent aux interprétations différentes des DP pluriels.

(15) Les garçons de l'équipe de football sont plus lourds que les garçons de l'équipe de boxe.

(13) Modèle A :
les garçons de l'équipe de football : 100kg, 60kg, 40kg, 20kg ;
les garçons de l'équipe de boxe : 120kg, 80kg

(14) Modèle B :
les garçons de l'équipe de football : 120kg, 80kg ;
les garçons de l'équipe de boxe : 100kg, 60kg, 40kg, 20kg

L'on peut supposer naturellement que lecture collective (disons, lecture de groupe) des deux DP rendra la proposition en (15) vraie dans le modèle A. Sa vérité dans le modèle B, dont nous avons rendu compte par nos conditions de comparaison plurielle (17), (24), (27) et (28), peut alors résulter d'une interprétation des deux DP pluriels comme « couvertures » (*covers* au sens de Schwarzschild 1996), et ces conditions elles-mêmes peuvent être prises comme une description de la façon dont un prédicat peut relier les cellules des deux couvertures (cf. Schwarzschild 1996).

Cependant, étant donné les découvertes des deux sections précédentes, une telle analyse n'est pas suffisamment générale. Nous avons vu que les diverses procédures de comparaison qui peuvent être appliquées aux comparatifs pluriels s'appliquent aussi aux superlatifs pluriels. Par exemple, le superlatif en (12), répété ci-dessous, peut être vérifié dans les mêmes types de modèles que le comparatif en (15), mais ne contient pas deux DP dont l'interprétation aurait pu servir à dériver les lectures nécessaires.

(12) Les garçons de l'équipe de football sont les plus lourds.

La vérité de (12) dans le modèle A peut encore être obtenue en utilisant une lecture collective pour les footballeurs, comme pour (15). Mais la vérité de (12) dans le modèle B, qui dépend de nos conditions de comparaison, ne peut pas être dérivée de la façon suggérée ci-dessus pour (15) : la comparaison en (12) ne se fait pas entre deux dénotations des DP pluriels. Au mieux, la comparaison se fait entre les cellules de la couverture de la dénotation du DP sujet d'un côté, et (tous) les membres de l'ensemble de comparaison C déterminé contextuellement, de l'autre ; nous ne voyons aucune manière de garantir que cette procédure conduise à comparer exactement les mêmes paires que dans le cas où deux dénotations DP sont reliées à la base de leurs couvertures.

Tandis que nous n'excluons pas la possibilité que les lectures différentes des DP en (15) ou (16) soient partiellement responsables des effets de comparaison observés dans la section 2, nous voudrions explorer l'hypothèse qu'une analyse unifiée des conditions de comparaison pour les comparatifs et les superlatifs pluriels est possible. Cela semble impliquer que la source de ces conditions ne soit pas à trouver au niveau des

dénotations des DP, mais à un niveau plus profond, qui est partagé par les comparatifs et les superlatifs : celui de la relation de comparaison elle-même.

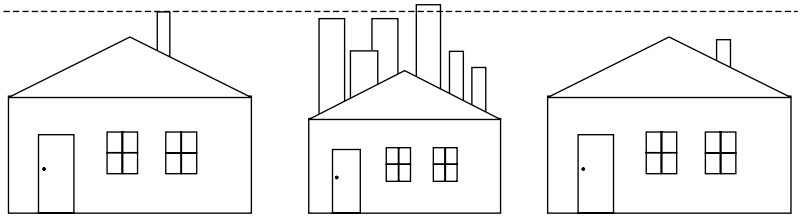
De nouveau plusieurs possibilités existent. Comme nos conditions de comparaison plurielle (17), (24), (27) et (28) décrivent la comparaison des individus pluriels plutôt que des degrés, une théorie des comparatifs sans degrés (voir par exemple Kamp (1975)) pourrait fournir le point de départ le plus direct. Pour un cadre basé sur les degrés, celui de Kennedy (1997) peut aussi fournir une base naturelle pour une implémentation. Nous laisserons du côté ces options et la discussion de leurs avantages et désavantages en faveur d'une exploration brève d'une implémentation possible de nos découvertes dans le cadre discuté dans la section 1 – celui de Heim (1999).

Comme la comparaison, dans ce cadre, pour les comparatifs comme pour les superlatifs, se fait entre des degrés plutôt qu'entre des individus ou des pluralités, nos diverses conditions de comparaison doivent être réinterprétées comme des méthodes pour relier des degrés aux individus et aux pluralités ; c'est-à-dire comme des « méthodes de mesure ». Nous pourrons alors expliquer comment la phrase (15) puisse être jugée vraie dans le modèle A en permettant une méthode de mesure (une méthode « collective ») qui assigne aux footballeurs un degré plus haut que celui assigné aux boxeurs dans le modèle A, et nous pourrons aussi rendre compte de la possibilité que la phrase (15) soit vraie dans le modèle B en permettant une autre méthode de mesure (qui utiliserait les conditions (17), (24), (27) et (28)), celle qui relie l'équipe de football à un degré plus haut que celui de l'équipe de boxe dans le modèle B. Nous n'essaierons pas de donner une définition formelle d'une méthode de mesure ; l'intuition que nous poursuivons peut être expliquée par les exemples en (35) et (36).

(35) a. Ces règles mesurent 500 mètres, quand elles sont placées de bout en bout.
b. Ces règles mesurent 4 mètres, quand elles sont placées côte à côte.

(35) illustre comment la mesure assignée à un objet pluriel peut être manipulée par la spécification des diverses méthodes de mesure, en particulier quand nous avons un prédicat tel que *long*, qui n'est pas strictement additif. Des méthodes diverses sont aussi disponibles quand nous voulons mesurer des objets singuliers complexes. Considérons la question (36) :

(36) Quelle maison est la plus haute ?



Le calcul de la réponse correcte n'est pas du tout élémentaire, parce que si un objet complexe n'est pas homogène, sa hauteur n'est pas une fonction des hauteurs de ses sous parties. Nous devons plutôt choisir une méthode de mesure déterminée en fonction des buts sous jacents à cette mesure : est-ce que nous devons connaître la hauteur de la maison afin d'y suspendre un drapeau, de l'escalader, ou encore de sauter pardessus – et, dans ce dernier cas, dans quel sens, etc. ?

Supposons qu'un adjectif scalaire tel que *haut* ne dénote une fonction des degrés aux ensembles d'individus que relativement à une méthode appropriée de mesure m

qui est déterminée contextuellement (nous évitons ici toute discussion des propriétés de ces méthodes de mesure, mais nous pouvons présumer qu'un adjectif comme *haut* rend saillante une méthode de mesure qui est appropriée pour mesurer les individus singuliers non complexes). Cela veut dire que *haut* se combine d'abord avec une variable libre *m* dont le domaine est l'ensemble des méthodes de mesure ; [[haut]] ([[m]]) produit alors une fonction de type <d, <e, t>> (ou une fonction des dénotations des noms vers les fonctions de ce type ; voir Heim (1999, note 6)). La sémantique des morphèmes comparatif *-er* et superlatif *-st* reste inchangée, mais *Anne est plus grande que Julie* reçoit alors l'analyse suivante ((37)) :

(37) $\max(\lambda d.\text{grand}(m)(d)(a)) > \max(\lambda d.\text{grand}(m)(d)(j))$

Comment pouvons-nous parvenir à nos conditions (17), (24), (27) et (28) ? Nous avons observé que quand ces conditions ne s'appliquent pas, la comparaison entre des pluralités n'est possible que si le contexte fournit des instructions sur la méthode de comparaison : une méthode de mesure m doit être saillante. Nous avons également observé qu'indépendamment du contexte, nous réussissons toujours à comparer des pluralités quand nos conditions s'appliquent. Dans les termes adaptés à la présente discussion, nos conditions garantissent qu'une méthode de mesure appropriée, qui fournira un résultat équivalent à ces conditions, existe, même quand le contexte ne la fournit pas. Nous pouvons formuler ces garanties comme des postulats d'interprétation. Ainsi nos conditions de comparaison peuvent être dérivées du postulat d'interprétation suivant :

(38) **Postulat d'interprétation 1**
$\forall R \forall x \forall y [\exists m$ [x est plus R que y par m] $\longrightarrow$
$\exists m' [\max(\lambda d.R(m')(d)(x)) > \max(\lambda d.R(m')(d)(y))]]$

où pour deux pluralités x et y et une méthode de mesure m, x est plus R que y par m si (39) est réalisée :

(39) A est plus R que B **par m** si
- a. $\forall a \prod A \forall b \prod B [\max(\lambda d.R(m)(d)(a)) > \max(\lambda d.R(m)(d)(b))]$, ou
- b. il existe une fonction bijective f de $\{a : a \prod A\}$ vers $\{b : b \prod B\}$ telle que $\forall a \prod A [\max(\lambda d.R(m)(d)(a)) > \max(\lambda d.R(m)(d)(f(a)))]$ ou
- c. (40)

(40) répète nos méthodes récursives :

(40) A est plus R que B **par m** si
- a. il existe une partition de A en A_1, A_2 telle que A_1 est plus R que B **par m** $\wedge$ A_2 est plus R que B **par m**, ou
- b. il existe une partition de B en B_1, B_2 telle que A est plus R que B_1 **par m** $\wedge$ A est plus R que B_2 **par m**

Supposons qu'une des dénotations possibles d'un DP pluriel tel que *les garçons de l'équipe de football* soit un individu pluriel. Alors quand nous interprétons (15) comme en (41), le postulat d'interprétation en (38) garantit que, si nos conditions de comparaison sont réalisées, il y a une valeur de m en (41) qui la rend vraie.

(41) $\max(\lambda d.\text{lourd}(m)(d)(\sigma(*\text{footballeurs}))) > \max(\lambda d.\text{lourd}(m)(d)(\sigma(*\text{boxeurs})))$

Comme tel est le cas dans le modèle B (nos conditions de comparaison conduisent à juger les footballeurs comme plus lourds que les boxeurs sur la base de la méthode par défaut de mesure du poids des individus singuliers), nous pourrons juger la proposition en (15) vraie en B. Nous pouvons traiter le postulat d'interprétation comme ajoutant aux méthodes saillantes de mesure une méthode supplémentaire pour mesurer des individus pluriels, construite à partir d'une méthode existante et saillante pour mesurer les individus singuliers.

En ce qui concerne l'interprétation qui rend la phrase (15) vraie dans le modèle A, nous pouvons présumer que les garçons de l'équipe de football dénote soit le même individu pluriel qu'en (41), soit le groupe correspondant à cet individu pluriel, et que pour les prédicats additifs, une méthode de mesure appropriée est disponible qui permette l'addition des degrés du poids reliés aux membres atomiques de la somme ou du groupe.

Afin de simplifier les choses, nous illustrons ici l'application de nos principes aux superlatifs en utilisant les sommes[7]. La proposition en (12) est alors interprétée ainsi :

(42) $\forall z \in C[z \neq \sigma(*\text{footballeurs}) \longrightarrow \max(\lambda d.\text{lourd}(m)(d)(\sigma(*\text{footballeurs}))) > \max(\lambda d.\text{lourd}(m)(d)(z))]$

De nouveau, si nos conditions de comparaison (17), (24), (27) et (28) nous conduisent à juger, par une méthode de mesure quelconque, que la somme des footballeurs est plus lourde que tous les membres de l'ensemble de comparaison C, alors le postulat d'interprétation en (38) garantit qu'il existe une méthode qui peut servir de valeur pour m en (42) et qui rendra l'interprétation en (42) vraie.

Une élaboration technique de ces brèves remarques, ainsi que la comparaison de notre méthode aux alternatives possibles, est certainement nécessaire, mais supposerait une digression importante, pour laquelle nous manquons d'espace ici. Dans la section qui suit, nous revenons aux superlatifs et examinons comment nous pouvons rendre compte du fait que les superlatifs requièrent la présence d'un article défini.

5 Définitude

Dans cette section nous examinons la question de la définitude des superlatifs pluriels. Rappelons-nous (1), répété ci-dessous :

(1) Contexte : Le Tibet possède 8 des 14 sommets les plus hauts du Monde.
   a. L'Everest et le K2 sont les plus grandes montagnes.
   b. L'Everest, le K2 et le Kānchenjunga sont les plus grandes montagnes.

Comme les deux phrases (1a) et (1b) peuvent être appropriées (et vraies), la description définie *les plus grandes montagnes* ne semble pas dénoter l'individu pluriel maximal unique[8]. Mais si cela est vrai, alors l'article défini est inattendu, et, en revanche,

[7] Nous verrons dans la section suivante qu'il existe des raisons de croire que les prédicats superlatifs s'appliquent aux groupes plutôt qu'aux sommes, et donc qu'un autre postulat d'interprétation est nécessaire, qui étende le postulat d'interprétation donné en (38) aux groupes.

[8] Le même effet peut être observé quand un superlatif est combiné avec un cardinal :

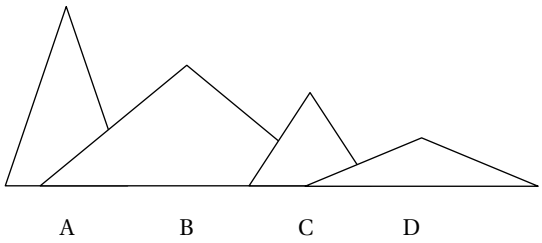
d'autres déterminants doivent être possibles, ce qui n'est pas le cas[9].

(43) L'Everest et le K2 sont quelques/deux plus grandes montagnes.
* si compris en tant qu'un superlatif

Avant d'en venir à cette question, considérons comment les phrases (1a) et (1b) peuvent être vraies. Afin de simplifier les exemples, évaluons (44) dans le modèle (45) :

(44) a. A et B sont plus grandes que C et D
b. A et B sont plus grandes que A, B et C
c. A, B et C sont plus grandes que A et B
d. A et B sont les plus grandes.

(45) Les Ramtops



Les comparatifs en (44a)-(44c) se comportent comme le prédisent les généralisations des sections précédentes. Nous considérons la phrase (44a) vraie ; ceci peut être dû à une lecture distributive, par exemple. Il y a une tendance forte à juger les assertions en (44b) et (44c) fausses[10], ce qui est tout à fait attendu puisqu'aucune de nos conditions de comparaison plurielle ne permet la comparaison des pluralités qui se contiennent l'une l'autre. Etant donné ces faits, (44d) semble être très problématique pour notre approche. Nous jugeons la phrase (44d) vraie, de la même façon que nous jugeons vraies (1a) et (1b). Pourtant, étant donné que ce jugement nécessite la comparaison de la pluralité A⊕B aux autres pluralités, y compris A⊕B⊕C, on s'attendrait à ce que la comparaison échoue, comme en (44b). Il semble que non seulement nous avons trouvé un contre-exemple à nos conditions de comparaison (17), (24), (27) et (28), mais que ces faits contredisent aussi notre généralisation fondamentale, selon laquelle la comparaison plurielle obéit aux mêmes contraintes dans les constructions superlatives et dans les constructions comparatives. Le plus frappant est le fait que les superlatifs pluriels en (44d), (1a) et (1b) appartiennent au type le plus élémentaire des superlatifs pluriels

(i) les deux plus hautes montagnes

(ii) les trois plus hautes montagnes

Comme noté par un commentateur anonyme, les descriptions (i) et (ii) peuvent les deux être appropriées malgré la présence de l'article défini. Comme nous ne discuterons pas ici la syntaxe et la sémantique des cardinaux à l'intérieur des syntagmes superlatifs, nous laisserons les propriétés spéciales de ces exemples de côté, mais leur définitude est expliquée de la même façon que pour les exemples (1) ci-dessous.

[9]Herdan and Sharvit (2005) affirment que les superlatifs indéfinis sont en fait grammaticaux, mais seulement dans des situations où C varie, comme en (29a) ci-dessus.

[10](44b) et (44c) n'échouent qu'en absence de contexte – comme ci-dessus, la comparaison peut réussir dans un contexte approprié qui nous permettrait de considérer les pluralités en question comme des individus singuliers complexes (les groupes), pour lesquels le contexte fournit une méthode de mesure (par exemple, en spécifiant le but).

– exactement le type d'exemple étudié par Stateva (2005), qui a déclenché cette investigation. Une solution potentielle à ce problème consisterait à changer la sémantique de -st de Heim (1999), comme en (3') :

(3') $[\![\text{-st}]\!] = \lambda C_{<e,t>} \lambda R_{<d,<e,t>>} \lambda x_e . \forall z \in C [z \not\leq x \wedge x \not\leq z \longrightarrow \max(\lambda d . R(d)(x)) > \max(\lambda d . R(d)(z))]$

$[\![\text{-st}]\!]$ (C)(R)(x) n'est défini que si $x \in C \wedge \forall y \in C \exists d : R(d)(y)$

(3') énonce qu'un superlatif est vrai d'un individu (pluriel) x si x est plus R que tous les individus (pluriels) *qui ne contiennent pas x et ne sont pas contenus dans x.* En conséquence, quand (44d) est évalué, la pluralité A⊕B n'est pas comparée avec A⊕B⊕C ; la phrase en (44d) devient vraie.

Nous n'adoptons pas cette analyse, parce qu'elle engendre deux problèmes. D'abord, (3') rend vrai dans le modèle (45) non seulement (44d), ce qui est correct, mais aussi (44e) :

(44) e. A, B et C sont les plus grandes.

Comme A⊕B⊕C contient A⊕B, A⊕B⊕C n'est pas comparé avec A⊕B, et la phrase (44e) peut être vraie dans le modèle (45), ce qui est correct aussi. Mais ceci laisse toujours sans réponse la question posée au début de cette section : pourquoi A⊕B⊕C et A⊕B peuvent-elles toutes les deux être jugées comme *les* plus grandes ?

Le second problème avec (3') est le suivant. La condition que les pluralités comparées ne se contiennent pas fait une prédiction incorrecte dans un contexte où l'ensemble de comparaison contient seulement des individus non disjoints, comme en (44f) :

(44) f. Parmi A, B et C et A et B, A et B sont les plus grandes.

La proposition en (44f) est fausse. Cependant notre (3') modifié prédit qu'elle doit être vraie : si l'ensemble de comparaison n'est constitué que de A⊕B⊕C et A⊕B, alors (3') doit ignorer les deux, en tant qu'éléments non disjoints, et le superlatif doit être vrai d'une façon triviale. Ainsi, (44f) démontre que (3') n'est pas une solution correcte. Mieux encore, (44f) est un argument direct en faveur de notre approche : les comparatifs et les superlatifs se comportent de nouveau de la même façon, en ce que les pluralités qui se contiennent l'une l'autre ne peuvent pas être comparées – c'est pourquoi la comparaison échoue en (44b), (44c) et (44f). Cependant la question se pose de savoir pourquoi la comparaison n'échoue pas en (44d).

La solution alternative que nous proposons est que la comparaison de pluralités qui se contiennent l'une l'autre dans l'ensemble de comparaison n'échoue pas en (44d), parce que les prédicats superlatifs s'appliquent seulement aux groupes et non pas aux sommes ; ainsi l'ensemble de comparaison est un «partitionnement» des individus pertinents dans le contexte en groupes pertinents, où les groupes ne sont pas des sommes d'individus mais des atomes, reliés aux sommes par l'opération de formation de groupes (↑) (voir Landman (1989a, b, 2000) pour une discussion).

Premièrement, si les superlatifs pluriels nécessitent la comparaison entre des groupes, l'apparence de l'article défini en (1) n'est plus problématique : la présupposition d'unicité peut être satisfaite dans les superlatifs pluriels comme dans les superlatifs singuliers par le fait que l'argument externe du superlatif pluriel est un groupe maximal défini contextuellement. (1a) sera applicable si le contexte fournit (ou permet d'ac-

commoder) un ensemble de comparaison contenant un groupe correspondant à l'Everest et le K2, mais ne contenant pas de groupe correspondant à l'Everest, le K2 et le Kānchenjunga ; inversement, l'assertion en (1b) peut être vraie et satisfaire la condition d'unicité, si le groupe correspondant à l'Everest et le K2 n'est pas contenu dans C.

Deuxièmement, nous pouvons maintenant comprendre comment la phrase (44d) peut être appropriée et vraie. Si l'ensemble des groupes qui sont saillants dans le contexte se trouve contenir, par exemple, les groupes ↑(A⊕B) et ↑(C⊕D) (mais, crucialement, pas ↑(A⊕B⊕C)), alors la phrase (44d) peut être vraie : le DP sujet A et B dénote le groupe ↑(A⊕B), qui est le plus grand des membres de l'ensemble de comparaison – à condition que nous trouvions une manière de comparer des groupes, naturellement. La comparaison ne doit pas échouer sur les membres de l'ensemble de comparaison C qui ne sont pas disjoints parce qu'il n'y a aucune raison pour C de contenir des groupes non disjoints (qui sont en plus difficiles à accommoder) – mais si c'est le cas (comme en (44f)), alors la comparaison échoue[11].

Cela veut dire que nous devons définir la manière dont la comparaison se fait entre des groupes. Une possibilité existe que les groupes soient vus comme des objets singuliers complexes. Nous avons déjà discuté cette option dans le contexte de l'exemple (35) ci-dessus : nous avons vu que si un objet complexe n'est pas homogène, sa hauteur n'est pas prédite par les hauteurs de ses composants, mais qu'une méthode de mesure appropriée doit être établie. Est-ce que le même est vrai pour des objets complexes tels que les chaînes de montagnes et d'autres groupes de montagnes contextuellement définis ? La réponse doit être négative. Comme nous avons vu que les superlatifs pluriels peuvent être évalués seulement dans les circonstances où les comparatifs pluriels peuvent l'être, c'est-à-dire quand nos conditions de comparaison (17), (24), (27) et (28) sont satisfaites, la comparaison entre des groupes

↑A et ↑B peut (et doit) se réduire à la comparaison entre les pluralités A et B correspondant à ↑A et ↑B. Ainsi nous ajoutons la condition de comparaison (46) :

(46) Le groupe ↑A est plus R que le groupe ↑B si A est plus R que B.

Autrement dit, des groupes peuvent être comparés l'un à l'autre par rapport à une relation scalaire particulière si les pluralités correspondant à ces groupes peuvent être ainsi comparées. Pour l'analyse proposée dans la section 4, cela veut dire que nous devons ajouter un postulat d'interprétation qui aurait le même effet que (46) :

(47) **Postulat d'interprétation 2**
$\forall R \forall x \forall y [\exists m\ [x \text{ est plus } R \text{ que } y \text{ par } m] \longrightarrow$
$\exists m' [\max(\lambda d.R(m')(d)(\uparrow x)) > \max(\lambda d.R(m')(d)(\uparrow y))]]$

Nous avançons l'hypothèse que si les pluralités correspondant aux groupes ne peuvent pas être comparées (aucune de nos conditions ne s'applique), les groupes sont vus

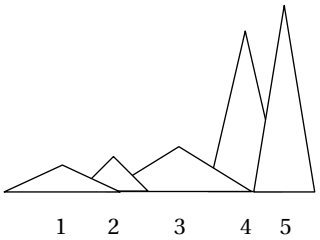
[11] Nous croyons que cela donne aussi la raison pour laquelle les superlatifs ne s'appliquent qu'aux groupes. L'intuition est que si un ensemble de comparaison C contient une somme particulièrement saillante S, il contiendra aussi toutes les sous-sommes de S, qui sont aussi saillantes que S, tandis qu'un groupe formé à partir d'une pluralité peut être saillant sans que les membres de cette pluralité soient individuellement saillants aussi. En conséquence, si une somme S était une valeur possible pour x en (3), alors S et ses sous-sommes devraient aussi être membres de C – mais alors S ne peut pas servir de valeurde x parce qu'elle ne se compare pas à ses sous-sommes dans C.

comme des singularités pragmatiquement complexes. Tel est le cas en (48), où aucune de nos conditions de comparaison (17), (24), (27) et (28) n'est réalisée et où, empiriquement, aucune comparaison entre les singularités n'est faite lorsqu'il s'agit d'établir la valeur de vérité de la phrase.

(48) Les Alpes sont les montagnes les plus hautes en Europe.

Une prédiction faite par notre théorie est que quand le contexte fournit un groupe, le superlatif pluriel le sélectionne :

(49) Gertrude climbed the highest mountains.



L'interprétation la plus naturelle de (49) est que Gertrude a escaladé les montagnes 4 et 5, mais pas 3 (sauf si de l'information additionnelle est fournie).

6 Conclusion

Le superlatif pluriel peut être interprété compositionnellement sur la base de la sémantique standard de Heim et des présuppositions standard sur les pluriels.

Sous certaines conditions, la comparaison entre les pluralités peut se réduire à la comparaison entre leurs composantes singulières – sinon, la comparaison entre les pluralités dépend du contexte (et est alors probablement une comparaison entre groupes).

Le traitement de la comparaison plurielle est indépendant de celui des superlatifs pluriels, du fait du caractère obligatoire de la sémantique basée sur les groupes pour ces derniers.

Les superlatifs pluriels ne sont pas définis à moins que nous les traitions comme des groupes. Cette hypothèse explique simultanément l'usage de l'article défini et l'impossibilité d'autres déterminants. La comparaison entre les groupes peut se réduire à la comparaison entre les pluralités correspondant à ces groupes si ces pluralités peuvent être comparées en utilisant les conditions de comparaison (17), (24), (27) et (28). Sinon les groupes sont comparés comme des singularités complexes, et une telle comparaison est nécessairement dépendante du contexte.

Parmi les problèmes restants sont la syntaxe et la sémantique des superlatifs contenant des cardinaux (*les trois plus hautes montagnes*) ou des ordinaux (*the second-highest mountain* 'la montagne la plus haute sauf une').

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The Meaning and Use of Negative Polar Interrogatives

Brian J. Reese*

1 Introduction

Standard semantic treatments of interrogative sentences predict positive and negative closed interrogatives such as those in (1a) and (2a) to be equivalent. Groenendijk and Stokhof (1997) dub the standard view the "Hamblin Picture" (after Hamblin 1958). On this approach, (i) an answer to a question is a proposition, (ii) the possible answers to a question partition the space of logical possibilities and (iii) to know the meaning of a question is to know which propositions count as direct answers to that question. At first glance, this prediction appears correct; the same propositions count as direct answers to both types of closed interrogative, as shown by the possible answers to (1a) and (2a) below.

(1) a. A: Is Jane coming?
b. B: Yes, she is. (= Jane is coming.)
c. B: No, she isn't. (= Jane is not coming.)

(2) a. A: Isn't Jane coming?
b. B: Yes, (of course) she is. (= Jane is coming.)
c. B: No, she isn't. (= Jane is not coming.)

Further inspection, however, reveals that negative interrogative (NI) questions differ from positive interrogative (PI) questions in at least two important repsects.[1] First, NI questions convey a backgrounded attitude on the part of the speaker toward the

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[1] By *negative interrogative* I mean an interrogative sentence with a negated, proposed auxillary verb, as in (2a). I thus exclude from consideration interrogatives such as (i).

(i) Is Jane not coming?

(i) and (2a) share a number of the divergent pragmatic and semantic properties discussed below, but (i) also permits a neutral question interpretation, which (2a) does not.

proposition expressed by a positive answer (Ladd 1981, Büring and Gunlogson 2000, Han 2002, van Rooy and Šafářová 2003, Romero and Han 2004, Reese 2006). (3b), for example, is a felicitous continuation of (3a), which entails that the speaker has no prior beliefs regarding the issue raised by the question.

(3) a. I have no beliefs on the matter. I just want to know…
b. Did the President read the August 6 PDB?
c. #Didn't the President read the August 6 PDB?

(3c), on the other hand, is marked, because it conveys a prior belief toward the issue raised by the question that conflicts with (3a), namely that the president read (or ought to have read) the PDB. The example in (4), adapted from Gunlogson (2003), provides further illustration.

(4) Aren't you a communist?

(4) is infelicitous in a context that requires neutrality on the part of the speaker, for example at a hearing of some sort.

The second respect in which the two question types differ is that NI questions display an ambiguity that PI questions do not (Ladd 1981, Büring and Gunlogson 2000, Huddleston and Pullum 2002, Romero and Han 2004). The available readings can be disambiguated by including a polarity sensitive lexical item. NI questions that contain a positively-oriented polarity sensitive item, as in (5), are biased toward positive answers. Ladd (1981) dubs this interpretation the *outside-negation* reading. NI questions that contain a negatively-oriented polarity sensitive item, as in (6), on the other hand, are biased toward negative answers, Ladd's *inside-negation* reading.

(5) a. Didn't Kim read the report *too*?
b. Aren't there *some* vegetarian restaraunts around here?

(6) a. Didn't Kim read the report *either*?
b. Aren't there *any* vegetarian restaraunts around here?

Ladd (1981) and Romero and Han (2004) treat the ambiguity as a genuine scope ambiguity involving negation, hence the outside-/inside-negation nomenclature. I argue for an alternative analysis of the ambiguity in section 2.3.2.

In principle, these differences are amenable to either a pragmatic or semantic explanation. The pragmatic stance assumes that negation in NIs serves a pragmatic function rather than a truth-functional one (cf. Groenendijk and Stokhof 1997, van Rooy and Šafářová 2003). In fact, as Groenendijk and Stokhof (1997) point out, the predicted equivalence between positive and negative closed interrogatives paves the way for a pragmatic analysis, since it frees the negation to play a role distinct from its truth functional one. The semantic approach, on the other hand, assumes that PIs and NIs do not ask the same question, i.e., they have distinct denotations. This approach is advocated by Romero and Han (2004). Their proposal is discussed in detail in section 2. While semantic approaches seem tailored to account for Ladd's ambiguity, which on the surface has the properties of a scope ambiguity, they must still account for the judgements in (1) and (2), especially if one maintains the Hamblin picture for the semantics of interrogatives.

The paper is organized as follows. Section 2 introduces and evaluates a semantic solution to the puzzle of negative interrogatives, namely Romero and Han (2004). A number of problems with their analysis are discussed and the following sections introduce data that demonstrate various restrictions on the discourse roles played by outside- and inside-negation questions. Section 3 provides evidence that outside-negation is not ordinary, descriptive negation. Examples pertaining to the available discourse functions of negative interrogatives are introduced. Section 4 discusses data showing that outside-negation NIs are in part *assertions*. Section 5 introduces some formal tools and provides an analysis of negative interrogatives in dialogue using Segmented Discourse Representation Theory (Asher and Lascarides 2003). Section 6 provides some concluding remarks and directions for future research.

2 A Semantic Approach to Negative Questions

Romero and Han (2004) presents an analysis of negative interrogative questions that assumes an underlying semantic distinction between NIs and PIs. NI questions, they argue, contain an implicit operator VERUM whose use implicates a backgrounded speaker attitude and which interacts with negation to produce the "inside-negation" and "outside-negation" readings. Section 2.1 provides a brief introduction to Romero and Han's analysis and sections 2.2 and 2.3 offer a critical evaluation.

2.1 Basics of the VERUM Approach

Romero and Han (2004)'s analysis begins from the observation that NI questions and questions containing the epistemic adverb *really* exhibit similar epistemic biases. (7a), for example, requires for any felicitous use that the speaker hold a prior attitude toward the proposition that Jane is not coming.

(7) a. Is Jane *really* coming?
b. Isn't Jane coming?

As already noted, (7b) requires a similar backgrounded attitude by the speaker toward the proposition that Jane *is* coming.

Romero and Han (2004) define the semantic contribution of *really* through the operator VERUM as in (8). $\text{Epi}_x(w)$ are the epistemic alternatives for x in w; $\text{Conv}_x(w')$ are the worlds where the *conversational goals* of x in w' are met, the default goal being to accumulate information about the state of the world (cf. Stalnaker 1978 and Roberts 1996). $\text{CG}_{w''}$ is the set of propositions representing the shared beliefs of the discourse participants in w'', i.e. the common ground (Stalnaker 1978).

(8) $[\![\text{VERUM}]\!]^{g[x/i]} = \lambda p_{\langle s,t\rangle} \lambda w. \forall w' \in \text{Epi}_x(w)[\forall w'' \in \text{Conv}_x(w')[p \in \text{CG}_{w''}]]$

In words, VERUM ϕ is true at a world w iff some anaphorically determined discourse participant x (normally either the speaker or the addressee) is certain that in all of the worlds in which the conversational goals of x are met the proposition ϕ is part of the common ground, a meaning Romero and Han gloss as FOR-SURE-$\text{CG}_x\phi$. They

assume that in negative interrogative questions, the preposed, negated auxiliary verb introduces VERUM into the logical form of the question.

2.1.1 VERUM and the Speaker's Backgrounded Attitude

According to the lexical entry in (8), VERUM is an epistemic modal operator that embeds a "meta-conversational" modal statement, i.e., a modal statement that refers to the conversation goals of the discourse participants rather than to the state of the world. The use of meta-conversational moves, or speech acts, is governed by the principle in (9).

(9) **Principle of Economy**:
Do not use a meta-conversational move unless necessary (to resolve epistemic conflicts or to ensure Quality) (Romero and Han 2004, p. 629).

Quality refers to the second part of Grice's Maxim of Quality: do not say that for which you lack adequate evidence (Grice 1975). For Romero and Han, adequate evidence is at least indirect evidence.

Romero and Han derive the backgrounded speaker attitude discussed in Section 1, which they treat as a conversational implicature, through (9). NIs are meta-conversational moves by definition given the inclusion of Conv_x in (8). Assuming that discourse participants are cooperative and obey (9), it follows either that the speaker holds some belief ϕ which is inconsistent with the addressee's beliefs or believes ϕ but lacks sufficient evidence to assert it, i.e., the speaker wishes to avoid a violation of Quality.

2.1.2 Ladd's Ambiguity

Romero and Han's analysis of NI questions provides an intuitive account of the outside-/inside-negation ambiguity. Once the logical form of NIs includes VERUM, Ladd's ambiguity can be reduced to a matter of syntactic scope. The outside-negation reading of NI questions results when negation outscopes VERUM. The logical form and resulting partition are shown in (10a) and (10b) respectively.

(10) a. [[[$_{\text{CP}}$ *Q* not [VERUM [$_{\text{IP}}$ Jane is coming]]]]] =
b. { FOR-SURE-CG$_x$ Jane is coming, ¬FOR-SURE-CG$_x$ Jane is coming }

The question in this case addresses x's degree of certainty about whether or not the proposition that *Jane is coming* is in the common ground, hence the positive bias noted in section 1.

The inside-negation reading results when VERUM outscopes negation, as shown in (11a). In this case, the question addresses x's degree of certainty about whether or not the proposition that Jane is *not* coming is in the common ground, as indicated by the partition in (11b).

(11) a. [[[$_{\text{CP}}$ *Q* VERUM [not [$_{\text{IP}}$ Jane is coming]]]]] =
b. { FOR-SURE-CG$_x$¬Jane is coming, ¬FOR-SURE-CG$_x$¬ Jane is coming }

The partition in (11b) captures the intution from section 1 that inside-negation NIs are negatively biased, i.e. the question is "about" the proposition that Jane is not coming.

2.2 Evaluation of the VERUM Approach

To summarize the previous section, Romero and Han (2004) maintain a semantic distinction between negative interrogative questions and positive interrogative questions: NI questions contain the operator VERUM in their logical form. Including VERUM results in a conversational implicature equivalent to the backgrounded speaker attitude noted in section 1 and provides an account of Ladd's Ambiguity. Romero and Han (2004) provide the most detailed analysis of NIs in the literature and merits serious consideration. Section 2.2 provides an in-depth evaluation of the approach, indentifying a number of problematic aspects, the most serious of which addresses the validity of the semantic approach.

2.2.1 The Backgrounded Speaker Attitude

Romero and Han (2004)'s analysis of the backgrounded speaker attitude rests on a problematic empirical generalization. They claim that NI questions "*necessarily carry the epistemic implicature* that the speaker believed or expected that the positive answer is true" (emphasis added) (p. 610). Although NI questions always convey *some* backgrounded attitude on the part of the speaker, this attitude is not always epistemic. The examples in (12) from Huddleston and Pullum (2002) are counter-examples.

(12) a. Aren't you ashamed of yourselves?
b. Don't you like it?

(12a) conveys a *deontic* attitude rather than an epistemic one: the speaker feels that the addressees *ought* to be ashamed of themselves. (12b) conveys what Huddleston and Pullum call a *desiderative* attitude: the speaker *wants* the positive answer to be true. The existence of non-epistemic background attitudes is problematic for Romero and Han's account because the derivation of the background attitude is based on the presence of VERUM in NIs, which is an epistemic operator, and (9), which refers exclusively to epistemic concepts.

2.2.2 Ladd's Ambiguity and Answer Patterns

A more fundamental problem arises from the assumption that PIs and NIs have distinct denotations. As I argued in the introduction, any attempt to give a semantic treatment of the phenomena associated with negative interrogative questions and which assumes a semantics for interrogative sentences consistent with the Hamblin picture must account for the apparent equivalence of positive and negative questions established in (1) and (2). This requirement is problematic for Romero and Han (2004). Direct answers to NI questions like (13b) do not correspond to the propositions contained in the partitions given in (10b) and (11b) on either an outside-negation or an inside-negation reading, as shown in (14) and (15).

(13) a. A: Sue just cancelled, so now no syntacticians are coming.

b. B: Isn't Jane coming (too/either)?

(14) A: Yes. (But she doesn't do syntax anymore.)

a. = Jane is coming
b. ≈ FOR-SURE-CG$_x$ Jane is coming
c. ≠ FOR-SURE-CG$_x$ ¬ Jane is coming

(15) A: No.

a. = ¬Jane is coming
b. ≠ ¬ FOR-SURE-CG$_x$ Jane is coming
c. ≠ ¬ FOR-SURE-CG$_x$ ¬ Jane is coming

Rather, a simple positive answer to either type of negative question intuitively conveys the proposition that Jane is coming. This result is congruent with the positive cell of the partition in (10b), but it is inconsistent with the prediction for inside-negation NIs shown in (14c). Simple negative answers are even more problematic (15). Such responses intuitively convey that Jane is not coming, not that the respondant is uncertain that Jane is coming (15b), nor that he is uncertain that she is not coming (15c).

Romero (2005) counters these observations by suggesting that VERUM contributes expressive content to the interpretation of an utterance (Kratzer 1999, Potts 2005b) and, as a result, that negative answers do not negate FOR-SURE-CG$_x\phi$ but rather the embedded proposition ϕ. Along the same lines, positive answers affirm ϕ rather than FOR-SURE-CG$_x\phi$. Romero (2005) does not provide an implementation of her proposal and problems arise when one attempts to fit it into existing accounts of expressive meaning. Both Kratzer (1999) and Potts (2005b), for example, assume that the computation of expressive content is independent of the computation of descriptive content (or at-issue entailment in Potts' terminology). It is pivotal to Romero and Han (2004)'s account of Ladd's ambiguity, however, that the semantic contributions of VERUM and negation interact. If VERUM is truly an expressive item, this possibility is excluded, as the two lexical items contribute to distinct dimensions of semantic interpretation.

For example, the assertion that negative answers negate the proposition embedded in the scope of VERUM, rather than the VERUM statement itself means that a negative answer to an outside-negation NI would have descriptive content $\neg\phi$ and expressive content FOR-SURE-CG$_x\phi$ where x is resolved to the speaker.[2] The approach fares no better with respect to inside-negation negative questions. In this case, the proposition in the scope of the VERUM operator is $\neg\phi$ and the VERUM statement itself is FOR-SURE-CG$_x\neg\phi$. So if a *no* answer negates the embedded proposition, as Romero (2005) claims, then it should convey ϕ rather than $\neg\phi$. In short, the "expressive content" solution to the problematic pattern of answers in (14) and (15) must destroy Romero and Han (2004)'s account of Ladd's ambiguity in order to save it. Ladd's ambiguity is argued to be a scope ambiguity between negation and VERUM, but it is a fundamental aspect of expressive meaning (at least as normally understood) that it is "scopeless" (Potts 2005b, p. 42); i.e., it is compositionally independent of at-issue content, and as a result, cannot enter into scope relations with negation.

[2]The VERUM statement, contributing expressive content, is of the wrong semantic type in Potts (2005b)'s framework, for example, to interact with the negation.

2.3 VERUM's Last Stand

2.3.1 The Distribution of Polarity Sensitive Items.

A final argument in favor of the VERUM approach according to Romero and Han (2004) and Romero (2005) is its account of the distribution of polarity sensitive items in negative interrogative questions. Positve polarity items (PPIs) only occur in outside-negation NI questions and negative polarity items (NPIs) only occur in inside-negation NI questions. Romero and Han (2004) follow Linebarger (1987) in assuming that NPIs are licensed at logical form in the immediate scope of negation. Consequently, no logical operator may intervene between an NPI and the licensing negative element. PPIs are not licensed in the immediate scope of negation.

Romero and Han (2004) use Linebarger's analysis to account for the distribution of polarity items in negative questions. Given the logical form in (16a), the NPI *either* is licensed because it is in the immediate scope of negation; VERUM does not intervene between the negation and the polarity item. The PPI *too* is not licensed in (16a) because it is in the immediate scope of the negation.

(16) a. [*Q* VERUM [¬ Jane is coming {either/*too}]]
b. [*Q* ¬ [VERUM Jane is coming {*either/too}]]

The situation is reversed for outside-negation NI questions. Given the logical form in (16b), the negative polarity item *either* is not licensed because it is not in the immediate scope of negation; VERUM intervenes between it and the negation. The positive polarity item *too* is licensed for this very reason: it is not in the immediate scope of the negation.

These observations, however, are not a "knock down" argument in favor of the VERUM approach. The immediate scope constraint is not uncontroversial. Not all negative polarity items are subject to the intervention affects noted by Linebarger (1987). In (17) for example, *any* is licensed despite the fact that the epistemic operator *certain* intervenes between it and the negation. The example is parallel to the examples in (18), which Romero and Han (2004) use to motivate the immediate scope constaint.

(17) It is not certain [that there are *any* vegetarian restaurants around here].

(18) a. *It is not certain [that Jane is coming *either*].
b. It is not certain [that Jane is coming *too*].

The immediate scope constraint does not account for the difference in grammaticality between (17) and (18a). Linebarger (1987)'s syntactic licensing account of NPIs is used to argue for the logical forms in (10) and (11), but it is far from clear that the syntactic approach is correct. von Fintel (1999), for example, provides a semantic licensing account that addresses many of the concerns cited in Linebarger (1987).

On a related point, it has long been noted that (at least some) negative polarity items are licensed in questions independently of the presence of a negative element as shown in (19) (cf. Ladusaw 1979, Krifka 1995, van Rooy 2003, inter alia).

(19) a. Are there *any* vegetarian restaurants around here?
b. Did John *lift a finger* to help Mary?

The real challenge then is to explain the presence of PPIs in questions containing a negative element. Section 2.3.2 pursues one solution to this problem. Interestingly, this solution is alluded to by Romero (2005); viz. that in outside-negation negative interrogative questions negation functions metalinguistically. Section 2.3.2 briefly addresses how this assumption accounts for the distribution of polarity items in NIs.

2.3.2 Outside-negation as Metalinguistic Negation

Horn (1989) notes that metalinguistic negation is neither "an active trigger of NPIs nor a passive countertrigger or inhibitor of PPIs."[3] Assuming that outside-negation is metalinguistic, therefore, accounts for the presence of PPIs in outside-negation NIs and explains why NPIs force an inside-negation reading. The sentences in (20) – (22) (from Horn 1989) motivate the generalization regarding the licensing properties of metalinguistic negation.

(20) a. The Sox have *already* clinched the pennant.
b. The Sox haven't *already* clinched the pennant.

(21) a. Chlamydia is not sometimes misdiagnosed, it is frequently misdiagnosed.

b. #Chlamydia is not ever misdiagnoxed, it is frequently misdiagnosed.

(22) Chris didn't manage to solve {some/*any} of the problems, he managed to solve all of them.

In (20b), the positive polarity item *already* falls within the scope of negation and as a result is ungrammatical. (20b), however, can be used as a *denial* of the assertion in (20a). In this case, it would normally be spoken with a fall-rise intonational contour (Liberman and Sag 1974, Horn 1989, Walker 1996, inter alia). Metalinguistic negation can also target the potential implicatures of previous utterances as demonstrated by (21) and (22). The instance of (22) that includes the PPI *some* objects to the potential scalar implicature of an utterance like *Chris managed to solve some of the problems* that Chris did not solve all of the problems. NPIs cannot be used in this way, as shown by the ungrammaticality of *ever* and *any* in (21b) and (22) respectively. Assuming that outside-negation NIs contain metalinguistic negation accounts for the distribution of polarity items in negative questions, since metalinguistic negation neither licenses NPIs nor anti-licenses PPIs.

I adopt an analysis of metalinguistic negation below that is similar to that suggested in Potts (2005a) and which provides a unified treatment of descriptive and metalinguistic negation. What distinguishes descriptive from metalinguistic negation, on this analysis, is what aspect of the meaning of an utterance negation targets, where the meaning of an utterance is an n-tuple of propositions. Nonetheless, both descriptive and metalinguistic negation are truth-functional operators. There is no important semantic difference, then, between "outside" and "inside" negation. Rather, what is at issue is whether negation targets the core meaning of an utterance or some secondary meaning. I provide more details in Sect. 5. First, I provide additional evidence that

[3] See Geurts (1998) for critical comments on Horn's position.

outside-negation NIs share the characteristic discourse function of utterances containing metalinguistic negation, i.e. *denials*.

3 Evidence for the Metalinguistic Approach

3.1 Discourse Function

Metalinguistic negation, according to Horn (1989), is a "device for objecting to an utterance on any grounds whatever, including the conventional and conversational implicata it potentially induces, its morhpology, its style or register, or its phonetic realization" (p. 363). As I already indicated, I do not assume with Horn that there is any essential difference between metalinguistic and ordinary, truth-functional negation. In this respect, when I speak of uses of metalinguistic negation, I am really concerned with the illocutionary act of *denial* or *correction*. Following van der Sandt and Maier (2003), denials object to and remove information that has been previously entered into the discourse record. It is necessary to move to the illocutionary level because denials need not contain an instance of negation. (23b), for example, corrects the assertion in (23a): assuming that Jane is a student, (23b) entails the negation of (23a).

Outside-negation NIs pattern with positive statements used as denials, as shown in (23) – (26). (23c), is a less forceful denial of (23a) than (23b), but is a denial regardless, since it puts into dispute the assertion in (23a).[4]

(23) a. A: None of the students turned in their assignment.
b. B: Jane turned in her assignment.
c. B: Didn't Jane turn in her assignment?

Inside-negation NIs cannot be used for this purpose, but some care is required in verifying this. (23c) on an inside-negation reading *is* a felicitous response to (23a). However, it is not a denial or correction of (23a), rather it is what is referred to in literature on dialogue acts as a CHECK move (Carletta et al. 1997). CHECK moves ask for confirmation of information that the speaker has reason to believe given the discourse context. (23c), for example, checks the entailment of (23a) that Jane is not coming.

The denial reading of a negative question can be coerced by including certain "priming" phrases which indiciate that what follows challenges the assertion of the previous utterance on some grounds. In (24), for example, *B* prefaces his turn with *That's not true*, which introduces a reasonable exprectation that the utterance that follows will provide counterevidence or correct *A*'s assertion in (24a).

(24) a. A: All of the students submitted a paper to *L&P*.
b. B: That's not true.
c. B: Some of them submitted to *LI*.
d. B: Didn't {*some*/#*any*} of them submit to *LI*?

(24c) and the outside-negation reading of (24d) are felictous as challenges to the entailment in (24a) that no student submitted their paper to *LI*. The inside-negation reading

[4] The intonational contours of (23b) and (23c) share certain features, for example the presence of an L*+H nuclear pitch accent on *Jane*. I return to these similarities below.

of (24d) is not.

The examples in (25) are analagous to those in (23), except that the denials in (25c) and the outside-negation reading of (25d) object to (25a) on the basis of what is perceived to be a false presupposition of *manage*, viz. that it was not easy for Nicholas to prove the theorem.

(25) a. A: Nicholas managed to prove the theorem.
b. B: I wouldn't say he [managed]$_F$ to prove the theorem.
c. B: It was *rather* easy for him.
d. B: Wasn't it {*rather*/#*at all*} easy for him?

(25b) indicates that *B* intends to object to *A*'s utterance on some grounds, in this case its presupposition. If we include the PPI *rather*, forcing an outside-negation reading, (25d) is a felicitous objection to (25a). If we include the NPI *at all* instead, forcing an inside-negation reading, (25d) is no longer felicitous. Note that without the prime (25b), the inside-negation reading of (25d) *is* allowed. In this case, it asks for confirmation that it was not easy to prove the theorem.

(26c) and (26d) object to a potential implicature of (26a), viz. that not all of the packages have arrived. Again, the prime in (26b) indicates that the following utterance rejects (26a) for some reason.

(26) a. A: Some of the packages have arrived already.
b. B: Well...That's not quite right.
c. B: All of the packages have arrived *already*.
d. B: Haven't all of the packages arrived {*already*/#*yet*}?

As in the previous examples, forcing an inside-negation reading of (26d) by including an NPI – in this case *yet* – produces an infelicitous result. The inside-negation reading of (26d), however, is felicitous as an attempt to ground new information – viz. the implicature that not all of the packages have arrived – that contradicts a previously held assumption.

3.2 Prosody

The prosodic characteristics of outside-negation NIs also point toward a metalinguistic use. One prosodic property mentioned above is the "fall-rise" intonational contour characteristic of utterances containing a metalinguistic negation (Liberman and Sag 1974, Horn 1989, Walker 1996) and the occurrence of an L*+H nuclear pitch accent, which has been analyzed as conveying a lack of speaker committment (Pierrehumbert and Hirschberg 1990) or contentiousness (Steedman 2003).

Besides intonational contour, Swerts and Krahmer (to appear) found that metalinguistic negation tends to be prosodically marked, the functional explanation being that it is important that disagreements about the content of the common ground be recognized by addressees. Thus, one might find higher mean pitch, greater pitch range, higher mean intensity or increased duration on the nuclear pitch accent in outside-negation questions. These features might be taken as paralinguistic cues indicating increased speaker involvement and have been shown to affect the interpretation of intonational contours (Hirschberg and Ward 1992). Preliminary investigation suggests

that outside-negation NIs are more prosodically marked than inside-negation NIs in the ways mentioned above. Outside-negation NIs tend to be louder and have an increased pitch range compared to inside-negation NIs. These investigations, however, are preliminary and a more systemateic study of these prosodic features needs to be carried out.

None the less, the foregoing sections have accrued a reasonable amount of evidence that outside-negation NIs contain metalinguistic negation. First, this assumption accounts for the distribution of polarity sensitive items in outside- and inside-negation NIs. Second, outside-negation NIs share the discourse function of positive statements used as denials, i.e. utterances targeting a previous utterance based on its truth-conditional content, its presuppostions or potential implicatures. Finally, outside-negation NIs share many prosodic characteristics with metalinguistic negation. Section 4 introduces a final argument for this analysis based on the co-occurrence of outside-negation NIs with the discourse markers *after all* and *yet* that emphasizes their similarity to assertions. If outside-negation NIs can be used as denials, a subtype of assertion, then we should expect them to have some of the distributional properties of assertions. At the same time, inside-negation NIs should lack these properties. As shown in Sect.4, these predictions are borne out.

4 Two Speech Acts in One

Given the discussion in section3, the expectation arises that outside-negation negative questions share at least some of the properties of assertions. For example, the outside-negation NI in (23c) and the assertion in (23b) are both possible denials of the truth-conditional content of (23a), so both utterances should be in some sense incompatible or inconsistent with (23a). It is obvious that (23a) and (23b) are inconsistent, assuming that Jane is a student, given their propositional content. But interrogative sentences do not denote a proposition, but rather a partition of the context set. It is unclear, therefore, how (23c) can be *inconsistent* with (23b).

In section 1, I noted that outside-negation NI questions are positively biased: the speaker expects a positive answer to the question. I argue in the current section that this positive bias is an assertion of the positive answer and that outside-negation NI questions are *both* questions *and* assertions.[5] This accounts for the overlap in discourse function between utterances like (23b) and (23c): both *assert* that Jane turned in her assignment. (23c) in addition asks a question. The discourse function of that question is addressed in Sect. 5.

Sadock (1971, 1974) proposes several tests for the illocutionary force of an utterance that appeal to co-occurrence restrictions between certain discourse markers and illocutionary forces. The sentence initial discourse markers *after all* and *yet* co-occur with assertions but not genuine, information-seeking questions. For example, *after all* can be prefixed to assertions but not to genuine questions, as shown in (27a) and (27b).

(27) It's fine if you don't finish the article today.

[5] Asher and Reese (2005) make the same argument for negatively biased questions containing a strong NPI.

a. After all, your adviser is out of the country.
b. #After all, is your adviser out of the country?

Utterances prefixed with *yet*, on the other hand, can follow assertions, cf. (28b), but not questions, as in (29b).

(28) a. John is always late for work.
b. Yet, he continues to be promoted.

(29) a. Is John always late for work?
b. #Yet, he continues to be promoted.

According to these tests, outside-negation NIs are assertions, while inside-negation NIs are not. Note that (30b) can be preceded by *after all* when it contains the PPI *too*, but not when it contains the NPI *either*. Either version of (30b) is felicitous in the discourse context established in (30) if *after all* is left off.

(30) a. A: Sue can't attend, so there'll be no syntacticians there.
b. B: What do you mean? After all, isn't Jane coming {too/*either}?

(31b) can follow (31a) when it contains *too*, but not when it contains *either*.

(31) a. A: Isn't Jane coming {too/*either}?
b. A: Yet, Mary claims there will be no syntacticians there.

Again, if *yet* is left off of (31b), then either the outside- or inside-negation reading of (31a) is available. Given these tests, I maintain that an assertion is present in outside-negation NIs which licenses the discourse markers *after all* and *yet* in the contexts established in (30) and (31).

Outside- and inside negation negative questions, however, are still questions: they can be answered with *yes* or *no* and they co-occur with discourse markers such as *tell me* and *by any chance* which co-occur with genuine questions (Sadock 1974).

(32) Tell me, isn't Jane coming {too/either}?

Outside-negation negative questions, consequently, are *both* questions and assertions, as demonstrated by the discourse in (33). *Tell me* requires (33a) to be a question.

(33) a. A: Tell me, isn't Jane coming too?
b. A: Yet, Mary claims there will be no syntacticians there.

At the same time, the *yet* prefixed to the assertion in (33b) requires (33a) to be an assertion. As a result, in order for the the typing constraints of *tell me* and *yet* to be satisfied in (33), the negative interrogative in (33a) must be simultaneously typed as an *assertion* and *question*: that is the type associated with (33a) is complex (Asher and Pustejovsky 2004).

5 Negative Questions in Discourse and Dialogue

Section 5 provides a formal analysis of how negative interrogative questions contribute to the semantics of a dialogue within Segmented Discourse Representation Theory (SDRT; Asher and Lascarides 2003). SDRT is a dynamic semantic theory of the rhetorical connections between utterances in a discourse or dialogue built on top of Discourse Representation Theory (DRT; Kamp and Reyle 1993). Some details of these formalisms are given in section 5.1. Section 5.1.1 specifically addresses DRT and section 5.1.2 addresses SDRT.

As shown in section 3 inside- and outside-negation negative interrogative questions have distinct discourse functions. Section 5.2.1 discusses how the discourse function of inside-negation NI questions is computed in SDRT. In section 3.1, inside-negation NIs were argued to be CHECK questions (Carletta et al. 1997), i.e., questions that ask for confirmation of some information entailed in the discourse context. Outside-negation NI questions challenge a previous utterance (or the presupposition or implicature of a previous utterance). In addition, section 4 showed that there is an assertion associated with outside-negation NI questions. This assertion affects the role that outside-negation NIs play in dialogue. Section 5.2.2 attempts to derive this assertion from the formal properties of outside-negation NIs and addresses its contribution to discourse logical form.

5.1 Formal Preliminaries

5.1.1 DRT Syntax and Semantics

In the analysis presented section 5.2, discourse representation structures, or DRSs, are used to represent the logical forms of individual clauses rather than of whole discourses. The syntax of DRSs is given below (Asher and Lascarides 2003):

Definition 1 (Syntax of L_{DRT})**.** A discourse representation structure, or DRS, K is an ordered pair consisting of a set U_K of *discourse referents* (the universe of K) and a list of conditions C_K. The language L_{DRT} is defined recursively as follows:

$$K \quad := \quad \langle U, \emptyset \rangle \mid K^{\frown}\gamma$$

where $K^{\frown}\gamma$ is the DRS that results from appending γ to K's list of DRS conditions.

The set of DRS conditions is recursively defined as follows, where P is an n-ary relation symbol, $x_1, \ldots, x_n$ discourse referents and K_1 and K_2 DRSs:

$$\gamma \quad := \quad P(x_1, \ldots, x_n) \mid \neg K \mid K_1 \Rightarrow K_2 \mid \Box K \mid \Diamond K$$

The logical operators have their usual interpretation. L_{DRT} is extended to L^{+}_{DRT} with an interrogative operator '?':

$$L^{+}_{DRT} = L_{DRT} \cup \{?K | K \in L_{DRT}\}$$

I use a short-hand notation below to represent DRSs, writing the universe U and conditions C between square brackets and separated by a colon.

DRSs are interpreted as relations between input and output world-assignment pairs (van Eijck and Kamp 1997). The semantics for closed interrogatives is given in (34a), which simplifies the definition in Asher and Lascarides (2003). (34a) is a dynamic extension of the analysis in Karttunen (1977).

(34) a. $(w,f)[\![?K]\!]_M = \{[\![p]\!]_M : \exists w' \exists g (w,f)[\![^\vee p]\!]_M(w,g) \wedge (p = {}^\wedge K \vee p = {}^\wedge\neg K)\}$, where p is a propositional term.

b. $(w,f)[\![^\vee p]\!]_M(w,g)$ iff $\langle (w,f),(w,g)\rangle \in [\![p]\!]_M^{w,f}$

The denotation of a closed interrogative with respect to a world w and an assignment function f, according to (34a), is the singleton set consisting of the true answer.

Finally, I define a function *core-proposition* that applies to a DRS and returns the *core proposition*, i.e., the DRS stripped of any markers of sentence mood, viz '?'. The core proposition corresponds to the *sentence radicals* of Stenius (1967).

Definition 2 (Core Proposition)**.** For $K \in L^+_{DRT}$, if $K \in L_{DRT}$, *core-proposition*$(K) = {}^\wedge K$; otherwise K is of the form $?K'$ and *core-proposition*$(?K') = {}^\wedge K'$. ($^\wedge$ indicates a *propositional term.*)

The *core-proposition* function will apply to an interrogative sentence such as *Is Jane coming?*, returning a propositional term $^\wedge$*Jane is coming.*

5.1.2 SDRT Syntax and Semantics

SDRT is an extension of DRT that takes into account the rhetorical connections between utterances in a discourse or dialogue and the ways these connections add to the truth-conditional content. The additional vocabulary of SDRT includes a set of speech act discourse referents $\pi_1,\ldots,\pi_n$ and relation symbols $R_1,\ldots,R_n$ that reflect the rhetorical connection between utterances. Each speech act referent π labels a token of some DRS K or larger discourse constituent. The well-formed SDRT formulae are defined formally below.

Definition 3 (Syntax of L_{SDRT})**.** The well-formed SDRS formulae of L_{SDRT} are given recursively as follows:

$$\phi \quad := \quad \psi \mid R(\pi,\pi') \mid \phi \wedge_D \phi' \mid \neg\phi$$

where π and π' are labels, R is a binary discourse relation symbol, $\psi \in L_{DRT}$, and $\phi,\phi' \in L_{SDRT}$. $\wedge_D$ is dynamic conjunction.

Segmented discourse representation structures, or SDRSs, are tuples $\langle A,\mathscr{F}\rangle$ consisting of a set of labels A and a function $\mathscr{F}$ from A to SDRS-formulae. By convention, the formula labeled by π, i.e. $\mathscr{F}(\pi)$, is written K_π. For the purposes of dialogue, discourse structures may also contain a function Ag from the set of labels A to the set of conversational participants. $Ag(\pi)$ returns the agent responsible for the speech act or utterance labeled by π, i.e. the speaker.

Like DRSs, SDRS formulae are interpreted as relations between input and output world-assignment pairs. The exact interpretation of an SDRS formula $R(\pi_1,\pi_2)$ depends on the properties of the relation R. For example, if R is a *veridical* relation,

$R(\alpha,\beta)$ entails K_α and K_β. *Narration* and *Result* are veridical relations. If R is *divergent*, on the other hand, $R(\alpha,\beta)$ entails $\neg K_\alpha$ and K_β. *Correction* and *Counterevidence* are examples of divergent relations and play a pivotal role in the analysis of negative interrogative questions in section 5.2.1 and 5.2.2. Divergent relations dispute the content or appropriateness of some prior discourse segment and consequently have a nonmonotonic affect on the updating of an SDRS: assume that $R(\alpha,\beta)$ where R is veridical. If R' is divergent and $R'(\beta,\gamma)$, it follows that both K_β and $\neg K_\beta$. In this case, $R(\alpha,\beta)$ is replaced in the SDRS for the discourse with $Dis(R)(\alpha,\beta)$, which indicates that the relation R between α and β is disputed.

Discourse logical forms, or SDRSs, are constructed by a glue logic that utilizes a nonmonotonic conditional operator $>$ (Asher and Morreau 1991). The general schema for glue logic axioms is given in (35), where "some stuff" represents limited information about α, β and λ that is transferred to the glue logic from lexical and compostional semantics, domain knowledge and information about the beliefs and goals of the discourse participants (Asher and Lascarides 2003).

(35) $(?(\alpha,\beta,\lambda) \wedge \text{"some stuff"}) > R(\alpha,\beta,\lambda)$

In words, (35) states that if the discourse segment λ contains the information that β is to be attached to α and "some stuff" holds of α, β and possibly λ, then normally β is attached to α with the rhetorical relation R. These axioms are defeasible: the inference to R may be blocked by an axiom with a more specific antecedent or if two default rules apply, neither of which is more specific than the other.

5.1.3 Intonation and Meaning

The semantic contribution of intonation plays a critical role in the following analysis. Following Ladd (1980), and more recently Potts (2005a), I assume the existence of an "intonational lexicon". A consequence of this assumption is that intonational tunes, or parts of a tunes depending on the granularity of the analysis, carry specific meanings. The semantic contribution of these intonational "words" is introduced into the discourse logical form, I assume, through axioms of the glue logic. An advantage of this approach is that more specific information can override default interpretations, accounting for the contextual variability of intonational meaning.

One important aspect of the intonational contour of utterances is the final pitch movement, i.e., whether or not an utterance ends in a final rise. *Yes/no* questions in English are typically associated with a final rise. I follow previous analyses in treating boundary tones as conveying speaker and hearer attitudes toward a proposition in a discourse or dialog. Steedman (2003) and Gunlogson (2003), for example, analyze final pitch movements as conveying "ownership" of the proposition, i.e. speaker vs. hearer; Šafářová (2005) analyzes a final rise as contributing a modal expression similar to Veltman (1996)'s $\Diamond$ operator; Marandin et al. (2005) analyze final pitch movements in French as indicators of the speaker's estimation of the compatability of his or her committments with those of the addressee.

The exact phonetic realization of the final rise is not important for present purposes; I follow Pierrehumbert and Hirschberg (1990) and Steedman (2000) and assume that a H% boundary tone marks a final rise. Building on previous analyses, H% is an-

alyzed as an indicator of the speaker's lack of committment to the core proposition of an utterance. The semantic contribution of H% is introduced by the glue logic axiom in (36).

(36) $(?(\alpha,\beta,\lambda) \wedge [\text{H\%}](\beta)) \rightarrow$
$\exists\gamma(?(\alpha,\gamma,\lambda) \wedge [\neg\ \textbf{committed}(Ag(\beta), \textit{core-proposition}(K_\beta))](\gamma))$

Since (36) uses $\rightarrow$ instead of $>$ it is a "hard" constraint, i.e., it cannot be overridden. As stated, the axiom requires that there be some constituent γ with the required content. If there is no such constituent, I assume that one is accommodated.

Nuclear pitch accents make a separate semantic contribution to interpretation. We focus on the L*+H nuclear pitch accent, since this tone is typical of outside-negation NIs. The L*+H tone is characterized by a low pitch target for much of the stressed syllable with a rapid rise toward the end, possibly continuing onto the adjacent, unstressed syllable (Pierrehumbert and Hirschberg 1990). It is often a marker of a divergent speech act, such as *Correction* or *Counterevidence* (Walker 1996). I therefore assume that L*+H introduces the "soft" constraint in (37), which provides information to the glue logic for inferring *Counterevidence* (see Sect. 5.2.2).

(37) $(?(\alpha,\beta,\lambda) \wedge [\text{L*+H}](\beta)) > (\textit{core-proposition}(K_\beta) > \neg K_\alpha)$

This description of the L*+H tone is consistent with Steedman (2003)'s treatment of the L*+H nuclear pitch accent as marking a non-agreed, or contentious, theme. In other words, this tone conveys that the speaker believes that there is information already in the discourse record that he or she does not take to be settled, perhaps because they believe it to be false. Although probably too simplistic, the information in (37) goes some way toward capturing Steedman's analysis.

5.2 Negative Questions in Context

With this formal machinery in place, we can address the use of negative questions in context, focusing on how their rhetorical effect is computed in SDRT. First, we discuss how the question in (38b) is interpreted in the discourse context set up by (38a) on its inside-negation reading.

(38) a. A: No syntacticians are coming to the meeting. (π_1)
b. B: Isn't Jane coming? (π_2)

We then discuss the interpretation of the same question on its outside negation reading, showing how the constraints introduced by intonational features determine the role the question plays relative to (38a).

5.2.1 Inside-Negation Questions

In section 3.1, I argued that inside-negation NI questions are CHECK moves, i.e., questions that ask the addressee to confirm information that follows, either directly or indirectly, from the discourse context. In (38), *A*'s utterance entails that Jane is not coming, assuming that it is common knowledge between *A* and *B* that Jane is a syntactician. As

a result, *B*'s question cannot be a simple request for information since *A* has already answered it.

The inside-negation reading of (38b) is intonationally unmarked relative to the outside-negation reading. While closed interrogatives typically have a final rise in English, there are no prosodic cues that the negation in (38b) is functioning in any way other than truth-functionally. Given the glue logic axiom in (36), then, (38b) conveys that:

$$\neg\ \textbf{committed}(Ag(\pi_2), \textit{core-proposition}(K_{\pi_2}))$$

where,

$$\textit{core-proposition}(K_{\pi_2}) \quad = \quad {}^{\wedge}[x : \textit{jane}(x), \neg[: \textit{come}(x)]]$$

The information that *B* is not committed to the proposition that Jane is *not* coming is consistent with the default goal of asking a question, viz. to know an answer to the question. However, since the discourse context already entails an answer to the question, (38b) can not be a simple request for information. *B* does not convey any contentiousness, for example through the use of a L*+H nuclear pitch accent, so *A* can reasonably infer that *B*'s intent is for *A* to *confirm* the proposition that Jane is not coming. Foregoing many formal details, I capture this relationship in SDRT with the relation *Confirmation*, which holds between an assertion α and question β just in case K_α entails (or presupposes or implicates) *core-proposition*(K_β). The semantics of *Confirmation*, furthermore, requires that for any γ such that $QAP(\beta,\gamma)$,[6] K_γ (defeasibly) entail *core-proposition*(K_β).

In section 1, I noted that inside-negation NIs are biased toward negative answers. This intuition is captured here through the semantics of *Confirmation*: a positive answer to (38b), i.e., that Jane is coming, does not defeasibly entail the core proposition of the question, i.e., that Jane is not coming. At the same time, it allows for indirect answers such as that in (39).

(39) She has the flu.

Answers to confirmation questions repeat the content of the left argument of the *Confirmation* relation or provide additional evidence for it, as in (39).

Negation plays no special role in these cases. Positive interrogatives can just as easily be used as confirmation questions when there is contextual evidence for a particular proposition. (40) is adapted from Gunlogson (2003).

(40) a. [*A* enters *B*'s windowless office wearing a dripping wet rain coat.]
b. B: Is it raining outside?

The context given in (40a) provides evidence that it is raining and (40b) is a request to confirm this information.

Confirmation questions can also target the presuppositions of an utterance, as shown in (41). The presuppostion that there is a king of France entails that France is not a republic (or equivalently that France is a monarchy).

(41) a. A: The king of France is bald.

[6] *QAP* stands for the relation *Question-Answer Pair*.

b. B: Isn't France a republic?
c. B: Is France a monarchy?

Hence, both (41b) and (41c) can be used to ask for confirmation of the presupposition associated with the use of the definite description *the king of France* in (41a).[7]

5.2.2 Outside-Negation Questions

Section 3 argued that outside-negation NI questions can be used to object to the truth-conditional content, presuppositions or implicatures of a prior assertion. It was argued on that basis that the negation in outside-negation questions is metalinguistic, which I take to mean that it applies to some aspect of meaning other than the meaning of the interrogative clause itself. As a consequence, the negation is not part of the core proposition.

$$\textit{core-proposition}(K_{\pi_2}) \quad = \quad {}^{\wedge}[x : \textit{jane}(x), \textit{come}(x)]$$

The glue logic axiom in (36) introduces new content into the discourse logical form, viz. the rather weak assertion that the speaker is not committed to the core propostion of the utterance and that this information attaches to the discourse context with some underspecified rhetorical relation, as shown in (42).

(42) $\exists\gamma(?(\pi_1, \gamma, \pi) \wedge [\neg\ \textbf{committed}(Ag(\pi_2), {}^{\wedge}[x : \textit{jane}(x), \textit{come}(x)])](\gamma)$

If this information is not already in the discourse context it may simply be accommodated and attached with a relation such as *Background*. Our contention is that it is this novel discourse constituent which the negation targets, resulting in:

$$\textbf{committed}(Ag(\pi_2), {}^{\wedge}[x : \textit{jane}(x), \textit{come}(x)])$$

Thus *B* conveys that he is committed to the proposition that Jane is coming. If "the point of an assertive is to get the audience to form, or to attend to, the belief that the speaker is committed to a certain belief" (Clark 1996, p. 134), then in uttering (38b) *B asserts* that Jane is coming. The evidence for this assertion was reviewed in section 4. The assertion plays a pivotal role in computing the overall discourse function of (38b). For example, it short-circuits the default goal of a question – to know an answer – since the speaker has conveyed that they are already committed to one.

This new assertion, labeled π' and instantiating γ in (42), must play some rhetorical role in the dialogue. Intonational and contextual information assist in computing this discourse function. The L*+H nuclear pitch accent contributes the information in (43) to the glue logic.

[7] Confirmation questions pattern with certain uses of rising declaratives, as shown in (i) (Gunlogson 2003).

(i) a. A: The king of France is bald.
b. B: France is a monarchy?
c. B: France isn't a republic?

There is thus reason to believe that final rising intonation plays an important role in the computation of the discourse function of inside-negation NIs, though the important informatin may be conveyed by the use of interrogative syntax itself.

(43) $(?(\pi_1, \pi_2, \pi) \wedge [\text{L*+H}](\pi_2)) > \textit{core-proposition}(K_{\pi_2}) > \neg K_{\pi_1}$

The core proposition of π_2 – that Jane is coming – is the same proposition asserted by π'. I assume, in this case, that the glue logic has access to the information that $K_{\pi'} > \neg K_{\pi_1}$. The glue logic axiom for inferring *Counterevidence* is given in (44).

(44) $(?(\alpha, \beta, \lambda) \wedge K_\beta > \neg K_\alpha) > \textit{Counterevidence}(\alpha, \beta, \lambda)$

Since the antecedent of (44) is satisfied, $\textit{Counterevidence}(\pi_1, \pi', \pi)$ is inferred. In other words, by conveying that they are committed to the proposition that Jane *is* coming, *B* provides counterevidence to the assertion by *A* in (38a).

Section 4 demonstrated that in addition to an assertion outside-negation NIs like (38b) are also questions. It remains to compute the discourse function of the question labeled by π_2. Again, given the assertion of counterevidence in π', it cannot be a genuine information-seeking question. Following Mackenzie (1979), and recent work reported in Maudet et al. (2004), I analyze the question asked by π_2 as an "evidence question", or challenge.[8] In other words, the question *B* asks is what evidence is there for the assertion in (38a). Evidence questions are defined using the SDRT relation $\textit{Evidence}_Q$ as in (45).

(45) $\textit{Evidence}_Q(\alpha, \beta)$ iff β is a question and any answer to β provides evidence for α. (So if $\textit{Evidence}_Q(\alpha, \beta)$ and $\textit{QAP}(\beta, \gamma)$, then $\textit{Evidence}(\alpha, \gamma)$.)

The evidence question interacts with the assertion of counterevidence to produce a very particular rhetorical effect. Not only does it explain the positive bias inherent to outside-negation questions – the speaker *asserts* his committment to a positive answer, but it also provides some insight into the pattern of answers to outside-negation questions, as dicussed in Reese (2006). The dialogue in (38) is repeated in (46) with short negative and positive answers.

(46) a. A: No syntacticians are coming to the meeting. (π_1)
b. B: Isn't Jane coming? (π_2)
c. A: No./#Yes. (π_3)

A simple *yes* is marked as an answer to (46b), while a simple *no* is not. These observations follow from the semantics of the SDRS constructed for (46). The assertion derived from the outside-negation question in (46b) is that Jane *is coming*. This proposition is presented as counterevidence to (46a), which means that it defeasibly entails that at least one syntactician is coming. This follows, if Jane is a syntactician.

A simple *no*, which conveys that Jane is not coming, answers the evidence question, thus providing evidence for *A*'s original assertion. At the same time, it *corrects B*'s assertion that Jane is coming. Recall from the discussion of divergent relations that this results in the replacement of $\textit{Counterevidence}(\pi_1, \pi')$ in the SDRS with $\textit{Dis}(\textit{Counterevidence})(\pi_1, \pi')$, indicating that *B*'s assertion of counterevidence is disputed by *A*. The resulting SDRS is coherent.

[8] On the analysis presented here, the use of an outside-negation NI exemplified in (38) is not a *challenge* in the sense of Mackenzie (1979) or Maudet et al. (2004) since uttering (38b) affects *B*'s committments.

Short positive answers are infelicitous because the proposition they convey is unable to dispute *B*'s counterevidence: both the positive answer and the counterevidence convey the same proposition, i.e., that Jane is coming. Given the definition in (45), the proposition that Jane is coming would have to count as both *Evidence* and *Counterevidence* to the proposition that no syntacticians are coming, which is impossible given the semantics of these relations. More elaborate positive answers may be felicitous. (47), from Reese (2006), for example, gives a positive answer, conveying that Jane is coming, but attacks *B*'s counterevidence claim by correcting the implicature (or assumption) that Jane is a syntactician.

(47) Yes, but she no longer does syntax.

6 Concluding Remarks

The current proposal maintains the "Hamblin Picture"of the meaning of interrogatives; positive and negative closed interrogatives are assumed to be semantically equivalent. The special characteristics of negative interrogatives discussed in section 1, for example the negative and positive bias of inside- and outside-negation interrogatives respectively, were accounted for with respect to how discourse function is computed given the intentions of participants in a discourse or dialogue, in effect, providing a pragmatic account of the peculiar properties of negative questions. *Confirmation* questions, for example, favor a positive answer in contexts where there is evidence *for* a proposition p and a negative answer in contexts where there is evidence *against* the proposition p. This followed from the semantics of *Confirmation*, not the semantics of the question itself.

At the same time, the current proposal relies heavily on a difference in logical form between inside- and outside-negation interrogatives. In this respect, the analysis aligns, at least in its account of Ladd's ambiguity, with the semantic account of Romero and Han (2004). The outside/inside-negation ambiguity results from a difference in logical form. This difference, however, is not a matter of syntactic scope. Rather it concerns the interpretation of the negation. Specifically, I argued that negation in outside-negation NIs has a metalinguistic function, which I take to mean that it negates a dimension of meaning other than the at-issue, or descriptive, meaning. The distinction was critical to the analaysis to the extent that it relied on the *core-proposition* function, which applies to *logical forms*, defined in section 5.1.1. This function played a role in the computation of the semantic contribution of intonation, which also played an important role in the analysis. However, even given this distinction in logical form and intonation, the questions asked by inside- and outside-negation closed interrogatives are equivalent, the scope of the negation not affecting the interpretation of the question. The present approach, by integrating pragmatic and intonational information, is able to provide a relatively straight-forward account of the meaning of negative closed interrogatives.

There are many issues that will have to be left for future work: formalizing the reasoning about intentions and beliefs that was left implicit in sections 5.2.1 and 5.2.2, for example. In addition, there is the possibility of bridging this work with recent work on rising declarative questions (Gunlogson 2003, Šafářová 2005), the biasing affect of

NPIs in questions (van Rooy 2003, Guerzoni 2004, Asher and Reese 2005), bias in *wh*-questions and the role of intonation and prosody on the interpretation of tag questions.

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Pronominal vs. determiner *wh*-words: evidence from the copy construction

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1 Introduction

Wh-copy constructions are interrogatives with copies of a *wh*-word in each of their CPs (as opposed to standard extraction, where there is only one *wh*-word and it's in the matrix CP). In some dialects of German, the copy construction is in free variation with standard extraction.

(1) a. Wen glaubt John dass Mary getroffen hat? *extraction*
who believes J. that M. met has
b. Wen glaubt John wen Mary getroffen hat? *copy construction*
who believes J. who M. met has
Who does John believe that Mary has met? German

This paper presents an analysis of the copy construction that explains its similarity to extraction constructions while accounting for its incompatibility with *wh*+NP phrases. Essentially, *wh*-phrases without an NP complement can be copied because they're non-quantificational (introducing only a free variable into the derivation). *Wh*-phrases with an NP complement cannot be copied because these *wh*-phrases *are* quantificational, and interpreting them twice in the derivation leads to vacuous quantification.

I first describe the properties of the copy construction, focusing on its incompatibility with *wh*+NP phrases. I argue that the restriction on *wh*+NP phrases is not due to D-linking (Pesetsky 1987) or morphological heaviness (Nunes 1999). I then draw on arguments from Wiltschko's (1998) work on pronominal forms in German to argue that there's a semantic difference between *wh*-phrases that occur without an NP complement ('*wh*-pronominals') and *wh*-phrases that occur with an NP complement ('*wh*-determiners'). The former just introduce a free variable x into the derivation, while the

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latter existentially quantify over a variable whose domain is additionally restricted by the NP complement. This claim is initially supported by the pattern of distribution between *wh*-phrases and the pronominals studied by Wiltschko and is bolstered by the distribution of the two types of *wh*-phrases in free relatives (Jacobson 1995, Caponigro 2002, 2004) and in a copy construction version of free relatives.

The core of the analysis explains how the difference in quantificational force between the two types of *wh*-phrases accounts for the incompatibility of *wh*-determiners in the copy construction. I argue (contra i.e. Felser 2004) that a copy construction is just an extraction construction with an overt, rather than covert, intermediate link in the *wh*-chain. When an intermediate copy is pronounced, it has the same semantics as its (pronounced) head-of-the-chain counterpart (type $\langle\langle e,t\rangle t\rangle$). When an intermediate copy is not pronounced, it has the same semantics as its (unpronounced) tail-of-the-chain counterpart (type $\langle e\rangle$).

When a *wh*-pronominal is pronounced twice in a copy construction, two co-referring individual variables are introduced into the derivation, which are later bound by a single existential quantifier (say, by existential closure). On the other hand, when a *wh*-determiner is pronounced twice, it introduces two individual variables bound by two different existential quantifiers. This vacuous quantification leads to an infelicitous semantics of the construction. The paper concludes by examining potential complications and consequences of the analysis.

2 Properties of the copy construction

2.1 The copy construction is like extraction

In some dialects of German, as well as in dialects of Afrikaans, Frisian, Romani and Hungarian, the copy construction is in free variation with standard extraction. The copy construction differs from extraction constructions in that it has, in addition to a *wh*-word in the specifier of the matrix CP, a copy of this same *wh*-word in the specifiers of intermediate CPs.

I give the two constructions in (1) the same gloss because they don't differ semantically: like extraction constructions, copy constructions elicit a single-answer response (which is to say they're not multiple-*wh*-questions).

The copy construction is multiply iterable, but optionally so (Höhle 2000, Andre Nuendel p.c.). So a multiply embedded *wh*-question may or may not have *wh*-words in each of its CPs.

(2) a. *Wen* glaubt John dass Hans meint dass Mary getroffen hat?
b. *Wen* glaubt John *wen* Hans meint dass Mary getroffen hat?
c. *Wen* glaubt John *wen* Hans meint *wen* Mary getroffen hat?
d. *Wen* glaubt John dass Hans meint *wen* Mary getroffen hat? German

However, the two (or more) *wh*-words in the copy construction are in the same

wh-chain, which means that they differ in structure and meaning from the ones in sentences like *Who wins depends on who enters the race.*[1]

2.2 The copy construction is not like *wh*-scope-marking

The copy construction crucially differs from *wh*-scope-marking constructions, which also happen to occur in some German dialects (although independently of the copy construction). I will address *wh*-scope-marking here only to show that it differs significantly from the copy construction and is therefore not relevant to the discussion at hand. I direct interested readers to Lutz, Müller & von Stechow 2000.

(3) Was glaubt John wen Mary getroffen hat? *scope-marking*
what believe J. who M. met has
Who does John believe that Mary has met? German

Whereas the copy construction has a copy of the same *wh*-word in the CP of the embedded and matrix clauses, *wh*-scope-marking constructions have a default *wh*-phrase (*was*, or 'what', in German, 'how' in other languages) in the CP of the matrix clause, while the meaningful *wh*-phrase is in the CP of the embedded clause.

Scope-marking differs significantly from extraction and copy constructions. First, copy (and extraction) constructions, but not scope-marking constructions, allow for cross-clausal quantifier binding in sentences like *Where does every man think he will get a job?* (Dayal 1994). Second, copy and extraction constructions are ambiguous between an individual and pair-list reading in questions with a quantifier in the matrix clause, whereas *wh*-scope-marking constructions receive only the pair-list reading (Pafel 2000, Fanselow & Mahajan (2000)).[2]

Thirdly, according to Dayal 2000, scope-marking constructions, but not extraction and copy constructions, are incompatible with de dicto/de re presuppositions in sequences like, "I know no one will volunteer. But who does Mary think will volunteer?". The same is true for consistent vs. inconsistent readings (as reported in Reis 2000): whereas the copy and extraction constructions can receive the "second source" reading crucial for the coherent reading of the sentence *Where does Mary believe John is more popular than he is?*, scope-marking constructions cannot.[3]

[1] Thanks to an anonymous CSSP reviewer for bringing the potential confusion of these constructions to my attention.

[2] Felser 2004 (p. 557) reports, citing Pafel 2000, that the copy construction may not be able to receive an individual reading. But Pafel admits confusion about whether or not the copy construction can be interpreted in these constructions (p. 340). Since my informants can get both readings, and since Pafel admits that the individual reading is possible in some circumstances, I feel that my above claim is substantiated.

[3] Once again, this goes against the judgment reported in Felser 2004 (p. 557-8). She argues that the copy-construction equivalent of questions like *Where does Mary believe John is more popular than he is?* is infelicitous. This goes against my informants' reports of German (for *Wo glaubt Mary wo ist John populŁrer als er ist?* as well as reports of the behavior of the copy construction in Hungarian (Horvath p.c.). Additionally, Felser uses this data to argue that the intermediate copy in the copy construction needs to be interpreted for scope purposes. According to Reis' account, however, *wh*-scope-marking constructions don't interpret the intermediate copy as a *wh*-phrase in the same chain as the head *wh*-

To sum up, the copy construction is a clear variant of the extraction construction; *wh*-scope-marking constructions need to be analyzed in some other way due to their aberrant semantic properties. See Dayal (1994, 2000) for just such an analysis, triggered by the examination of *wh*-scope-marking constructions in Hindi.

I'd also like to point out that the copy construction different from the constructions in Poletto & Pollock 2004, which they refer to as '*wh*-doubling' (examples here from Illasi, a Verona dialect).

(4) a. S' a-lo fat che?
what has-he done what
What has he done?
b. Ndo e-lo ndat endoe?
where is-he gone where
Where has he gone? Ilasi, a Verona dialect

For starters, the two *wh*-phrases (the high and the low) usually take different forms, with the high *wh*-phrase behaving like a clitic. Secondly, the high phrase can be pronounced without the low phrase being pronounced, and vice-versa. These properties of *wh*-doubling, and more, are enough to separate the two constructions (although see 4.1 for one final mention of *wh*-doubling).

2.3 Ways in which the copy construction differs from extraction

Although the copy construction patterns very closely with extraction, it does differ from extraction in a few ways. Most notably, it is incompatible with *wh*+NP phrases.

(5) a. Welche Bücher glaubst du dass sie gerne liest?
which book believe you that she gladly reads
b. *Welche Bücher glaubst du welche Bücher sie gerne liest?
which book believe you which book she gladly reads
Which book do you believe she gladly reads? German

This restriction extends to all *wh*+NP phrases, including *what book* and *how many books*. But it is not related to D-linking (Pesetsky 1987):

(6) Susie has only three dollars.
a. Wieviel meint sie wieviel das kostet?
how.much thinks she how.much that costs
b. *Wieviel Geld meint sie wieviel Geld das kostet?
how.much money thinks she how.much money that costs?
How much money does she think that costs? German

phrase, but rather as the head *wh*-phrase in the second of two sequential questions with the syntax of embedded questions (see Dayal 1994, 2000 for details of this approach).

The first sentence in (6) establishes that money, specifically Susie's three dollars, is contextually salient. Given this, (6-a) and (6-b) are equally D-linked. Despite this, the disparity between the *wh*-phrase and the *wh*+NP phrase remains.

Nor is the restriction related to phonological or morphological heaviness (contra Nunes 1999). Whereas *wh*+NP phrases are incompatible with the copy construction, most PP+*wh* phrases are not:

(7) a. Mit wem glaubst du mit wem Hans spricht?
with whom believe you with whom H. talks
Who do you think Hans is talking with?
b. Auf wem hat sie gesagt auf wem er warten soll?
on whom has she said on whom he wait should
Who has she said he should wait on? German

Although the *wh*+PP phrases in (7) *are* compatible with the copy construction, there are some *wh*+PP phrases that are not, for instance *unter wem*, although my informants differ on their judgment of i.e. *Unter wem glaubst du unter wem er am meisten leidet?*. This could indicate that morphological heaviness *does* play a role in the acceptibility of the copy construction, but the data in (7) indicate that it isn't the only factor.

Finally, unlike extraction constructions, copy constructions are incompatible with matrix negation.

(8) a. Wen glaubst du nicht dass sie liebt?
who believe you not that she loves
b. *Wen glaubst du nicht wen sie liebt?
who believe you not who she loves
Who don't you believe she loves? German

It's debated whether or not this restriction extends to negative quantifiers like *noone* and negative predicates like *doubts* (Felser 2004, Fanselow & Mahajan 2000, among others). The restriction on *wh*+NP phrases in the copy construction will be discussed throughout the paper, as it motivates the analysis. The restriction on matrix negation will be discussed in Section 5.2.

3 *Wh*-phrases and quantification

This section presents several arguments for the background assumptions required for the analysis. I'll first introduce the distinction between pronominal and determiner *wh*-phrases by drawing an analogy to work on German pronominals in Wiltschko 1998. Pronominal *wh*-phrases are ones where the *wh*-word does not take an NP complement; determiner *wh*-phrases do take NP complements.

I'll then introduce the idea that *wh*-phrases are not quantificational (specifically, they introduce free variables), based on some observations of the behavior of *wh*-phrases in free relatives (Jacobson 1995, Caponigro 2004). I'll argue that *wh*-pronominals

are not quantificational in just this way (they function as indefinites in the Heimian sense), while *wh*-determiners are quantificational (which is to say, they introduce a variable bound by an existential quantifier). This distinction is supported by, among other things, the fact that *wh*-pronominals are compatible with free relatives but *wh*-determiners are not. These assumptions play a crucial role in the analysis presented in Section 4.

3.1 A parallel with Germanic pronominals

Wiltschko 1998 looks at two types of pronominal forms in German; personal pronouns (*er, sie, es*) and d-pronouns (*der, die, das*). These pronominals sometimes can (9-a) but sometimes cannot (9-b) occur in the same environment.

(9) a. Maria hat ihn /den gesehen.
M. has him /d-pron seen.
Mary has seen him.
b. Es /∗das kam ein Mann zur Tür herein.
it /d-pron came a man to-the door herein.
There came a man through the door. German

Wiltschko argues against the standard view that d-pronouns are transitive determiners and personal pronouns are intransitive determiners. She concludes that d-pronouns are full DPs containing an empty NP while personal pronouns are the "mere spell out of phi-features, i.e. an instantiation of AgrD, rather than an instantiation of D" (p. 148).

This difference in lexical status affects the internal semantics of personal pronouns and d-words. Wiltschko quotes Longobardi 1994: "Determiners are semantically understood as operators binding a variable, whose range is always the extension of the natural kind referred to by the head noun" (p. 633).[4]

Wiltschko's proposal takes two types of words thought to be determiners and argues that one type, personal pronouns, are not in fact determiners. I extend this conclusion to *wh*-words; of the two sorts of *wh*-words thought to be quantificational (those taking NPs and those not taking NPs), only one type, those taking NPs, is in fact quantificational. *Wh*-pronominals, then, are non-quantificational assemblies of features.

If this were true, d-words (by virtue of having determiners) and *wh*-pronominals (by virtue of being pronominal non-determiners) would be in complementary distribution, as would personal pronouns and *wh*-determiners. This seems to be the case,

[4]Wiltschko explains the fact that d-prons never occur with NPs by arguing that d-prons, by virtue of their status as strong arguments, are able to license empty NPs. She demonstrates this distinction with a discussion of Dutch strong and weak determiners (p. 161). This poses a question for the present analysis: if an empty NP can fulfill this requirement for an NP position, why do *wh*-determiners always need an overt NP? I strongly suspect that one could successfully argue that *wh*-determiners in German are weak arguments, as opposed to their d-pron counterparts. However, this argumentation is beyond the scope of this paper.

for the few available tests[5] (Wiltschko 1998: 146):

(10) a. Nimm das Buch, das /∗was du willst.
take the book d-pron /what you want.
Take the book you want.
b. Nimm, was /∗das du willst.
take, what /d-pron you want.
Take whatever you want. German

So we have a pronominal paradigm on which to build a distinction between *wh*-pronominals and *wh*-determiners: the former, as a bundle of phi- and *wh*-features, is non-quantificational. The latter, because they're operating over a range restricted by the NP complement, are quantificational.

Before we see how this works in extraction and copy constructions, I'll present some evidence from the behavior of *wh*-words and phrases in free relatives to bolster the idea that *wh*-pronominals are not quantificational and *wh*-determiners are.

3.2 A parallel with free relatives

This section draws on work on free relatives[6] like Jacobson 1995, Dayal 1995 and Caponigro 2002, 2004 to argue that a) *wh*-phrases that occur in free relatives aren't quantificational, and b) since *wh*-determiners, as they're defined above, do not occur in free relatives, there is no reason to extend this generalization to them. It implicitly assumes that, all things being equal, it's desirable to have a theory that gives *wh*-phrases in free relatives and *wh*-phrases in interrogatives the same semantics.

First, Jacobson (1995) and Dayal (1995) note that *wh*-phrases in free relatives behave more like plural definites than quantifiers both in their distribution (11) and in their ability to receive either universal and existential readings, depending on the sentence (12):

(11) I don't like everything/*what/*the things Sue ordered but I like most of them.

(12) a. I ordered what he ordered for dessert. (=the thing he ordered)
b. Do what the babysitter says. (=everything the babysitter says)

Jacobson proposes that *wh*-phrases aren't quantificational in free relatives. Caponigro (2002) expands on this claim, arguing based on crosslinguistic data that *wh*-phrases just introduce free variables, with restrictions on the predicate correlating to the particular *wh*-phrase ('animate(x)' for who, 'location(x)' for $where$, etc.). These free vari-

[5] These examples involve *wh*-words in free relatives. Although I've mainly discussed interrogative *wh*-words so far, I'll demonstrate in Section 3.2 that these generalizations extend to *wh*-words in free relatives too.

[6] For the purposes of this paper, I'll ignore $-ever$ free relatives ('I ate whichever food John cooked'). These constructions seem to have significantly different semantics due to the contribution of *-ever*: it signals the speaker's ignorance and patters strongly with universal, rather than existential, quantifiers. These constructions therefore do not provide a good environment for the investigation of the meaning of *wh*-phrases. See Dayal 1997 and von Fintel 2000.

ables are later bound by non-DP quantifiers or lambda-abstraction (whereas indefinites, which are analyzed by Heim (1982) as introducing free variables, can be bound by higher DP quantifiers in i.e. donkey-anaphora sentences).

Now the question is, given our distinction above between *wh*-pronominals and *wh*-determiners, can this analysis of *wh*-phrases as non-quantificational be extended to *wh*-determiners? It seems like it cannot. *Wh*-determiners, but not *wh*-pronominals, are straightforwardly incompatible with free relatives:

(13) a. I ate what John cooked.
b. *I ate which food John cooked.[7]

So it seems that our motivation for thinking of *wh*-pronominals as non-quantificational, specifically their behavior and distribution in free relatives, cannot be extended to *wh*-determiners.

I mentioned above that the arguments from free relatives can be extended to our investigation of the copy construction only if we believe there is a parallel between *wh*-phrases as they occur in free relatives and *wh*-phrases as they occur in interrogatives. This belief is supported by the novel fact that the copy construction is available in free relatives in those dialects that allow for them in interrogatives.

(14) a. Ich traf wen John meint wen Mary liebt.
I met who J. thinks who M. loves.
I met who John thinks Mary loves.
b. *I traf welche Person John meint welche Person Mary liebt.
I met which person J. thinks which person M. loves.
I met who John thinks Mary loves. German

Just as in the interrogative form of the copy construction and the non-copy-construction form of free relatives, *wh*-determiners are incompatible in the copy construction form of free relatives.

I conclude this section having substantiated the distinction between *wh*-pronominals, *wh*-phrases without NP complements, and *wh*-determiners, those that occur with NP complements. The argument stems from a similar distinction made by Wiltschko 1998 with respect to pronouns, and is bolstered by the distribution of *wh*-phrases in similar constructions. I've also argued that there's a semantic difference between the two types of *wh*-phrases: *wh*-pronominals introduce free variables (along with a property 'animate,' etc.), which is later bound by non-DP quantifiers or lambda-abstraction (see Caponigro 2002). *Wh*-determiners, on the other hand, existentially quantify over the individual variable they introduce, and this variable is further restricted by the NP complement to the *wh*-phrase.

[7] This construction is possible in some languages, none of which are Germanic, and none of which allow the copy construction (see Caponigro 2004 for an indepth crosslinguistic survey of free relative constructions).

The next section outlines how these distinctions account for the properties of the copy construction.

4 The analysis

The analysis takes for granted that extraction and copy constructions differ only with respect to the fact that the former don't spell out intermediate copies while the latter do. The idea is that if a copy is pronounced it has the same semantics as the (pronounced) head of a chain is, and if it is not pronounced, it has the same semantics as the (unpronounced) tail of a chain is (i.e. as a variable of type ⟨e⟩).[8]

4.1 The semantics of *wh*-pronominals

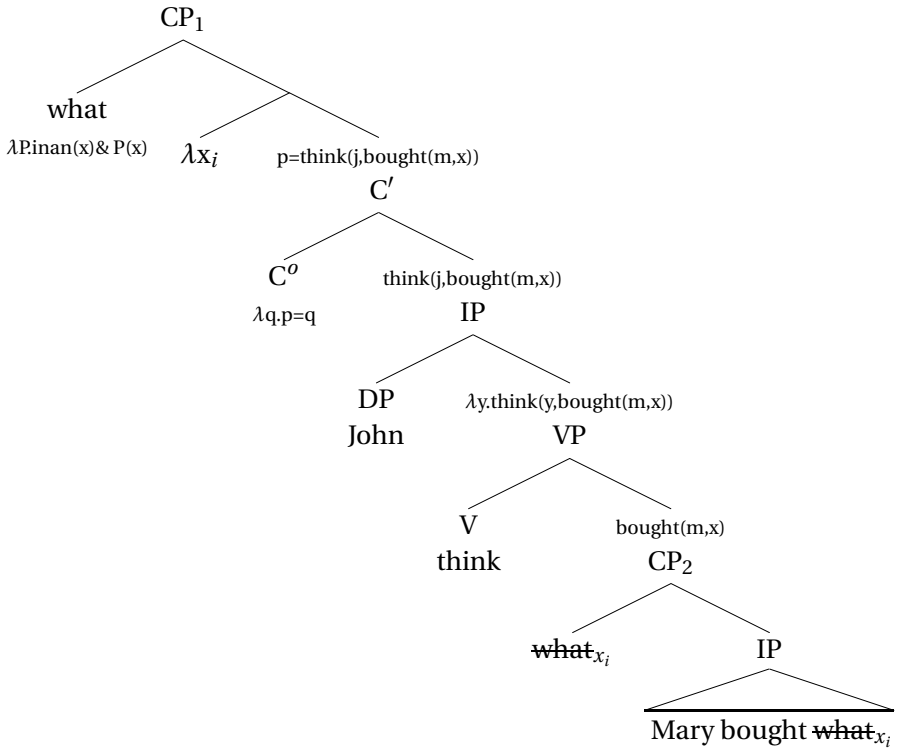
I'll first demonstrate how the semantics of *wh*-pronominals works, first in a standard extraction construction and then in a copy construction. Below are the two meanings of the word *what* as it occurs as a *wh*-pronominal (15-a) and a *wh*-determiner (15-b).

(15) a. $[\![what_1]\!]$ = λP.inanimate(x) & P(x) *(wh-pronominal)*
b. $[\![what_2]\!]$ = λQλPλx.inanimate(x) & Q(x) & P(x) *(wh-determiner)*

(16) is a derivation of an extraction construction with a *wh*-pronominal. (17) is a derivation of a copy construction with a *wh*-pronominal. I'll show that a derivation of a *wh*-pronominal extraction construction, given existential closure is just the same as a standard Hamblin semantics of questions, and that the derivation of a *wh*-pronominal copy construction, given existential closure, differs from extraction only insignificantly.

(16) *What* in extraction constructions:
a. What does John think Mary bought?
b. λp∃x.inanimate'(x) & p=think'(j, bought'(m,x))

[8]Such an analysis requires a novel view about the interaction between LF and PF. I cannot offer a proposal here but rather direct the readers to papers that have tried to address this tension in other phenomena: Bobaljik 2002 and Sauerland 1998, among others.



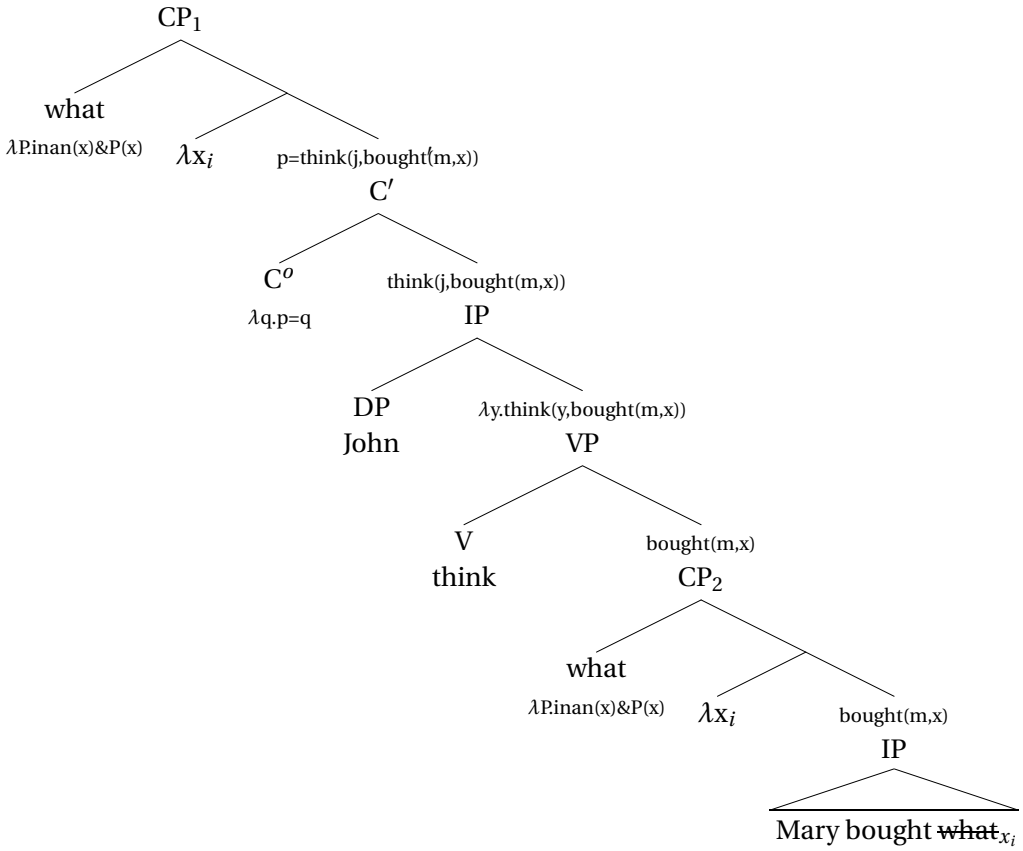
The tail of the *wh*-chain and the intermediate *wh*-copy are both interpreted as x, an individual variable of type ⟨e⟩, because they are unpronounced in an extraction construction. These variables are lambda-abstracted over right before their moved counterpart, the overt *what* in the specifier of CP, is interpreted. These are all standard moves. Finally, the head of the chain, the pronounced *what*, introduces the same individual variable x along with the property *inanimate*. At the end of the derivation in (16), we have two coreferring unbound variables x,[9] which are both bound by existential closure at the end of the utterance (see Caponigro 2002 for alternative ways of binding these variables).

(17) *What* in copy constructions:

a. What does John think Mary bought?

b. λp∃x.inanimate'(x) & p=think'(j,inanimate'(x) & bought'(m,x))

[9]...and an unbound p variable: to simplify the type of the *wh*-phrase, I've removed a λp argument from its meaning, and am attributing lambda-abstraction over p to context at the moment. The reader may adjust for this on his own by thinking of the meaning of *what* as λPλp.inanimate'(x) & P(x).



In (17), the tail of the chain is interpreted as x, just as it was in (16). The difference is that the intermediate copy has the same semantics as the head of the chain. This means that it, too, introduces the property *inanimate* along with the unbound variable x. But at the end of the derivation, there (again) remains three unbound coreferring x variables, and they are bound by a single existential quantifier.

Close comparison of (16) and (17) shows that the two differ only in that (17), the copy construction derivation, has an additional 'inanimacy' property in the scope of the belief operator. It's not clear that this is a significant difference; standard analyses of extraction don't require that (for instance) John think of x that x is a person, but it's not clear that they shouldn't. The *wh*-phrase originates under the scope of the belief operator, so it stands to reason that the *wh*-phrase reflects the belief state, rather than the real world.[10] This means that the additional 'inanimacy' property embedded under the belief operator is interpreted, but somewhat redundantly.

Interestingly, this analysis, unlike other copy construction analyses, can account for why the tail of the chain is never pronounced in these constructions:

[10] I presented several speakers (English and German) with a scenario in which John thinks Mary kicked Bob, where Bob is an actual person in the real world, but John thinks Bob's a dummy. When asked which question sounds better, *Who does John think Mary kicked?* or *What does John think Mary kicked?* (and their corresponding copy constructions), my informants were divided and unconfident. This stresses to me that an i.e. 'animacy' property embedded under the bridge verb is inconsequential.

(18) *Wen glaubt John dass/wen Mary getroffen wen hat?
who believes J. that/who M. met who has?
Who does John believe Mary has met? German

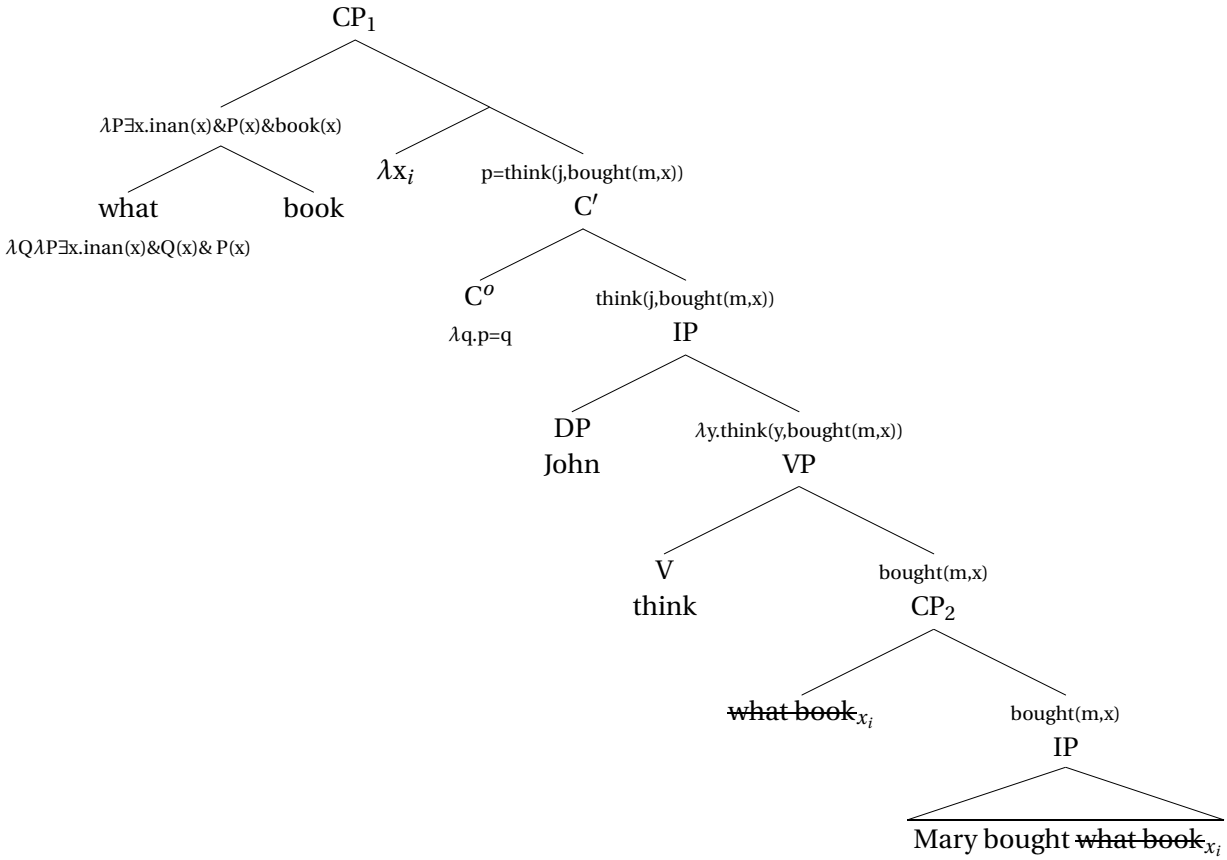
If the tail of the chain in (18) were pronounced, it would be of type ⟨⟨e,t⟩t⟩, and couldn't properly combine as the argument of the VP met.[11] Also, recall the Italian *wh*-doubling data in (4); although this construction differs significantly from the copy construction, it's interesting to note that even these constructions don't spell out the tail of the *wh*-chain: "...there are good reasons to believe that the 'strong' wh-form at the right edge of the sentence is not standing in an in situ position within IP" (Poletto & Pollock 2004: 257).

4.2 The semantics of *wh*-determiners

We've seen that it's because *wh*-pronominals introduce a free variable, rather than quantify over the variable, that allows for them to be overtly iterated in the copy construction. This section demonstrates that it's the downfall of *wh*-determiners that they introduce a quantifier into the derivation, which leads (in the case of iteration) to vacuous quantification. I'll start by showing that our conception of *wh*-determiners doesn't pose a problem for their use in an extraction construction.

(19) *What*+NP in extraction constructions:
a. What book does John think Mary bought?
b. λp$\exists$x.inanimate'(x) & book'(x) & p=think'(j,bought'(m,x))

[11] As Roger Schwarzschild and Angelika Kratzer (p.c.) independently point out, this doesn't work as cleanly for subject *wh*-phrases; no type mismatch results from $met\ John$ having an ⟨⟨e,t⟩t⟩ subject. However, it's not immediately obvious that subject tails of a chain, as opposed to object tails, $can't$ be spelled out; one could argue, for instance, that since spelling out an subject tail would result in a repetition of the *wh*-word ('Who does John think who who Mary met?'), there's a phonological restriction against realizing both copies overtly. However, the details aren't crucial for the core of my proposal, for which the above restriction against pronouncing the tail of a chain is only an added bonus, so I'll leave them aside.

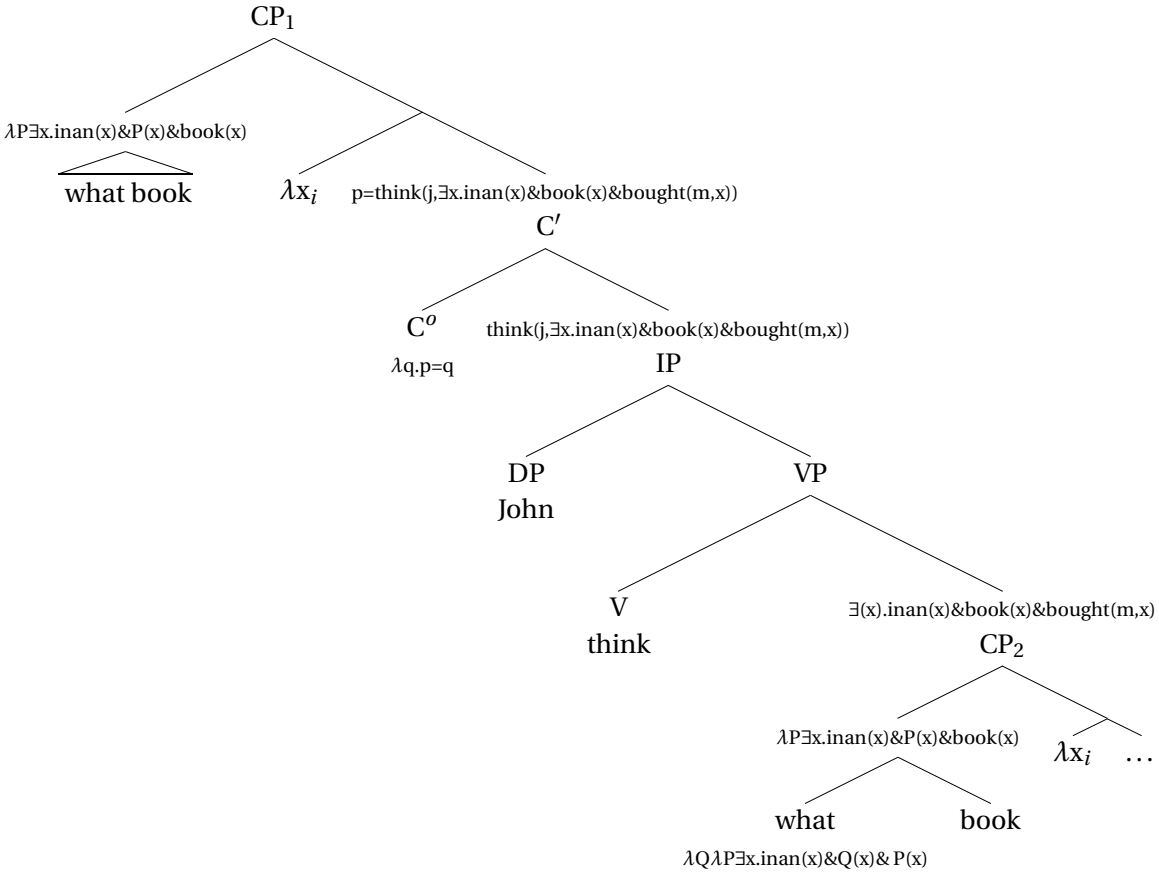


This works much like (16) above; the tail and the intermediate copy, because they're not pronounced, are interpreted as individual variables. The head of the chain introduces a third coreferring variable in addition to an existential quantifier which binds all three. The semantics of (19) is identical to those of (16), it just doesn't rely on existential closure. The semantics of *what*+NP in the copy construction, however, are a different matter entirely:

(20) *What*+NP in copy constructions:

a. *What book does John think what book Mary bought?

b. λp$\exists$x.inan(x) & book(x) & p=think'(j,$\exists$x.inan(x) & book(x) & bought(m,x))



In (20), the tail of the chain, as always, contributes a free individual variable to the derivation. The intermediate copy is interpreted with the meaning of a *wh*-determiner, however, which means that it existentially binds both the individual variable it introduces and the one introduced by the tail of the chain. This means that the head of the chain, which introduces a second existential quantifier, can bind only the individual variable it introduces, leading to vacuous quantification.

This analysis, in which a *wh*-pronominal can be spelled out as an intermediate copy but a *wh*-determiner cannot, is further supported by a dialect-specific version of the copy construction in which a *wh*-determiner heads the *wh*-chain and a coreferring *wh*-pronominal is spelled out as the intermediate chain link:[12]

(21) Welche Person glaubt John welche Mary getroffen hat?
which person believes J. which M. met has?
Which person does John believe Mary has met?

Although this data requires a separate story about how *welche Person* and *welche*, two non-identical *wh*-phrases, can be in a single *wh*-chain, it suffices to show that the

[12]Thanks to Hedde Zeijlstra for this data.

ability of a wh-phrase to be an overt intermediate copy in the copy construction has entirely to do with whether or not it takes an NP complement.

5 Consequences

The main claim of this paper, of course, is that *wh*-phrases are quantificational when they take an NP complement and non-quantificational when they don't. When a *wh*-phrase is quantificational, it cannot be copied; when a *wh*-phrase is non-quantificational, it can be.

This next section explores consequences of such an analysis. It starts by addressing the copyability of *how many* constructions: if the *many* in *how many* is quantificational, why can it be copied?[13] It moves on to address a robust difference between extraction and copy constructions: the former, but not the latter, allows matrix negation.

5.1 *How many* constructions

Crucial to this section is the perhaps surprising grammaticality of the following:

(22) Wieviel meint sie wieviel das kostet?
how.much thinks she how.much that costs
How much does she think that costs? German

The reason this might be surprising, given the above analysis, is because standard theories of *how many* constructions analyze *many* [14] as an existential quantifier over individual variables, specifically pluralities (and, usually, *how* as an existential quantifier over degree variables). This sort of analysis is defended in Romero 1998 and Hackl 2000 and used in Cresti 1995 and Fox 1999.

(23) $[\![many]\!] = \lambda P \lambda d \lambda Q \exists X.P(X) \,\&\, Q(X) \,\&\, |X|=d$

This sort of analysis, very briefly, is motivated by two sorts of considerations: 1) arguments in Bresnan (1973) that $more$ in comparative constructions is historically derived from the morphemes *much* and $-er$, and 2) observations that, for instance, since *too* and *how* in the phrases *too many* and *how many* are quantifiers over degree variables, there must be some morpheme lower than *too* and *how* that quantifies over the individual variable *X* and attributes a degree to the size of the plurality. Given these two considerations, it seems useful to attribute the meaning in (23) to *many*. If this is the case, then *many* is quantificational, and its copyability in (22) poses a problem for the analysis presented above.

However, there are several reasons to think that the meaning in (23) *shouldn't* be associated with the word *many* (and that *many* is instead a predicate over sets of de-

[13] Thanks to Veneeta Dayal for posing this question.

[14] I'll collapse discussion of *many* and *much* in this section, treating them as different only in the count/mass specification of their NP complement. See Rett 2005 for further argumentation.

grees: see Schwarzschild 2002). I'll present two here for consideration, and direct interested readers to Rett 2005. First, data from French *combien* split-NP constructions (Obenauer 1984, de Swart 1992):

(24) a. Combien de livres faut-il que vous lisiez? $\exists x \gg \Box$
how.many of books it's.necessary that you read
b. Combien faut-il que vous lisiez de livres? $*\exists x \gg \Box$
how.many it's.necessary that you read of books
How many books must you read? French

Both of the *how many* constructions in (24) can get a reading where the necessity operator takes wide scope with respect to ∃x, the reading where the requirement is that you read three books, any three books (think of the requirements for a speed-reading class, as opposed to those of a class on a particular topic). However, only (24-a) can get the reading where ∃x scopes outside of the necessity operator ('There are three books such that you have to read them,' think of a class on Alexandre Dumas).

However, the two constructions differ only in the position of the NP *books*; the morpheme *many* , assuming that it's associated with the *wh*-phrase *combien*, is pronounced high with respect to the necessity operator in both sentences. Since the data in (24) show that the relative location of the pronunciation of the NP is enough to effect the relative location of interpretation of the individual quantifier, there is reason to believe that this quantifier is associated with the NP (or some morpheme more closely connected to the NP) rather than to the morpheme *many*.

A second reason for divorcing the existential quantifier from the morpheme *many* comes from languages in which the *many* in *how many* is optional (the example below is Romanian; this is also possible in Macedonian and Bulgarian).

(25) a. Cîte femei ştie?
cît-Fpl women know.3sg
b. Cît de multe femei ştie?
cît of many-Fpl women know.3sg
How many women does he know? Romanian

The monomorphemic *how many* form in (25-a) demonstrates that no overt *many* is needed to ask a *how many* question in Romanian (and, of course, there are lots of other languages whose *how many* phrase doesn't involve a compositional *many* or *much*). However, it's possible in the construction in (25-b), and its inclusion slightly changes the semantics of the sentence (adding a sense of maximality, among other things: see Rett 2005) (showing that it's not present even covertly in (25-a)).

The fact that *many* is optional in *how many* constructions in Romanian indicates that it is not responsible for existentially quantifying over x; if this were the case, x would be unbound in (25-a), leaving it ungrammatical. See Rett 2005 for an analysis of the meaning of *many* that accounts for its optionality in (25) in addition to its semantic influence in (25-b).

This section has shown that there's more than enough reason to believe that the existential quantifier over individuals is not correlated with the word *many*. This means that its iteration in (22) is unproblematic for the above analysis.

5.2 Negation

The copy construction is incompatible with matrix negation, a fact which has in the past been attributed to movement violations over negative islands.

(26) a. Wen glaubst du nicht dass sie liebt?
who believe you not that she loves
b. *Wen glaubst du nicht wen sie liebt?
who believe you not who she loves
Who don't you believe she loves? German

Since extraction and copy constructions do not differ in the above analysis on the type of movement they employ (successive-cyclic v. across-the-board) and since, contra Felser 2004, I do not consider the higher copy to be the operator and the lower to be its restrictor, I cannot appeal to negative islands to explain the ungrammaticality of (26-b).[15]

I'd like to note only that the class of verbs that allow for the copy construction ('bridge verbs': *think*, *believe*, and a few others) correspond for the most part to neg-raising verbs, and to also suggest that non-neg-raising predicates (for instance, factive verbs) are generally ungrammatical with matrix negation in interrogative constructions (from Dayal 2000):

(27) *Wohin bedauerte sie dass Hans ging?
where regretted she that H. went
Where did she regret that Hans went? German

6 Conclusion

The fundamental claim of this paper is that *wh*-phrases quantify over an individual variable when they occur with an NP complement and introduce a free individual variable when they do not occur with an NP complement. I've tied this claim strongly to similar ones with respect to pronominals in German (Wiltschko 1998) and free relatives crosslinguistically (Jacobson 1995). I've demonstrated how it accounts for the copy construction data: *wh*-pronominals are copyable, while *wh*-determiners are not, the latter because they lead to vacuous quantification. This claim is additionally supported by the fact that *wh*-determiners are incompatible with free relatives (and the copy construction version of free relatives) and by the fact that *wh*-determiners are permissible in the copy construction when the intermediate copy is a *wh*-pronominal.

[15] Nor can I appeal to a method of subextraction as in Rizzi & Schlonsky 2004, because it would require analyzing the top copy as an expletive, as was originally proposed in Cheng 2000.

Two consequences of the analysis are 1) further motivation for analyzing the word *many* in *how many* constructions (presumably the *viel* part of *wieviel*) as non-quantificational, and 2) reason to think that the restriction on negation is not syntactic (i.e. doesn't have to do with movement restrictions across negative islands). Furthermore, the analysis, which calls *wh*-determiners but not *wh*-pronominals quantificational, contrasts dramatically with the analysis of D-linked (usually *wh*-determiner) phrases as non-quantificational (Pesetsky 1987). Some work will need to go into reconciling the two approaches.

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Don't Believe in Underspecified Semantics
Neg Raising in Lexical Resource Semantics

Manfred Sailer *

1 Introduction

Neg raising is a construction that has been widely studied from different theoretical perspectives, going back to the classic philosophers (cf. Horn (1989)). Yet even the most central properties have not received a satisfactory integration into a linguistic framework. In this paper I will try to approach the phenomenon from a new angle: that of scope ambiguity.

In neg raising (NR) a negation in the matrix clause is understood as negating the complement clause. Such readings are only possible with certain matrix predicates such as *believe*, *think*, *want*, so-called *neg raising predicates* (NR predicates). For illustration, (1-a) can either mean that it is not the case that John thinks Peter will come, or it can be seen as expressing the same idea as (1-b).

(1) a. John doesn't think Peter will come.
b. John thinks Peter will not come.

I will argue that in (1-a), the negation is syntactically realized in the matrix clause, but that it can take scope either in the matrix or in the embedded clause. In a way this can be seen as the exact opposite of the classic syntactic transformation of *negation raising* (Fillmore, 1963), in which a negation is syntactically moved out of an embedded clause into a higher clause.

I have encoded my proposal within the syntactic framework of *Head-Driven Phrase Structure Grammar* (HPSG, Pollard and Sag (1994)) using techniques of *underspecified semantics* for the syntax-semantics interface. Frameworks of underspecified semantics (Pinkal, 1996) provide the necessary ingredients to model the empirical generalization as an instance of *scope ambiguity*. In this paper, I use *Lexical Resource Semantics* (LRS, Richter and Sailer (2004)), but it should be possible to express the basic idea within other underspecified frameworks as well, such as *Constraint Language for Lambda Structures* (Egg et al., 2001), *Minimal Recursion Semantics* (Copestake et al., 2005), or the semantics proposed for *Lexical Tree Adjoining Grammar* in Kallmeyer and Romero (2006).

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In Section 2 I present data to justify the claim that in a neg raising construction, the negation is syntactically part of the matrix, but semantically part of the embedded clause. The data will mainly stem from English, Dutch and German. Previous approaches and their problems are sketched in Section 3. Section 4 contains a brief introduction to Lexical Resource Semantics, focusing on the aspects needed for the analysis of NR. The analysis is then presented in Section 5. A short summary and directions for future research are given in Section 6.

2 Data on Neg Raising

The most enlightening study of NR to date, and also the primary source of this paper, is Horn (1978). Horn lists a number of NR predicates for English, ordered according to semantic categories. I present Horn's classification together with a subset of the predicates he lists in (2). The "%" symbol indicates that the given predicate is an NR predicate for some speakers, but not for others.

(2) NR predicates (Horn, 1978, p. 187):
   a. opinion: think, believe, suppose, imagine, expect, reckon, % anticipate, %guess
   a′. perception: seem, appear, look like, sound like, feel like,
   b. probability: be probable, be likely, figure to
   c. intention/volition: want, intend, chose, plan
   c′. judgment/(weak) obligation: be supposed to, ought, should, be desirable, advise, suggest

It is important to note that not all predicates that fall within a certain category are really NR predicates. This is already obvious from the "%" marking in (2). The following list is also taken from Horn. Note that close translations of some of the non-NR predicates in English are indeed NR predicates in other languages. For example, German *hoffen* (*hope*) is mentioned as an NR predicate in Horn (1978), but English *hope* appears on the list of non-NR predicates.

(3) Not NR predicates (Horn, 1978):
   hope, realize, know, be certain/sure, claim, insist on, demand, have to, order

In this section I will try to provide empirical support for the major analytical claim of this paper: that the negation in an NR construction is semantically part of the embedded sentence (in Section 2.1), but syntactically part of the matrix sentence (in Section 2.2).

2.1 The Negation is Semantically in the Embedded Clause

To substantiate the claim that the negation in NR constructions is semantically part of the embedded clause, I will first review the classical data which demonstrate that strong negative polarity items can occur in the embedded clause. Then, I will show that the negation does not license negative polarity items in the matrix clause.

2.1.1 Polarity Item Licensing in the Embedded Clause

The strongest argument for an embedded position of the negation in an NR construction clearly comes from their licensing potential for *negative polarity items* (NPI). The data in (4-a) show that the word *ever* is an NPI, i.e., it cannot occur if there is no negation. This NPI is not restricted to a clause-mate negation. A negated NR predicate as in (4-b) can also license the NPI. The same is true for a number of other matrix predicates such as *claim* in (4-c), but not for all, as illustrated in (4-d).[1]

(4) Weak NPI: *ever*

a. Nobody/ *Someone will ever finish this paper.
b. I don't think that Pat will ever finish this paper.
c. I don't claim that Pat will ever finish this paper.
d. *I don't whisper that Pat will ever finish this paper.

The situation of more restrictive NPIs such as *lift a finger* and *until* is different from that of *ever*. As shown in (5) and (6) these NPIs can occur with a clause-mate negation (a) or in the complement clause of a negated NR predicate (b), but not in the complement clause of a negated occurrence of *claim* (c).

(5) Strong NPI: *lift a finger*

a. Pat won't/ *will lift a finger to help you.
b. I don't think that Pat will lift a finger to help you.
c. *I don't claim that Pat will lift a finger to help you.

(6) Strong NPI: *until*

a. Pat won't/ *will finish the paper until Friday.
b. I don't think that Pat will finish the paper until Friday.
c. *I don't claim that Pat will finish the paper until Friday.

The simplest explanation of these facts lies in an analysis which semantically reconstructs the negation in the complement clause of a NR predicate, but not in that of other matrix verbs. The analysis that I present in Section 5 will achieve exactly this.

2.1.2 No NPI Licensing in the Matrix Clause

Let us consider next the NPI licensing potential in the matrix clause. There are instances with a matrix clause NPI, but in these sentences, the strong NPIs from (5) and (6) are excluded in the embedded clause:

(7) a. Nobody would suppose anymore that the war was worth it.
Everyone would suppose now/%anymore that the war was not worth it. (Horn, 1978, p. 170)
b. Chris wouldn't suppose anymore that the war was worth it.
c. *Chris wouldn't suppose anymore that Pat lifted a finger to help her.
d. *Chris wouldn't suppose anymore that I will finish until the next century.

[1] Throughout this paper I will underline NPIs in the examples.

The NPI *anymore* needs to be in the scope of a negation. Thus, the negation introduced by *nobody* must take scope over the matrix verb. This is possible in (7-a) and (7-b). Sentences (7-c) and (7-d) are excluded because either (i) the negation is interpreted in the matrix clause, and there is no local licenser for the strong NPI in the embedded clause; or (ii) the negation is interpreted in the embedded clause, and there is no licenser for the NPI in the matrix. This is exactly the pattern that we expect if we assume that in NR, the negation is interpreted in the embedded clasue. In (7-a), there is no NR and the NPI *anymore* is licensed because negation is interpreted in the matrix clause.[2]

These data present a problem for a naive interpretation of the c-command condition for NPI licensing, according to which an NPI must be c-commanded by its licenser at surface structure. Hoeksema (2000) discusses a series of other problems. In his cases, NPIs could be licensed even without being c-commanded, because they fall into the scope of an appropriate licenser at the level of interpretation. In the sentences considered here, the syntactic condition is met, but the semantic relation fails to hold, which accounts for the ungrammaticality of a matrix NPI in neg raising.

2.2 The Negation is Syntactically in the Matrix Clause

In this subsection I will present evidence that syntactically, in NR constructions, the negation is part of the matrix clause. I will show that the form in which the negation appears depends on items in the matrix clause.

2.2.1 Form of the Matrix Verb

In an NR constellation the negation particle interacts with an auxiliary the same way it interacts in simple clauses. In particular, we can observe *do*-insertion (8-a), contraction (8-b) and suppletion of the auxiliary (8-c).

(8) a. I don't believe that Pat will win.
b. Jan isn't likely to win.
c. I can't believe Pat will win.

2.2.2 Neg Incorporation in the Matrix Clause

In the following I will consider sentences in which an NR predicate combines with a subject of the form *no N* or *few N*. In such constellations, strong NPIs are still possible in the embedded clause. I will argue that this is due to an independently motivated property of such NPs — their potential to occur as an antecedent to a so-called *complement set anaphor*. I will argue that a quantifier and a sententential negation are lexically fused into the relevant determiners. This fusion only occurs if the negation and the quantifier are syntactically expressed within the same clause. I will also point to a surprising contrast between *no N* and *few N* on one side and *not every/all N* on the

[2]The data in (i) suggests that even a weak NPI such as *ever* is less acceptable in the embedded clause if there is an additional NPI in the matrix clause. I will not have anything to say about this contrast here.

(i) ?* I don't believe at all that Pat will ever finish this book.

other: the latter item does not license NPIs in the complement clause of an NR predicate, whereas the former two do. This will also follow from the analogy to complement set anaphora.

There is some debate as to which matrix clause elements other than *not*/*n't* give rise to NR readings. In particular, expressions such as as *no one*, *nothing*, *no (N)* or *none (of NP)* play an important role in the discussion. I will call these items *n-words* in this paper.[3] Klooster (2003) argues that matrix n-words do not create NR contexts.[4] However, Horn and others provide examples in which the matrix negation is introduced by an n-word. In (9) and (10) I give the example sentence in (a) and sketch the logical form in (b).

(9) a. None of my friends think [that I'll finish until the twenty-first century]. (Horn, 1978, p. 148)
b. $\forall x[\text{my-friend}'(x) \rightarrow \text{think}'(x, \hat{}\neg[\text{I will finish before the 21st century}])]$

(10) a. No Belgian believes that the Dutch will lift a finger to help him. (van der Wouden, 1995)
b. $\forall x[\text{belgian}'(x) \rightarrow \text{believe}'(x, \hat{}\neg[\text{the Dutch will help } x])]$

If we follow the reasoning of Section 2.1 that a strong NPI must be in the scope of a negation in its own clause, this type of examples requires an interpretion of the n-word as a universal quantifier.[5]

The data in (9) and (10) can be put in a broader context. A neg raising reading with an n-word in the matrix clause seems to be possible only under certain conditions — in particular if there is a concrete antecedent set available, such as my friends in (9) and the Belgians in (10). The availability of this kind of antecedent is also relevant for situations in which a so-called *complement anaphor* can be used, i.e. an anaphor which refers to the intersection of the restrictor and complement set of the scope of the subject NP. For example, (9-a) can be continued with (11). In this continuation, the pronoun *they* refers to such a complement set, i.e. to those of *my friends* who *don't believe that I will finish until the 21st century*.

(11) They actually wonder whether I will finish at all.

Complement anaphora occur with a number of quantifiers.[6] In particular, the de-

[3] I am aware of the fact that this terminology differs from that of, for example, Giannakidou (2005). For her, and other authors working on negative concord, the term *n-word* is confined to items which (i) may co-occur with a sentential negation marker and still express a single negation, and (ii) express negation in fragmentary answers. Expressions such as English *no one* and their Dutch and German equivalents are called *negative quantifiers*. This distinction is not relevant for the present paper and, furthermore, my analysis of English "negative quantifiers" will be analogous to the analysis of Polish "n-words" in Richter and Sailer (2004).

[4] Klooster (2003) suggests that *no one believes that* (and its Dutch equivalent *niemand gelooft dat*) are idiomatic expressions, having the meaning *it is absolutely implausible that*. As such, they are claimed to behave like negative predicates such as *doubt*. This explanation cannot work directly for (9) and (10), since the subject-verb combination is not idiomatic in these examples.

[5] With an existential quantifier the logical form of (9-a) would be as in (i), i.e. the negation would be outside the logical form of the embedded clause and the NPI could not be licensed.

(i) $\neg\exists x[\text{my-friend}'(x) \wedge \text{think}'(x, \hat{}[\text{I will finish before the 21st century}])]$

[6] Sanford et al. (1994) provides psycholinguistic evidence for the existence of such readings, Kibble

terminer *few* can give rise to complement anaphora, whereas its positive dual *many* or negated universal quantifiers (*not all, not every*) cannot. In (12) the judgements are given for an interpretation of the pronouns as "those congressmen who didn't go to the beach"

(12) a. Few congressmen went to the beach. They preferred the swimming pool.
b. Many congressmen went to the beach. * They preferred the swimming pool.
c. Not all congressmen went to the beach. * They preferred the swim. pool.

We can account for this dynamic effect of *few* by assuming a lexical decomposition. For contexts which allow a complement anaphor, the reading in (13-b) can be chosen. Then the dynamic properties of *few* are reduced to those of *many*.[7]

(13) Possible logical forms for *few*:
a. Expected reading: $\neg \mathsf{many} x(\phi)(\psi)$
b. Reading required for complement set anaphora: $\mathsf{many} x(\phi)(\neg\psi)$

Van der Wouden (1995) observes a puzzling behavior of the Dutch NPI *ook maar iets* (*anything at all*): This NPI is licensed by a clause-mate negation or a clause-mate n-word, but not by a weaker licenser such as *nauwelijks* (*hardly*) (see (14)).

(14) a. Niemand heeft ook maar iets gezien.
no one has anything at all seen
'No one has seen anything at all.'
b. *Jan heeft nauwelijks ook maar iets gezien.
Jan has hardly anything at all seen

The situation changes, however, in NR constructions. The NPI *ook maar iets* can appear in the complement clause of an NR predicate even if the matrix clause does not contain an appropriate licenser for *ook maar iets*.

(15) a. U beweert dat niemand gelooft dat er ook maar iets gebeurd is.
you claim that no one believes that there anything happened has
'You claim that no one believes that anything happened at all.'
b. U beweert dat Jan nauwelijks gelooft dat er ook maar iets gebeurd
you claim that Jan hardly believes that there anything at all happened
is.
has
'You claim that Jan hardly believes that anything happened at all.'

While this data seems mysterious at first sight, it patterns precisely with the observations on complement anaphora made above. Van der Wouden (1995) shows that not all downward-entailing operators license *ook maar iets* in the embedded clause. The simply downward entailing quantifier *weinig* (*few*) can license an embedded NPI. The

(1998) and Nouwen (2003) provide formal analyses.

[7] In this paper, I use $\mathsf{many} x(\phi)(\psi)$ as an abreviation for something like *all* ϕ *with a small number of exceptions did* ψ, i.e. $\exists X(\forall x(x \in X \rightarrow (\phi \wedge \psi)) \wedge |X| \geq |\{\lambda x.\phi\}| * \mathsf{n}/100)$, where n is the percentage which must satisfy the condition to count as *many*.

quantifier *niet iedereen* cannot.[8]

(16) a. Weinig mensen herinneren zich [ook maar iets gezien te hebben]
few people remember themselves anything at all seen to have
'Few people remember having seen anything at all.'

b. *U beweert dat niet iedereen gelooft dat er ook maar iets gebeurd
you claim that not everyone believes that there anything at all happened
is.
has

The contrast in (16) is parallel to that in (12). If we assume the expression in (13-b) as a possible translation of *few*, we get the following logical forms for the above sentences.

(17) a. (15-a): $\forall x(\text{human}'(x) \rightarrow \text{believe}'(x, \hat{}\neg\exists y \text{happen}'(y)))$
b. (16-a): $\text{many}x(\text{human}'(x))(\text{remember}'(x, \hat{}\neg\exists y \text{see}'(x, y)))$
c. (16-b): $*\ldots\neg\forall x(\text{human}'(x) \rightarrow \text{believe}'(x, \hat{}\exists y \text{happen}'(y)))\ldots$

These logical forms explain the facts immediately. In (a) and (b) the semantic contribution of the NPI ($\exists y\ldots$) is in the immediate scope of the negation operator. In (17-c), the negation must take scope over the universal quantifier. Thus, the NPI is not licensed because the universal quantifier ($\forall x\ldots$) intervenes between the negation operator and the semantic contribution of the NPI.[9]

For German I can present a set of data which supports the parallelism between NR constellations and complement anaphora. The German NPI *auch nur irgendetwas* (*anything at all*), like its Dutch counterpart *ook maar iets*, is licensed by a clause-mate negation or an n-word, but not by the language-specific equivalents of *few* or *hardly*.

(18) a. Niemand hat auch nur irgendetwas fürs Seminar gelesen.
no one has anything at all for the class read
'No one has read anything at all for the class.'

b. *Wenige Studenten haben auch nur irgendetwas fürs Seminar gelesen.
few students have anything at all for the class
read

The set of sentences in (18) reflects the generally observed pattern for this NPI. We can, however, embed sentence (18-b) in contexts where the subject *wenige Schüler* serves as antecedent to an anaphoric expression. In (19-a), the second sentence contains an anaphor which refers to the set of pupils that have to be notified. The NPI is not licensed in this reading. In (19-b), however, the second sentence contains a complement anaphor, i.e., the pronoun refers to the pupils that don't have to be notified. In such a context, the NPI *auch nur irgendetwas* is considerably better if not perfectly acceptable.[10]

[8] Note that in the hierarchy of negation strength established in Zwarts (1997) *niet iedereen* (*not everyone*) is stronger than *weinig* (*few*) in that it is not only downward-entailing but also anti-multiplicative.

[9] This account generalizes to the licensing by *nauwelijks* (*hardly*) in (15-b) if we follow Kibble (1998) and treat *hardly* as a version of *few*, quantifying over situations ("*in few situations*").

[10] If the personal pronoun precedes the NPI, the contrast between (a) and (b) remains, but (i-b) is

(19) a. *Wenige Studenten haben auch nur irgendetwas fürs Seminar gelesen. Sie sind sehr fleißig.
'Few students read anything at all for the class. They are very dilligent.'
b. Wenige Studenten haben auch nur irgendetwas fürs Seminar gelesen. Sie sind lieber ins Kino.
'...They preferred to go to the cinema.' (complement anaphor)

As expected, we find the NPI *auch nur irgendetwas* in NR constructions with *wenige* (*few*) as the quantifier in the subject position of the matrix clause.

(20) Wenige Studenten glauben, dass sie auch nur irgendetwas fürs Seminar
few students think that they anything at all for the class
lesen sollen.
read should
'Few students think they should read anything at all for the class.'
a. *Sie haben auch schon ein paar Aufsätze durchgearbeitet.
'They have already read a couple of papers.'
b. Sie glauben, es reicht, wenn sie ins Seminar kommen.
'They think it's enough if they attend classes.'

In (20) I offer two continuations. In (20-a), the pronoun *sie* (*they*) is intended to refer to the set of students that think they should do some reading. This continuation is not possible. In (20-b), the pronoun refers to the complement set, which leads to an acceptable continuation. This supports the assumption that the logical form needed for NPI licensing is identical to the logical form that allows for complement anaphora.

I have presented arguments that a negation and a quantifier can be fused into an n-word or into the determiner *few*. The following sentences show that this fusion cannot occur if the negation and the quantifier are not syntactically part of the same clause. I use a non-NR predicate to prevent NR. Then, the sentence with *many* and the negation *not* in different clauses in (21-a) is not synonymous with a sentence with *few* in the matrix clause in (21-b).

(21) a. Many students realized that they wouldn't pass the exam.
b. Few students realized that they would pass the exam.

In the data reported in this section the negation is part of the subject of the matrix clause. I have tried to show that this "incorporation" can take several forms, from an n-word to a quantifier, *few*. In both cases, however, I think that there is interesting parallelism to complement anaphora, which motivates a lexical decomposition as suggested here.

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perceived as even better than (19-b) by some speakers (J.-P. Soehn, p.c.):

(i) a. *Da sie sehr fleißig sind, haben wenige Studenten auch nur irgendetwas ...
since they very dilligent are, have few students anything at all ...
b. Da sie lieber ins Kino sind, haben wenige Studenten auch nur irgendetwas ...
since they rather to the cinema are, have few students anything at all ...

2.2.3 Specialized Negators

Another set of evidence for the claim that the negation is part of the matrix clause comes from collocationally specialized negators in German. I have listed some of these expressions in (22).

(22) NP-negatives:
  a. einen Dreck
     a dirt
  b. einen feuchten Kehrricht
     a wet dirt

The NP-negatives in (22) can only be used to negate a highly restricted set of verbs, such as those of intellectual concern in (23-a) and (23-b), but not the semantically relatively close verb *reizen* (*attract*).

(23) a. Das interessiert mich einen Dreck/ einen feuchten Kehrricht.
     this interests me a dirt/ a wet dirt
     'I am not at all interested in this.'
  b. Das geht dich einen Dreck/ einen feuchten Kehrricht an.
     this concerns you a dirt/ a wet dirt PARTICLE
     'This is none of your business.'
  c. *Das reizt mich einen Dreck/ einen feuchten Kehrricht.
     this attracts me a dirt/ a wet dirt
     putative meaning: 'This does not attract me at all.'

There is at least one NPI-verb that can combine with these special NP-negatives, *kümmern* (*care/worry*). Note that the NP-negatives must be considered the NPI-licensers in (24-b) in the absence of any other overt negator.

(24) a. Das kümmert ihn *(nicht).
     this worries him not
     'He doesn't care about this.'
  b. Das kümmert ihn einen Dreck/ einen feuchten Kehrricht.
     this worries him a dirt/ a wet dirt

As an NPI, *kümmern* can occur in an NR construction. However, then the matrix clause may not contain any of the NP-negatives.

(25) a. Ich glaube nicht, dass ihn das kümmert.
     I believe not that him this worries
     'I don't believe he cares about this.'
  b. *Ich glaube einen Dreck/ einen feuchten Kehrricht, dass ihn das kümmert
     I believe a dirt/ a wet dirt that him this worries

Under an analysis in which the surface matrix negation stems from the embedded clause, the ungrammaticality of (25-b) would be unexpected because the specialized negation is compatible with the verb *kümmern*. If we assume, however, that the negation is part of the matrix clause, the ungrammaticality follows from a violation of the collocational restrictions of the specialized negator.

The data presented in this subsection strongly support the claim that the negation in an NR construction syntactically behaves as a matrix negation. After establishing the contrast between the syntactic and the semantic aspects of the negation in NR constructions, I will review data that address the scopal behavior of the negation in Section 2.2.4.

2.2.4 Scope of the Negation

There is another classical observation about NR which indirectly defeats attempts to analyse NR in terms of a negation which is syntactically part of the embedded sentence. It has been observed that the "NR reading" is not always equivalent to a reading in which there is an overt negation in the embedded clause. Instead, the "raised" negation must have wide scope over quantifiers and operators in the embedded clause.

This leads to a potential difference between an NR sentence and an analogous sentence with a negation in the embedded clause with respect to the set of possible readings. The NR reading of (26-a) is paraphrased as (26-c). The narrow-scope reading of the negation with respect to *several senators*, indicated in (26-d), is not available. The sentence in (26-b), with the negation in the embedded clause, is ambiguous between the readings in (26-c) and (26-d).

(26) (Horn (1978), p. 181, quoting unpublished work by Epstein)

a. I don't believe that several senators are communists.
b. I believe that several senators aren't communists.
c. I believe that [it is not the case that several senators are communists.]
d. I believe that [for several senators it is true that they are not communists.]

An analogous situation can be observed with the relative scope of other operators. In English, negated auxiliaries have idiosyncratic scope properties. In NR, however, the "raised" negation must have scope over any embedded auxiliary. If this scope is not possible, the NR reading is excluded. The future auxiliary *will* usually takes narrow scope with respect to a clause-mate negation. Thus, the NR reading is fine, as illustrated in (27).

(27) a. I believe Kim will not call. ($\neg$(Fut…))
b. = I don't believe Kim will call. ($\neg$(Fut…))

The modals *may* and *must*, on the other hand, take scope over a clause-mate negation, as indicated in the (a)-sentences in (28) and (29). In an NR construction, the negation may not take scope below the modal operator. This leads to a situation in which speakers either reject an NR reading or at least argue that the negation will have scope over the modal, contrary to what we find with clause-mate negation.

(28) a. Kim may not have called (May($\neg$…))
b. I don't think that Kim may have called.
$\neq$ I think that Kim may not have called.

(29) a. The prisoners must not make a second phone call. (Must($\neg$…))
b. I don't believe that the prisoners must make a second phone call.
($\neg$(…Must))

The obligatory wide scope of the matrix negation in NR constructions leads to intervention effects in the embedded clause. In (30-a) it is shown that *most* cannot license an NPI. However, if the sentence is negated, as in (30-b), the NPI *lift a finger* can occur. As indicated, (30-b) only has a reading in which the negation is inside the scope of *most*. If we embed sentence (30-a) in an NR construction, as in (30-c), the NPI is not licensed. This follows directly if we assume that the "raised" negation must take wide scope over quantifiers in the embedded sentence. In this case, the subject quantifier intervenes between the negation and the NPI and, thus, the licensing is not possible.

(30) a. *Most people will lift a finger to protest against it.
b. Most people won't lift a finger to do anything against it.
(Most(...¬...); but not: ¬(...Most...))
c. *I don't think most people will lift a finger to protest against it.

The scope data considered in this section suggest for NR constellations that while the negation is syntactically part of the matrix clause it is semantically part of the embedded sentence. There, however, it takes wide scope.

3 Previous Approaches

In this section I will schematically address a number of previous approaches to NR. I will discuss the classical transformational analysis of *syntactic raising* (Section 3.1), a more recent syntactic approach that assumes a negative operator (Section 3.2), a semantic approach (Section 3.3) and a pragmatic approach (Section 3.4).

3.1 Syntactic Raising

The phenomenon of neg raising received its name from an analysis in which the negation is syntactically introduced in the embedded clause and interpreted there. It is then raised into a higher clause (Fillmore, 1963). This transformation can be iterated as demonstrated in (31), where (31-a) is the underlying structure, (31-b) shows the derivation steps, and (31-c) is the surface realization.

(31) a. I believe [he wants [I think [*not* [he did it]]]]
b. → I believe [he wants [*not* [I think [he did it]]]]
→ I believe [*not* [he wants [I think [he did it]]]]
→ *not* [I believe [he wants [I think [he did it]]]]
c. I don't believe that he wants me to think he did it.

Horn (1978) lists a number of problems for this approach, among which are the observations on the obligatory wide scope of the raised negation referred to in Section 2.2.4.

The traditional neg raising analysis builds on the assumption that the base position of the negation determines the semantic interpretation. This assumption is no longer shared among generative linguists. Instead, a level of *Logical Form* (LF, May (1985), Stechow (1993), Heim and Kratzer (1998) among others) is taken as the interface to semantic interpretation. In such a more up-to-date architecture, a neg raising analysis

would assume that the negation is first raised out of the embedded clause(s) to achieve the right surface representation and then reconstructed into its base position at LF. To my knowledge, no such adaptation of the classical theory has been proposed yet.

3.2 Negative Operator in Comp

Progovac (1994) assumes an empty negative operator in the complementizer position (COMP) of the complement clause of some predicates. It is, however, not clear how her approach would differentiate between NR predicates and negated propositional attitude predicates (*don't claim*) that only license less strict NPIs, as illustrated in (4)–(6).

Klooster (2003, to appear) proposes an analysis along the lines of Progovac, i.e., he assumes that there is a negation operator in the COMP position of the embedded clause. His structure is sketched in (32).

(32) a. I do not think that John will leave until tomorrow.
b. I *neg* think [[C:*neg*] John will leave until tomorrow]

Klooster faces two conceptual problems: (i) Why is the matrix negation not interpreted? (ii) Why does a negated NR predicate select for such a negative complement clause, when a non-negated NR predicate does not? Klooster makes the following assumptions to address these issues: (i) The matrix negation undergoes a process of "neg absorption" (going back to Klima (1964)). (ii) The use of an NR predicate that embeds a negative complement clause is licensed by a distinct lexical entry, which specifies this predicate as an NPI itself.

The data on the NPI *ook maar iets* (*anything at all*) presented in Section 2.2.2 seem to provide the right kind of empirical evidence for this rather complex analysis. Klooster's analysis predicts the data in (15) correctly: in the matrix clause the (weak) NPI "*geloven* + CP[neg]" is licensed by *nauwelijks*. The neg feature in the embedded COMP can, subsequently, license the strong NPI *ook maar iets*. However, the ungrammaticality of (16-b) shows that this explanation is insufficient, since it would predict that if *few* can license an NPI then *niet iedereen* (*not everyone*) should be capable of licensing the same NPI.

Thus, Klooster's analysis of NR predicates as NPIs leads to incorrect empirical predictions. Furthermore, his two assumptions seem rather undesirable conceptually: Concerning the first, it is surprising that neg absorption would require a lowering of the matrix negation. As far as the second assumption is concerned, the ambiguity of NR predicates seems ad hoc if no further support of this assumption is being offered.

3.3 Entailment-based Theory

According to the entailment-based theory of NPI licensing (Ladusaw (1980), Zwarts (1997), van der Wouden (1997), among others) an NPI can be used in a context which is *downward entailing* (DE). A strict NPI requires an *anti-additive* (AA) context (Zwarts, 1997). The logical characterizations of these two basic kinds of entailment are stated schematically in (33). It can be shown that anti-additivity implies downward-entailingness.

(33) Entailments:

a. f is a downward entailing (DE) context iff for each sets X, Y if $X \subseteq Y$ then $f(Y) \rightarrow f(X)$.

b. f is an anti-additive (AA) context iff for each sets X, Y, $(f(X) \wedge f(Y)) \leftrightarrow f(X \cup Y)$

The following examples show that the scope of *nobody* is a downward-entailing domain (34-a), and in fact an anti-additive domain (34-b). Thus, the theory correctly predicts that *lift a finger* can occur in the scope of *nobody* (34-c).

(34) a. see a sparrow $\subseteq$ see a bird
Nobody saw a bird. $\rightarrow$ Nobody saw a sparrow. (DE)

b. Nobody saw a sparrow and nobody heard a nightingale.
$\leftrightarrow$ Nobody saw a sparrow or heard a nightingale. (AA)

c. Nobody lifted a finger to help her.

Similarly, it can be shown that the complement position of *I don't believe* is an anti-additive context, from which the grammaticality of (35-b) is expected.

(35) a. anti-additive:
I don't believe that Kim saw a sparrow
and I don't believe that Kim heard a nightingale.
$\leftrightarrow$ I don't believe that Kim saw a sparrow or that Kim heard a nightingale.

b. I don't believe that Kim lifted a finger to help her.

However, the predicate *it is not the case/true that* also creates an anti-additive context, see (36), but is not an NR predicate, as evidenced by the ungrammaticality of (37):

(36) anti-additive:
It is not the case that Kim saw a sparrow
and it is not the case that Kim heard a nightingale.
$\leftrightarrow$ It is not the case that Kim saw a sparrow or that Kim heard a nightingale.

(37) a. It isn't true/the case that he'll get here (*until Sunday). (Horn, 1978, p. 207)

b. *It isn't true/the case that he'll lift a finger to help her.

Van der Wouden (1995) investigates the question of whether the entailment behavior of a matrix clause can be derived from some *monotonicity calculus*. He concludes that distinct rules might be needed for NR predicates, in particular in light of the data in Section 2.2.2. Furthermore, non-NR predicates will require special marking as well to prevent NPI-licensing in cases like (37). Thus, the entailment-based theory will have to be enriched by idiosyncratic marking of the predicate classes with respect to their behavior in the calculus.

3.4 Pragmatic Approaches

Pragmatic approaches such as Horn (1978) or Tovena (2001) also assume that the negation in an NR construction is syntactically part of the matrix clause. Pragmatic strategies are, then, envoked to account for a "lowered" interpretation of this negation. In

the case of Horn, this is assumed to be possible for a predicate F if it occupies a middle position on some scale of certainty (such as *be likely* on the scale ranging from *be possible* to *be evident*). For such predicates there is not much difference between the meaning of $\neg F\phi$ and $F\neg\phi$, which explains their NR potential.[11] For Tovena, NR is the consequence of applying a "closed world assumption". This means that the conversation partners may assume that if there is no evidence for ϕ, it is possible to assume $\neg\phi$. NR predicates are lexical items which mark that such an assumption can be made due to their evaluative reading.

Tovena (2001, p. 345) points out that there is a difference between predicates that allow for an NR-type inference and those that license strict NPIs. Her account concentrates on the inference behavior. Similarly Horn (1978) uses NPI data to show that even they do not constitute convincing evidence for a syntactic raising analysis. His own approach does not integrate the NPI data, but focusses on the inferential properties of NR predicates. In the present paper, however, we are mainly concerned with formal reflexes of NR, in particular with NPI licensing.

Even if we confine our attention to inference behavior, the pragmatic approaches lack a way to account for the language-specific idiosyncrasies with respect to the class of NR predicates. Horn (1978) already discusses a number of predicates which are NR predicates, although close synonyms are not. The classical example is English *be likely* which is an NR predicate, but *be probable* is not; or the contrast between the NR predicate *suppose* and the non-NR predicate *guess* (Horn, 1978, p. 215). This problem extends to a cross-linguistic comparison of NR predicates (English *hope* is not an NR predicate, but its German or Latin equivalents are).

This short discussion showed that the pragmatic accounts of NR address issues such as why a certain predicate is an NR predicate or why a speaker would use an NR construction instead of a lower negation. Such issues, though important, are tangential to the main interest of this paper: the question of how an NR reading and the grammatical effect of NPI licensing under NR can be captured within a formally defined syntax-semantics interface.

4 Lexical Resource Semantics (LRS)

I will provide an analysis within the framework of *Lexical Resource Semantics* (LRS, Richter and Sailer (2004)). LRS uses techniques of underspecified semantics. In such approaches, the semantic representation of a sentence is not a single term, but a set of expressions, which will ultimately form the overall logical form of a sentence. What makes these systems underspecified is that the subexpression relation between these expressions is constrained by the lexical properties of the words and by the syntactic constellations, but not fully determined. This allows for a lean representation of scope ambiguities, which will also turn out to be the main analytical device of the present paper.

For the syntax-semantics interface, it is necessary to identify some items from the mentioned set of expressions that will play a role in the formulation of constraints on

[11] Blutner (2002) suggests that this type of account can be integrated into the framework of *Bidirectional Optimality Theory* in a natural way.

the possible readings. The following four have been singled out so far for LRS:

First, the MAIN contribution is the main semantic constant contributed by the lexical head of a phrase (think′, or come′). A selector can impose semantic selection requirements on the main contribution of a selected element. Second, the INDEX value is the referential index associated with a constituent. Third, the *internal content* (INC) is the subexpression in the semantic representation of a phrase which is necessarily in the scope of all scope-bearing items that belong to this phrase (such as a negation, or quantified arguments that combine with the head of the phrase). In the case of *come* in (1), the INC value is come′(*e*, Peter). Finally, there is the *external content* (EXC). This is the semantic representation associated with a phrase. I will also refer to the EXC value of a sign as its *logical form*.

The different semantic attributes are integrated into the architecture of a linguistic sign as indicated in (38) (see Richter and Sailer (2004) and Sailer (2004)). In LRS descriptions attribute-value matrices (AVM) are employed, as is the standard in HPSG. We enrich these descriptions with expressions of a semantic representation language, Montague's *Intensional Logic* (IL).[12] In addition, lower case Greek letters are used as meta-variables to indicate parts of the logical form which are not specified in the word or phrase depicted.[13] The integration of IL into the HPSG description language has the consequence that we can indicate identities by means of boxed symbols (tags). We will use $\boxed{x}$, ... as tags over IL expressions for individuals and $\boxed{e}$, $\boxed{s}$, ... for those referring to events or situations. The meta-variables (α, β, ...) can also be understood as tags. In (38) the lexical entries of a simple verb, *come*, and a modal verb, *may*, are shown.

(38) a. Example lexical entry of the verb *come*:

$$\begin{bmatrix} \text{PHON } \langle come \rangle \\ \text{SYNSEM LOC CONT} \begin{bmatrix} \text{MAIN} & \text{come}' \\ \text{INDEX} & \boxed{e} \end{bmatrix} \\ \text{ARG-ST} \left\langle \text{NP}[\text{INDEX } \boxed{x}] \right\rangle \\ \text{LF} \begin{bmatrix} \text{EXC} & \alpha \\ \text{INC} & \text{come}'(\boxed{e}, \boxed{x}) \\ \text{PARTS} & \langle \boxed{e}, \exists \boxed{e}\, \beta, \text{come}', \text{come}'(\boxed{e}, \boxed{x}) \rangle \end{bmatrix} \end{bmatrix}$$

b. Example lexical entry of the verb *may*:

$$\begin{bmatrix} \text{PHON } \langle may \rangle \\ \text{SYNSEM LOCAL CONT} \begin{bmatrix} \text{MAIN} & \text{may}' \\ \text{INDEX} & \boxed{s} \end{bmatrix} \\ \text{ARG-ST} \left\langle \text{NP, VP}[\text{INDEX } \boxed{e}] \right\rangle \\ \text{LF} \begin{bmatrix} \text{EXC} & \gamma \\ \text{INC} & \alpha \\ \text{PARTS} & \langle \boxed{s}, \exists \boxed{s}\, \delta, \text{may}', \text{may}'(\boxed{s}, \beta[\boxed{e}, \alpha]) \rangle \end{bmatrix} \end{bmatrix}$$

[12] In other LRS publications, Ty2 (Gallin, 1975) is used instead of IL. IL allows us to have a simpler notation in the present paper. The analysis, however, can directly be reformulated in Ty2.

[13] Penn and Richter (2004) present a shorthand for the LF value. Their notation is used in the TRALE implementation of LRS. I will not use this notation here because (i) there is no shorthand for the values of MAIN and INDEX, and (ii) while I use the the intensor symbol (the "up operator" (^)) as in IL, it marks the external content in the notation of Penn and Richter (2004).

(where α is the INC value of the VP complement.)

These lexical entries encode the following information: The main semantic content of the verb *come*, i.e. its MAIN value, is the constant come'. The eventuality variable, $\boxed{e}$, appears as the INDEX value. These two bits are part of the SYNSEM information of the word, i.e., part of the information which is accessible for selection (Sailer, 2004). The LF value (LOGICAL FORM) contains the semantic components that play a role in the semantic combinatorics. The PARTS list contains all the semantic expressions which are associated with the verb *come*: its eventuality variable $\boxed{e}$, the existential binding of this variable $\exists_{\boxed{e}}\,\beta$, its main semantic constant come', and the combination of this constant with its arguments $\mathsf{come}'(\boxed{e},\boxed{x})$. The INC of the verb is identical to the main constant combined with its arguments, $\mathsf{come}'(\boxed{e},\boxed{x})$. The EXC value is not specified. Therefore, I simply put a meta-variable, α, in (38-a).

The lexical entry of the verb *may* is slightly more complicated and illustrates a case in which the INC value and the MAIN value are not related in a way as direct as is the case with *come*. The MAIN value is the constant may', the INDEX value is an eventuality variable, $\boxed{s}$. On the PARTS list, there is the eventuality variable, its existential binder $\exists_{\boxed{s}}\delta$, and the main constant. In addition, there is an expression in which the main constant is combined with its arguments ($\mathsf{may}'(\boxed{s},\beta)$). The notation $\beta[\boxed{e},\alpha]$ expresses that the variable $\boxed{e}$ and the expression α are subexpressions of β. The variable $\boxed{e}$ is the INDEX value of the subcategorized VP. This guarantees that the event associated with this VP will occur in the scope of the modal operator may'. The INC value of the modal is α, i.e., an expression which occurs in the second argument of may'. This is all we know about α at this place. In practice this opens the possibility for operators occurring in the higher clause to scope below may'.

After an example of a lexical entry, some remarks about the semantic combinatorics are in order. The MAIN value of a phrase is identical to that of its head daughter, as are the INDEX, EXC and INC values. A general well-formedness condition guarantees that the EXC of a given utterance will exclusively consist of all semantic items contributed by the words of this utterance (the EXTERNAL CONTENT PRINCIPLE).

At phrasal nodes in the structure, the syntax-semantics interface may impose additional embedding constraints on how the contributed subexpressions combine: For example, when an adjunct combines with a head, the head's INC must be a subexpression of the nonhead's EXC and the nonhead's MAIN must be a subexpression of the phrase's EXC. This will ensure that a modifier (including negation) cannot take scope in a higher clause than the one in which it occurs.

Existing LRS analyses showed that the MAIN, INDEX, INC and EXC are necessary to restrict the possible readings of utterances adequately. Applied to sentence (1-b), we get the simplified semantic representation in (39). In Figure 1 the syntactic structure and the semantic derivation are shown. Since nothing depends on the precise syntactic analysis I assume a structure in which the negation particle *not* is realized as a syntactic complement of the auxiliary verb, following Kim (1996).

(39) The semantic representation of (1-b):

John thinks Peter will not come.
$\exists s(\mathsf{think}'(s,\mathsf{John},\hat{}\neg(\exists e(\mathsf{come}'(e,\mathsf{Peter})))))$

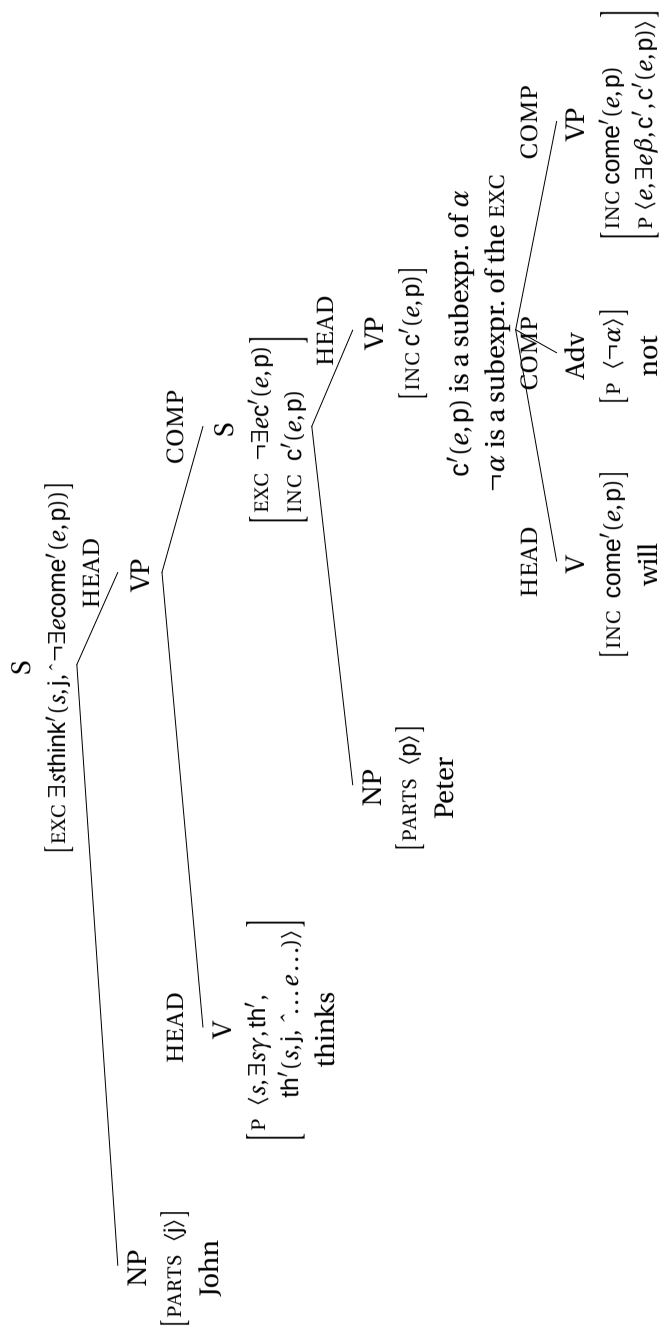

Figure 1: The derivation of the reading in (39)

In the tree structure in Figure 1 I indicate the PARTS list of the words (P ⟨...⟩). For phrases the INC and the EXC values are given where relevant, and the constraints on possible readings which follow from the syntax-semantics interface principles are included (for example "$\neg\alpha$ is a subexpression of the EXC" at the lowest VP node).

5 The Analysis

Since LRS is a lexicalist framework, the analysis of NR will mainly consist of the lexical entries of neg raising predicates, the negator and the determiners of the subject NPs. I will first present some assumptions about NPI licensing in Section 5.1. The lexical entries of NR predicates and the analysis of basic examples of neg raising are given in Section 5.2. Section 5.3 contains a discussion of the scope data from Section 2.2.4 and of the specialized n-word from Section 2.2.3. In Section 5.4 I will show that the analysis also applies to cases in which the negation is contributed by an n-word or another quantifier.

5.1 Assumptions about NPI Licensing

I make the simplifying assumption that a strict NPI is licensed if its MAIN value is in the immediate scope of a negation operator "¬" in the EXC of the smallest S which contains the NPI.[14] In (40-a) there is a negation in the EXC value of the sentence. In (b) the negation is part of the EXC value of the matrix clause, but not of the EXC value of the embedded clause. Therefore, the NPI is not licensed. In the analysis of NR the negation will appear in the EXC of the embedded clause. Thus, the occurrence requirements of the NPI are satisfied.[15]

(40) a. [$_S$ Kim won't finish the paper until midnight.]
b. *Pat doesn't claim [$_S$ that Kim will finish the paper until midnight]
c. Pat doesn't believe [$_S$ that Kim will finish the paper until midnight]

5.2 Lexical Properties of NR Predicates

To account for NR it suffices to assume the following two lexical properties: (i) NR predicates are semantically like modal verbs in that their INC value is identical to that of one of their complements, and (ii) most modifiers impose a restriction on the INDEX value of the head they adjoin to, but negation does not.

We will address the first of these assumptions in this paragraph. This will allow us to derive the NR readings. For non-NR predicates such as *claim*, the INC is, similar to the case of *come*, the verb's MAIN, together with its semantic arguments. NR predicates

[14] The MAIN value is used because this is the only part of the logical form which is always genuinely contributed by the considered lexical item. Note that some NPIs, such as German *brauchen* (*need*) are modal verbs, i.e., their INC is raised from their complement VP.

[15] Soehn (2006) sketches a combination of a general collocational module and an LRS semantics to account for NPI licensing as a collocational requirement of the polarity item, as suggested in van der Wouden (1997). I will implicitly assume an architecture for NPI licensing along these lines here, but I will restrict my focus to the problem of the semantic combinatorics that allow us to derive the required logical forms.

behave like modals in that their INC is identical to that of their verbal complement. This is analogous to our treatment of *may* in (38-b). The lexical entries of the non-NR predicate *claim* and of the NR predicate *think* are given in (41).

(41) a. Example lexical entry of the non-NR predicate *claim*:

$$\begin{bmatrix} \text{PHON } \langle \textit{claim} \rangle \\ \text{SYNS LOC CONT} \begin{bmatrix} \text{MAIN} & \text{claim}' \\ \text{INDEX} & \boxed{\text{e}'} \end{bmatrix} \\ \text{ARG-ST} \left\langle \text{NP}\left[\text{INDEX } \boxed{\text{x}}\right], \text{S}\left[\text{INDEX } \boxed{\text{e}}\right] \right\rangle \\ \text{LF} \begin{bmatrix} \text{INC} & \text{claim}'(\boxed{\text{e}'}, \boxed{\text{x}}, \alpha) \\ \text{PARTS} & \langle \boxed{\text{e}'}, \exists \boxed{\text{e}'}\, \beta, \text{claim}', \text{claim}'(\boxed{\text{e}'}, \boxed{\text{x}}, \alpha[\boxed{\text{e}}]) \rangle \end{bmatrix} \end{bmatrix}$$

b. Example lexical entry of the NR predicate *think*:

$$\begin{bmatrix} \text{PHON } \langle \textit{think} \rangle \\ \text{SYNS LOC CONT} \begin{bmatrix} \text{MAIN} & \text{think}' \\ \text{INDEX} & \boxed{\text{s}} \end{bmatrix} \\ \text{ARG-ST} \left\langle \text{NP}\left[\text{INDEX } \boxed{\text{x}}\right], \text{S}\left[\text{INDEX } \boxed{\text{e}}\right] \right\rangle \\ \text{LF} \begin{bmatrix} \text{EXC} & \gamma \\ \text{INC} & \alpha \\ \text{PARTS} & \langle \boxed{\text{s}}, \exists \boxed{\text{s}}\, \delta, \text{think}', \text{think}'(\boxed{\text{s}}, \boxed{\text{x}}, \beta[\boxed{\text{e}}, \alpha]) \rangle \end{bmatrix} \end{bmatrix}$$

(where α is the INC value of the S complement.)

Let us turn to the NR example in (1-a) again. From the lexical entry for *think* in (41-b) it follows that the INC value of the matrix verb is identical to that of the embedded verb *come*, i.e. it is the expression $\text{come}'(e, \text{Peter})$. This, then, allows a matrix quantifier or adverbial to take either wide or narrow scope with respect to the verb's MAIN, as long as it has scope over the INC. In fact, both readings of (1-a) satisfy this restriction.

With the lexical entry of the NR predicate *think* in (41-b) and the general principles of LRS, it is possible to derive the NR reading of (1-a), whose logical form is given in (42). In Figure 2 this derivation is shown. It can be seen that the negation, *not*, is introduced in the matrix clause, but the negation operators occurs in the EXC of the embedded clause.

(42) The semantic representation of the NR reading of (1-a):

John does not think Peter will come.
$\exists s(\text{think}'(s, \text{John}, \hat{}\neg\exists e(\text{come}'(e, \text{Peter}))))$

Let us turn to the condition below the AVMs in (38-b) and (41-b), i.e. the required identity between the INC values of the higher verb and its verbal argument. This condition cannot be stated as part of the lexical entries because the INC value of selected elements is not part of the information on the ARG-ST list of the selecting word. This architecture was argued for in Sailer (2004). However, we can show that there is no need to specify the INC identity idiosyncratically in individual lexical entries. Instead, it follows from general semantic properties of the relevant predicates, i.e., it is a consequence of a general principle of the grammar.

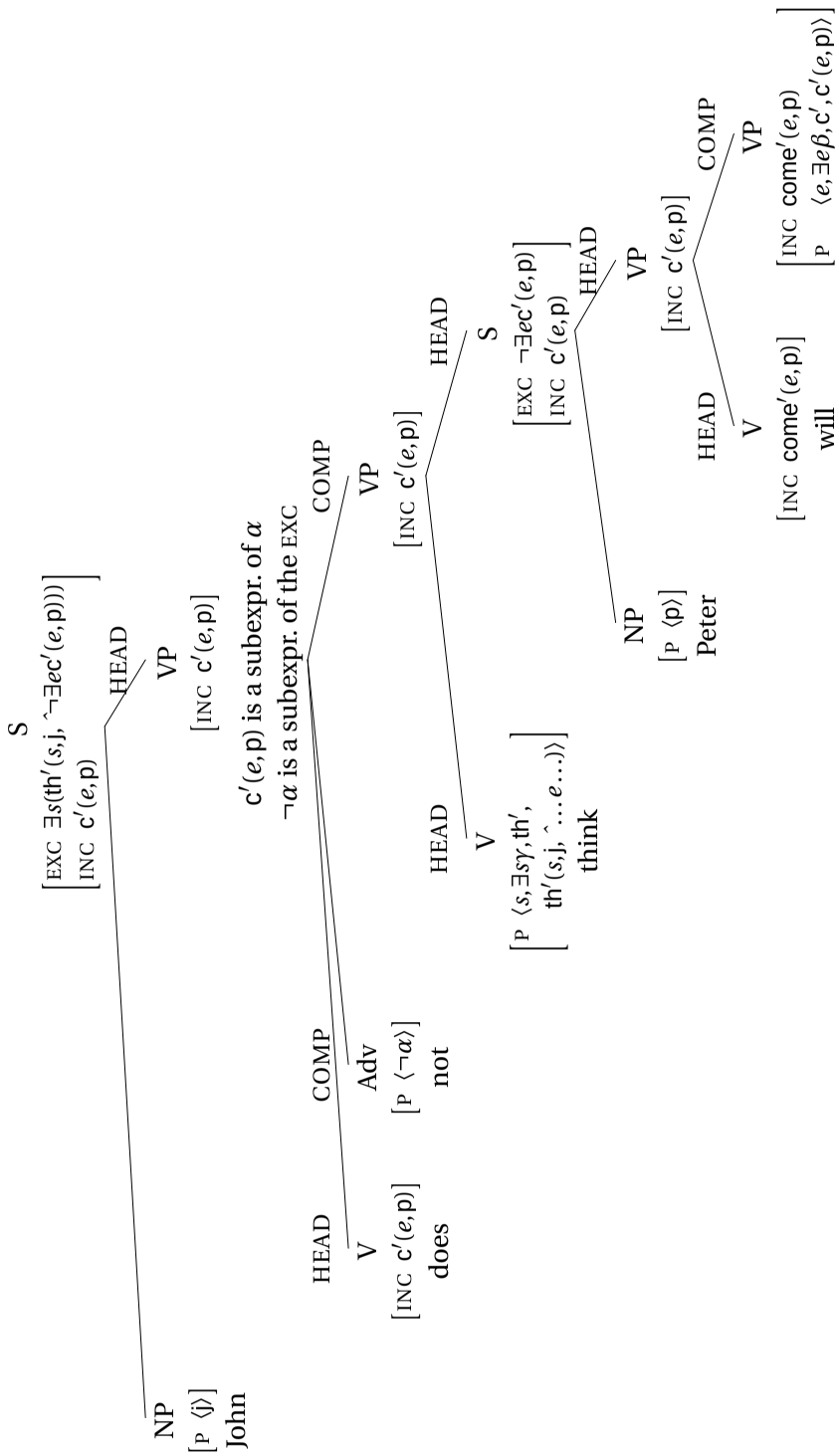

Figure 2: The derivation of the reading in (42)

In Richter and Sailer (2004) argument raising verbs in Polish are analyzed in such a way that they identify their INC value with that of their verbal complement. We can, however, give a more general characterization of the circumstances in which INC-identification occurs that includes argument raising predicates, modals and NR predicates: the INC value is a component of one argument slot of the MAIN value. The following principle expresses this idea formally.[16]

(43) The INC RAISING PRINCIPLE:

In a head-complement structure: if

the INC value of the head is a proper component of a semantic argument of the head's MAIN value, and
the INDEX value of the non-head occurs in this argument slot,

then the head's INC and the complement's INC are identical.

To illustrate the principle in (43), consider the VP headed by *think* in Figure 2. In the lexical entry of *think* it is specified that the INC value of *think* is some expression which occurs within an argument position of the constant think′ and the INDEX value of the complement clause is a subexpression of the same argument slot. Thus, the antecedent of the INC RAISING PRINCIPLE is satisfied and the consequent must be true as well. This means that the INC value of *think* and the complement clause must be identical.

Note that it is important that the INC of the matrix verb and the INDEX of the complement must be within the same argument slot of the matrix MAIN constant. This allows us to identify the complement whose INC value must be chosen.

5.3 Modifiers and Scope

The analysis developed so far correctly accounts for the NR reading of (1-a). However, it over-generates in two ways: (i) Nothing precludes other modifiers from also taking scope in the embedded clause, i.e., it is possible to assign the sentence in (44-a) a reading identical to that of the sentence in (44-b). (ii) Since we only require the negation to have scope over the INC value of the embedded clause, the obligatory wide scope of the negation with respect to embedded quantifiers and operators is not enforced (see the data in Section 2.2.4).

(44) a. ??I quickly believe that Pat runs.
b. ≠ I believe that Pat runs quickly.

The solution to both problems has two aspects: First, there is a general constraint on the relative semantic completeness of embedded clauses. Second, some items lexically require to be semantically interpreted within the clause in which they occur. In this subsection I will look at these two aspects.

[16] Throughout this papger I assume a formalization of HPSG as given in Richter et al. (1999) and Richter (2004), i.e., a powerful description language which provides relations, full classical negation and explicit quantification. Within this description language the principle in (43) can be formalized, just as all other principles used in this paper.

5.3.1 The Relative Semantic Completeness of Embedded Clauses

It was observed in Section 2.2.4 that a "raised" negation always has wide scope with respect to quantifiers and operators in the embedded clause. We can express this as a condition on the semantic completeness of clauses.[17]

(45) The EXTERNAL CONTENT PRINCIPLE FOR CLAUSES:

For every clause S with an EXC value ϕ,
there exists an expression ψ which is a subexpression of ϕ such that

all subexpressions of ψ occur in the PARTS list of S,
the INDEX value of S is bound in ψ, and
for each non-head phrase X in S,

if X's EXC is a subexpression of ϕ, then it is also a subexpression of ψ.

This principle guarantees that the semantic contribution of finite clauses has a complete expression which contains all the quantifiers and operators from this clause that take scope within the clause. This means that if semantic material from a higher clause takes scope within an embedded clause, then this material must have scope over the embedded operators.

For illustration, consider (29), repeated as (46). In its NR reading the embedded clause has the EXC value in (46-a). The expression ψ of (45) is the existential quantification over the eventuality variable s and its entire scope. This expression is built up entirely from expressions from the PARTS list of the clause. It contains the binding of the INDEX value. And it comprises all the EXC values of non-heads which take scope within this clause.

(46) I don't believe that the prisoners must make a phone call.

a. EXC of the embedded S (ϕ):
$\neg\exists s(\mathsf{must}'(s, \mathsf{the\text{-}prisoners}, \hat{}\exists e(\mathsf{call}'(e, \mathsf{the\text{-}prisoners}))))$

b. unavailable EXC of the embedded S (ϕ):
$\#\ \exists s(\mathsf{must}'(s, \mathsf{the\text{-}prisoners}, \hat{}\neg\exists e(\mathsf{call}'(e, \mathsf{the\text{-}prisoners}))))$

In (46-b) I mention an unavailable reading in which the matrix negation takes scope below the modal operator. This reading is excluded by the principle in (45) because we cannot find an appropriate ψ: since the INDEX value of the sentence must be bound in ψ, ψ must at least be the expression $\exists s(\mathsf{must}'(s, \mathsf{the\text{-}prisoners}, \hat{}\neg\exists e(\mathsf{call}'(e, \mathsf{the\text{-}prisoners}))))$. This expression, however, contains the negation operator ($\neg$), which is not on the PARTS list of the embedded clause.

The principle in (45) guarantees the wide scope of the matrix negation with respect to embedded quantifiers and operators. It also ensures that eventuality modifiers cannot be "raised". Such a hypothetical "raised" reading of (44-a) is given in (47-b). In this reading the semantic contribution of the modifier *quickly* occurs in the scope of the quantifier that binds the embedded eventuality variable. However, this part of the embedded EXC is required to contain only semantic material from the embedded clause itself.

[17] There might be a language-specific variation as to whether this principle applies to all clauses or only to finite or indicative clauses.

(47) a. I quickly believe that Pat runs
b. unavailable EXC of the embedded S: # $\exists e(\text{quickly}'(e) \wedge \text{run}'(e, \text{Pat}))$

This analysis also accounts for the unavailability of NR with the n-word *never* mentioned for instance in Klooster (to appear). Sentence (48-a) cannot have an NR reading, i.e., it cannot have the meaning paraphrased in (48-b). In (48-c) I give the hypothetical EXC value of the embedded sentence in such a reading.

(48) a. John never thinks that Peter will call.
b. $\neq$ John thinks that Peter will never call.
c. $\#\neg\exists t\exists e(\text{call}'(e, \text{Peter}) \wedge \text{occurs-at}'(e, t))$

I assume that *never* modifies an eventuality. In particular it introduces an existential quantification over a time variable t and locates the modified eventuality with respect to this time. The n-word also introduces a negation and the requirement that the existential quantifier be in the scope of the negation. It follows from this that at least the predicate $\text{occurs-at}'(e, t)$ must be part of the expression ψ from the principle in (45). Thus, NR is excluded with *never* for the same reasons that exclude an embedded reading for manner adverbials and, analogously, for other temporal modifiers.

5.3.2 Lexical Requirements

Next we will consider the influence of lexical requirements on the possibility of a embedded reading of an item from the matrix clause. I will consider two cases: modal adverbs and the specialized negators discussed in Section 2.2.3. The behavior of modal adverbs will follow from the general treatment of modal elements, the behavior of specialized negators from their idiosyncratic collocational restrictions.

Olivier Bonami (p.c.) points out that modal adverbials such as *probably* do not show NR readings either, i.e., sentence (49-a) can only have the reading in (49-b), but not the one in (49-c).

(49) a. Pat probably thinks that Chris will call.
b. $\text{probably}'(\hat{}\exists s(\text{think}'(s, \text{Pat}, \hat{}\exists e(\text{call}'(e, \text{Chris})))))$
c. $\#\exists s(\text{think}'(s, \text{Pat}, \hat{}\text{probably}'(\hat{}\exists e(\text{call}'(e, \text{Chris})))))$

As illustrated above with the lexical entry of *may* in (38-b), we treat modal verbs as INC raisers. As a consequence, if there is a sequence of modal verbs, they all have the same INC value. In principle this leaves the mutual scope relations among the modals open. However, as indicated in (38-b), a modal states that the INDEX value of its verbal complement occurs within one of its argument slots. Since *probably* is semantically similar to a modal verb, we will employ the same technique to exclude the reading in (49-c): The modal adverb requires that the INDEX value of the verb that it combines with be within its scope, in this case the INDEX of the NR predicate *think*. Thus, the unavailability of the reading in (49-c) is a consequence of the general treatment of modals.

Next, we will address the specialized negators such as German *einen Dreck*. As shown in Section 2.2.3, they cannot occur with an NR predicate. This can be reduced to their collocational restriction to co-occur with only a small class of verbs, in contrast to a general negation particle such as German *nicht* or English *not*. I will assume that

einen Dreck introduces a negation and a minimizing constant similar to *a bit*. Thus, the specialized negators behave analogously to *never* discussed in the previous paragraph. In addition *einen Dreck* requires that the eventuality to which the minimizer is applied is the index of a verb of intellectual concern.[18]

(50) Sketch of a description of the specialized negator *einen Dreck* (*a dirt*):

$$\begin{bmatrix} \text{PHON } \langle \textit{einen Dreck} \rangle \\ \text{SYNS LOC} \left[\text{CAT HEAD} \left[\text{MOD } \textit{synsem} \right] \right] \\ \text{LF} \begin{bmatrix} \text{EXC} & \alpha \wedge \beta \\ \text{INC} & \text{minimal}'(\boxed{e}) \\ \text{PARTS} & \langle \neg\gamma, \text{minimal}'(\boxed{e}), \alpha \wedge \beta \rangle \end{bmatrix} \end{bmatrix}$$

and $\boxed{e}$ is the INDEX value of a verb of intellectual concern.

The combination of this lexical specification with the principle in (45) accounts for the contrast in (51) and (52). In (51) the negation contributed by *einen Dreck* has scope over the modal verb *brauchen* (*need*), but the minimizing is applied to the embedded eventuality. In the LRS analysis *brauchen* is a content raiser, i.e. its INC value is identical to that of the embedded verb. Since *brauchen* combines with an infinitival verb the principle in (45) does not apply and the reading in (51-b) is possible.

(51) a. Das braucht Peter einen Dreck zu interessieren.
this needs Peter a dirt to interest
'This doesn't need to be of any concern to Peter.'
b. $\neg\exists s(\text{need}'(s, \hat{}\exists s'(\text{concern}'(s', \text{this}, \text{Peter}) \wedge \text{minimal}'(s'))))$

In (52), the matrix verb is an NR predicate. Its INC value also is identical to that of the embedded verb. Therefore, the collocational requirements of *einen Dreck* could be satisfied in the reading indicated in (52-b). However, this reading violates the principle in (45), as the minimizing predicate needs to occur inside the scope of the binder of the index of the embedded clause, i.e. inside $\exists s'(\ldots)$.[19]

(52) a. *Maria denkt einen Dreck, dass das Peter interessiert.
Maria thinks a dirt that this Peter interests
b. $\#\exists s(\text{think}'(s, \text{Maria}, \hat{}\neg\exists s'(\text{concern}'(s', \text{this}, \text{Peter}) \wedge \text{minimal}'(s'))))$
c. $\#\neg\exists s(\text{think}'(s, \text{Maria}, \hat{}\exists s'(\text{concern}'(s', \text{this}, \text{Peter}))) \wedge \text{minimal}'(s))$

In the hypothetical logical form in (52-c) the EXC of the embedded verb satisfies the principle in (45). The minimizing predicate is applied to the matrix situation s. This situation is not the INDEX value of a verb of intellectual concern and, therefore, sentence (52-a) cannot have this reading either.

[18] This condition can be encoded within a collocational module such as the one of Soehn (2006) which we also employ to encode NPIs (see footnote 15).

[19] Since the unavailability of this reading stems from the position of the minimizing predicate, it is irrelevant here whether the negation has scope over the matrix situation or only over the embedded situation.

5.4 Neg Raising with Matrix N-Words

In Section 2.2.2 I argued that a lexical decomposition of *none* and *few* is needed to account for the data in (9). In (53) I give a description of the word *none* as it occurs in (9). Its semantic contribution is a universal quantifier and a negation, where the negation is in the scope of the universal. LRS enables us to leave it open whether the negation is in the immediate scope of the universal quantifier or not.

(53) Parts of the lexical entry of *none* (universal reading):

$$\left[\begin{array}{l}\text{PHON } \langle none \rangle \\ \text{SYNS LOC CONT INDEX } \boxed{x} \\ \text{LF}\left[\begin{array}{ll}\text{EXC} & \forall\boxed{x}\,(\alpha \rightarrow \beta) \\ \text{PARTS} & \langle \boxed{x}, \neg\gamma, (\alpha \rightarrow \beta), \forall\boxed{x}\,(\alpha \rightarrow \beta)\rangle\end{array}\right]\end{array}\right] \quad \textbf{and} \quad \neg\gamma \text{ is a subexpression of } \beta$$

The constituent structure imposes the constraint that the verb's INC be in the scope of the universal. Since the universal binds a variable (say x) in an argument slot of the verb, the quantifier's scope must include the expression $\mathsf{think}'(x, \hat{}\ldots)$. Again, the negation can have either wide or narrow scope with respect to this expression. Thus, the NR reading follows from the interaction of the LRS treatment of negation in Richter and Sailer (2004) and the analogy between NR predicates and auxiliary verbs.

It should be noted that, in addition to the universal reading in (53), English n-words also have an existential reading. The two readings of the n-word only differ with respect to their LF values: For the existential reading, the EXC value is the expression $\exists x(\alpha \wedge \beta)$ and the PARTS list contains this existential quantifier, the conjunction $(\alpha \wedge \beta)$, the variable bound by the quantifier, and a negation which has scope over the existential quantifier.[20]

Clearly we cannot derive an NR reading for the existential reading of *none*, because (i) the variable bound by the existential occurs in an argument slot of the predicate think', but (ii) the negation must have scope over the existential. It is not possible to satisfy these two conditions if the negation occurs in the EXC value of the embedded clause.

At the end of this subsection, a remark on other quantificational items such as *few* is in order. To account for the data in Section 2.2.2 I assumed an ambiguity similar to that of n-words: for NR readings I required the semantic contribution of the quantifier to be of the form indicated in (13-b), i.e., as $\mathsf{many}x(\ldots)(\ldots\neg(\ldots)\ldots)$.

Based on this analysis it is possible in LRS to give a single lexical entry for *few* which also captures the two possible logical forms given in (13). In (54) I indicate the LF specification as it should appear in the lexical entry.

(54) LF value of the lexical entry of *few*:

$$\left[\begin{array}{ll}\text{EXC} & \mathsf{many}\boxed{x}\,(\alpha)(\beta) \\ \text{PARTS} & \langle \boxed{x}, \mathsf{many}\boxed{x}\,(\alpha)(\beta), \neg\gamma\rangle\end{array}\right] \quad \wedge\, \gamma \leq \mathsf{many}_{\boxed{s}}(\alpha)(\beta)$$

(where $\phi \leq \psi$ means that ϕ is identical or a subexpression of ψ)

[20] It remains to be shown whether we are forced to stipulate a lexical ambiguity of n-words or whether there is a systematic way to relate existential and universal n-words, such as by a lexical rule or by underspecification in the lexicon, as in the case of *few* in (54).

LRS allows us to leave the relative scope of the negation underspecified. We only require that the negation either has immediate scope over many (i.e. γ = many…), or the negation is within the scope of the quantifier.[21] The description in (54) is compatible with the two readings in (55), which correspond to the two logical forms for *few* given in (13). Remember that $\beta[\neg\gamma]$ is the notation for stating that the expression $\neg\gamma$ occurs inside the expression β.[22]

(55) a. $\neg$many$x(\alpha)(\beta)$
b. many$x(\alpha)(\beta[\neg\gamma])$

If the narrow scope of the negation given in (55-b) combines with an NR predicate, the $\neg\gamma$ can take scope within the embedded clause, and, thus, license an embedded strict NPI as, for example, in (20).

This subsection has shown that the data from Section 2.2.2 can be handled within the analysis developed in this paper.

6 Conclusion

I have argued in this paper that intriguing properties of neg raising follow directly within a framework of semantic underspecification. I provided evidence that in an NR constellation, the negation is semantically part of the logical form of the embedded clause, while it is syntactically integrated into the matrix clause. This apparent conflict can be expressed within LRS by allowing for a narrow scope of the negation with respect to the main semantic contribution of the matrix verb.

The empirically new aspects of the paper are (i) the observations about NPI licensing by *few* in NR constellations and the relation to complement anaphora (Section 2.2.2), and (ii) the remarks on collocationally restricted negators in Section 2.2.3. I have shown that these observations are compatible with the LRS analysis developed in Section 5.

It is desirable to extend the analysis of NR constructions to other constructions which license strict NPIs in the absence of a clause-mate negation. One such context is the complement clause of adversative predicates such as *deny*, *doubt*, …. The most natural extension in the present framework would be a lexical decomposition of *deny* as "*assert … not*" and of *doubt* as "*think … not*". I leave such an extension to further research. Another group of contexts in which strict NPIs can occur are idiosyncratic combinations such as *I'll be damned if …* and *I'd rather die than …* (von Bergen and von Bergen, 1993). This type of context is explored in some detail in Sailer (2006).

The basic ideas of the LRS analysis of NR can in principle be expressed in other frameworks of underspecified semantics as well. For the details of the analysis, however, I relied heavily on properties of LRS such as its particular interface features (MAIN, INDEX, INC, and EXC). Other frameworks (*Constraint Language on Lambda Structures*,

[21] This use of a $\leq$-scope constraint is inspired by the constraint Kallmeyer and Romero (2006) use for the correct scope options of quantifiers which are embedded inside an NP.

[22] The lexical entry is compatible with a third reading: many$x(\alpha[\neg\gamma])(\beta)$. It is not clear whether the third reading is available or not. It can easily be excluded if we add the requirement that γ must not be a subexpression of α.

Minimal Recursion Semantics, or Lexicalized Tree Adjoining Grammar) do not use the same features. This may have an influence on the transferability of my analysis.

The present paper focused on the lexical representations of NR predicates. If there is a pragmatic motivation for some predicates to act as NR predicates, as argued for in Horn (1978), pragmatics can serve as a trigger for leaving the INC specification of the relevant predicates underspecified in the lexical entries. In addition, a lack of INC specification may arise from semantic reasons in the case of (English) modal verbs, and from syntactic reasons in the case of argument raising verbs in Polish or German.

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The Ban on True Negative Imperatives

Hedde Zeijlstra

Abstract

Languages cross-linguistically differ with respect to whether they accept or ban True Negative Imperatives (TNIs). In this paper I show that this ban follows from three generally accepted assumptions: (i) the fact that the operator that encodes the illocutionary force of an imperative universally takes scope from C^0; (ii) the fact that this operator may not be operated on by a negative operator and (iii) the Head Movement Constraint (an instance of Relativized Minimality). In my paper I argue that languages differ too with respect to both the syntactic status (head/phrasal) and the semantic value (negative/non-negative) of their negative markers. Given these differences across languages and the analysis of TNIs based on the three above mentioned assumptions, two typological generalisations can be predicted: (i) every language with an overt negative marker X^0 that is semantically negative bans TNIs; and (ii) every language that bans TNIs exhibits an overt negative marker X^0. I demonstrate in my paper that both typological predictions are borne out.

1 Introduction

This paper is about the fact that not every language accepts so-called TRUE NEGATIVE IMPERATIVES (TNIs).[1] TNIs are exemplified in (1) and (2) for Dutch and Polish respectively. In Dutch, in main clauses the finite verb precedes the negative marker *niet*. In imperative clauses the negation can also follow the finite imperative verb without yielding ungrammaticality. Polish also accepts TNIs: both in regular negative indicative clauses and in imperative clauses, the negative marker *nie* immediately precedes the finite verb.[2,3]

(1) a. Jij slaapt niet. Dutch
you sleep NEG
'You don't sleep.'

b. Slaap!
sleep
'Sleep!'

[1] Terminology following Zanuttini (1994).

[2] Footnote with the abbreviations used in the glosses here please.

[3] NEG stands for 'negation'; SG for 'singular'; IMP for 'imperative'; SUBJ for 'subjunctive'; AUX for 'auxiliary'

c. Slaap niet! (TNI)
sleep NEG
'Don't sleep!'

(2) a. (Ty) nie pracujesz. Polish
you.2sg NEG work.2SG
'You don't work.'

b. Pracuj!
work.2SG.IMP
'Work!'

c. Nie pracuj! (TNI)
NEG work.2SG.IMP
'Don't work!'

Things are different however in a language like Spanish, as illustrated in (3). In Spanish the negative marker *no* always occurs in preverbal position. However, if the verb has an imperative form, it may not be combined with this negative marker. Spanish does not allow TNIs. In order to express the illocutionary force of an imperative,[4] the imperative verb must be replaced by a subjunctive. Such constructions are called SURROGATE NEGATIVE IMPERATIVES (SNIs).[5]

(3) a. Tu no lees. Spanish
you.sg NEG read.2SG
'You don't read.'

b. ¡Lee!
Read.2SG.IMP
'Read!'

c. *¡No lee! (*TNI)
NEG read.2SG.IMP
'Don't read'

d. ¡No leas! (SNI)
NEG read.2SG.SUBJ
'Don't read!'

In this paper I address two questions: (i) how can this ban on TNIs in languages such as Spanish be explained? And (ii) how does the observed cross-linguistic variation follow?

The outline of the paper is as follows: in section 2 I discuss three previous analyses of the ban on TNIs. In section 3 I discuss some relevant semantic and syntactic properties of negative markers and in section 4 I demonstrate by means of a survey of different languages that the properties described in section 3 are related to the acceptance of TNIs. In section 5, I present my analysis for all language groups that have been discussed. In section 6, I show that the analysis presented in section 5 makes some correct predictions regarding the development of Negative Concord and the grammaticality of TNIs in Romance languages. Finally, Section 7 concludes.

[4] Negative sentences with the illocutionary force of an imperative are often referred to as prohibitives.

[5] See van der Auwera (2006) (and references therein) for many more examples of languages that ban TNIs and the way those languages express SNIs.

2 Previous analyses

2.1 Rivero (1994), Rivero & Terzi (1995)

Rivero (1994) and Rivero and Terzi (1995) assume that the clausal structure always has the structural relations in (4).

(4) CP > NegP > IP > VP

They propose then that the difference between Slavic languages (which generally allow TNIs) and Romance languages (that generally disallow them) concerns the position where imperative force is induced in the sentence. This is either IP (expressed by movement of V_{imp} to I^0) or CP (expressed by verbal movement to C^0). Now the difference between Slavic and Romance languages falls out immediately: if the Neg^0 position is filled by an overt element, i.e. by a negative marker, then verbal movement from I^0 to C^0 is no longer allowed, given the Head Movement Constraint (Travis (1984)). Hence Slavic languages, such as Polish allow TNIs, whereas Romance languages, such as Italian,[6] where the verb moves to C^0, do not (see (5)).

(5) a. $[_{CP}\ [_{NegP}\ [_{Neg^0}$ Nie $]\ [_{IP}\ [_{I^0}$ pracuj $_{[IMP]\,i}]\ [_{VP}\ t_i]]]]$ Polish
NEG work.2SG.IMP
'Don't work!'

b. $*[_{CP}\ [_{C^0}$ Parla $_{[IMP]\,i}]\quad [_{NegP}\ [_{Neg^0}$ no$]\quad [_{IP}\ [_{I^0}\ t_i]\ [_{VP}\ t_i]]]]$ Italian
talk.2SG.IMP NEG
'Don't talk!'

Rivero's and Rivero & Terzi's analysis faces two serious problems. The first problem is that it is unclear why in Romance languages the negative marker is not allowed to cliticize onto V_{imp} so that they move together to C^0 as a unit, a point already addressed by Han (2001). Rizzi 1982 argues that in constructions such as (6), consisting of a participle or an infinitive, the subject occupies a Spec,IP position and the auxiliary moves to C^0. In case of negation, the negation then joins the verb to move to C^0. Rizzi refers to these structures as AUX-TO-COMP constructions (examples taken from Rizzi 1982).

(6) a. $[[_{C^0}$ avendo] Gianni fatto questo] Italian
having Gianni done this
'Gianni having done this, ...'

b. $[[_{C^0}$ non avendo] Gianni fatto questo]
NEG having Gianni done this
'Gianni having not done this, ...'

If in the cases above *non* is allowed to attach to V_{part}/V_{inf}, it is unclear why this movement would not be allowed in the case of V_{imp}.[7]

[6] At first sight the ban on TNIs seems only to apply to the singular imperative forms in Italian. However, the Italian plural imperative form and the corresponding 2nd person indicative are phonological identical. I follow Zanuttini (1997) who takes plural imperatives to banned as well and takes the (phonologically identical) indicative forms as the corresponding SNI. This adoption is in line with the observation that no other language banning TNIs makes a distinction between singular and plural imperatives.

[7] Rivero and Terzi argue that in these cases the $V_{part/inf}$ does not raise to C^0, but to a position lower than Neg^0 and that the subject is in a position even below. This analysis seems to be contradicted by

The second problem is that in the structure in (5a) the operator that encodes the illocutionary force of an imperative is c-commanded by the negation. It has already been noted by Frege (1892) and Lee (1988) that negation cannot operate on the illocutionary force of the sentence, but only on its propositional content (a negative assertion remains an assertion, a negative question remains a question, and a negative command has to remain a command). Hence, in Rivero and Terzi's analyses for Slavic languages either negation takes scope from too a high position, or the imperative operator takes scope from too a low position.

2.2 Zanuttini (1997)

Zanuttini (1997) discusses different kinds of negative markers basing herself on a number of Romance dialects (mostly from Northern Italy). She distinguishes for instance between negative head markers (X^0) that can negate a clause by themselves and those that require an additional negative marker in order to express sentential negation. The differences are given in (7): Italian *non* can negate a clause by itself, French *ne* cannot.

(7) a. Gianni non telefona. Italian
Gianni NEG calls
'Gianni doesn't call.'

b. Jean ne téléphone *(pas). French
Jean NEG calls NEG
'Jean doesn't call.'

Zanuttini argues that the difference between Italian *non* and French *ne* reduces to the functional projection they host. She observes that with respect to the Italian varieties she studied the following generalisation holds: every variety that has a negative marker that can negate a clause by itself bans TNIs. Moreover Zanuttini observes that in some varieties the negative markers that can negate a clause by themselves are sensitive to mood. Subjunctives may require a different negative marker than indicatives, an observation that goes back to Sadock and Zwicky (1985) who studied a larger set of languages. Zanuttini accounts for the ban on TNIs in Romance varieties by assuming that all negative markers that can negate a clause by themselves are always lexically ambiguous between two different lexical items, which are often phonologically identical. She claims that in Italian the negative marker *non* is lexically ambiguous between *non*-1, which may occur in clauses with the illocutionary force of an imperative, and *non*-2, which may appear in indicative clauses. Furthermore, Zanuttini proposes that *non*-1 subcategorizes a MoodP, whereas *non*-2 does not:

(8) a. $[_{\text{NegP}}$ *non*-1 $[_{\text{MoodP}} \ldots [_{\text{VP}}]]]$ imperative clauses

b. $[_{\text{NegP}}$ *non*-2 $\ldots [_{\text{VP}}]]$ indicative clauses

The ban on TNIs can now be accounted for as follows. Imperative verbs are often morphologically defective, indicating that they lack a particular [MOOD] feature. As a result, the [MOOD] feature on Mood^0 cannot be checked and the sentence becomes ungrammatical. In other clauses, e.g. indicatives, there is no MoodP selected, and thus the sentence is grammatical, as shown in (9).

the fact that *(non) avendo* may even precede speaker oriented adverbs such as *evidamente* ('evidently'), which occupy a position higher than NegP (as pointed out by Cinque (1999) and repeated in Han (2001)).

(9) a. *[$_{\text{NegP}}$ *Non*-1 [$_{\text{MoodP}}$ [$_{\text{Mood}^0\text{[MOOD]}}$ telefona $_{\text{[IMP]}\,i}$]a Gianni t_i]] Italian

NEG call.2SG.IMP toGianni

'Don't call Gianni!'

b. [Io [$_{\text{NegP}}$ *non*-2 telefono$_i$ a Gianni t_i]]

I NEG call.1SG to Gianni

'I don't call Gianni.'

Still, this analysis suffers from two problems. First, the lexical distinction between *non*-1 and *non*-2 seems not well motivated. The piece of evidence that *non* is lexically ambiguous is motivated by the observation that in languages, which have two distinct negative markers, these markers are often sensitive to mood distinctions in the verbal paradigm (cf. Sadock & Zwicky 1985). However, in most of these languages this second negative marker is not only used in imperatives, but also in subjunctives. In Greek, for example, the negative marker *dhen* is used in indicatives and the negative marker *mi* in subjunctives and imperatives. However, TNIs are ruled out not only if *dhen* is the negative marker, but also if the negation is expressed by *mi*. The SNI can only be formed using the negative marker *mi* in combination with a subjunctive verb:[8]

(10) a. * *Dhen* to diavase! Greek

NEG it read.IMP

'Don't read it!'

b. * *Mi* to grapse!

NEG it write.IMP

'Don't write it!'

c. *Mi* to grapsis!

NEG it write.SUBJ

'Don't read it!'

The fact that Greek exhibits two negative markers is not related to the fact that TNIs are excluded with the first negative marker as the second negative marker excludes them as well. Consequently, the fact that several languages have different negative markers for different moods does not hold as an argument for the lexical ambiguity of Italian *non*.

Second, the prediction that this analysis makes is too strong. It is unclear why the analysis does not hold for Slavic languages, such as Polish, which has a negative head marker *nie* that negates a clause by itself and allows TNIs. Note that in most Slavic languages the imperative seems to be morphologically defective as well. Moreover, one may even find Romance varieties, which allow TNIs. Old Italian (11) is an example.

(11) Ni ti tormenta di questo! Old Italian

NEG yourself torment.2SG.IMP of this

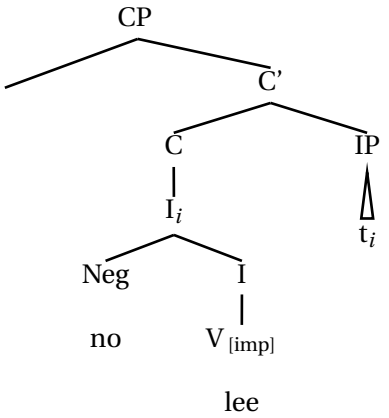
'Don't torment yourself with this!'

[8]The position of the clitic is related to the imperative/subjunctive distinction. Imperatives require the clitic to appear left adjoined to the verb, subjunctives require enclitisation.

2.3 Han (2001)

Han (2001) argues that the ban on TNIs does not follow from syntactic requirements that have been violated, but from a semantic violation: the imperative operator (i.e. the operator that encodes the illocutionary force of an imperative, Op_{IMP} hereafter) may not be in the scope of negation. Op_{IMP} is realised by moving V_{imp}, carrying a feature [IMP], onto C^0. Han takes negation in Romance languages to head a projection somewhere high in the IP domain. Hence, negation head-adjoins first to V_{imp}, and then as a unit they move further to C^0. As a result Op_{IMP} remains in the c-command domain of negation, which violates the constraint that negation may only operate on the propositional content of the clause. The structure (12) is thus ill-formed.

(12) *



Under this analysis, it becomes immediately clear why in languages like Dutch TNIs are allowed. In those languages negation does not form a unit with V_{imp} and V_{imp} raises across negation to C^0, as shown in (13).[9]

(13) [$_{CP}$ slaap$_{[imp]\,i}$ [$_{VP}$ *niet* t_i]] Dutch

For Slavic languages Han assumes that V_{imp} does not move to C^0. Consequently, this would mean that V_{imp} remains under the scope of negation (as the negative marker is a syntactic head in those languages, V_{imp} cannot move across it). However, Han argues that in those cases the feature [IMP] moves out of V_{imp} and moves to C^0. Thus, Op_{IMP} outscopes negation, as demonstrated in (14) for Polish.

(14) [$_{CP}$ [IMP]$_i$ [$_{NegP}$ *nie* [$_{IP}$ pracuj$_i$]]] Polish

The fact that Han allows feature movement for the Slavic languages seems to contradict the analysis for Romance languages, since it remains unclear why this feature movement would not be possible in Romance languages. Apart from this problem, Han's analysis crucially depends on the assumption that the negative marker (in the languages discussed) is always the carrier of semantic negation. In the following section I demonstrate that this is not always the case.

[9] In Zeijlstra (2004) it is suggested that there is no NegP and that the negative marker *niet* occupies a VP-adjunct position (instead of Spec,NegP). However, the current analysis of TNIs in Dutch does not depend on this assumption.

3 Semantic and syntactic properties of negative markers

In this section I discuss some semantic properties of negative markers. I present arguments that show that negative markers differ cross-linguistically with respect to their semantic contents. In some languages, such as Spanish and Italian, I argue that the negative marker is the phonological realisation of a negative operator. In other languages, such as Polish and Czech, I argue that the negative marker is semantically vacuous, but has a syntactic requirement that it needs to stand in an Agree relation with a negative operator, which may be left phonologically abstract. The section concludes with a few remarks about the syntactic status of negative markers.

3.1 Strict vs. Non-strict NC languages

The term Negative Concord (NC) refers to the phenomenon in which two negative elements yield only one semantic negation. The set of NC languages falls apart in two classes: Strict NC languages and Non-strict NC languages. In Strict NC languages the n-words[10] must be accompanied by the negative marker, regardless whether they follow or precede the negative marker as is demonstrated for Czech in (15). In Non-strict NC languages the negative marker must accompany postverbal n-words, but may not accompany preverbal n-words. An example of a Non-strict NC language is Italian (16).

(15) Strict NC

a. Milan *(*ne*)vidi *nikoho*. Czech
Milan NEG.saw n-body
'Milan didn't see anybody.'

b. Dnes *(*ne*)volá *nikdo*.
today NEG.calls n-body
'Today nobody calls.'

c. Dnes *nikdo* *(*ne*)volá.
today n-body NEG.calls
'Today nobody calls.'

(16) Non-strict NC

a. Gianni *(*non*) ha telefonato a *nessuno*. Italian
Gianni NEG has called to n-body
'Gianni didn't call anybody.'

b. Ieri *(*non*) ha telefonato *nessuno*.
yesterday NEG has called n-body
'Yesterday nobody called.'

c. Ieri *nessuno* (**non*) ha telefonato (a *nessuno*).
yesterday n-body NEG has called to n-body
'Yesterday nobody called anybody.'

In Zeijlstra (2004) it is argued that NC is a form of multiple Agree (cf. Ura (1996), Hiraiwa (2001, 2005)) between a negative operator that carries an interpretable negative feature [iNEG] and elements that carry an uninterpretable negative feature [uNEG].

[10] Terminology after Laka (1990), Giannakidou (2002).

Sentence (16a) can thus be analysed as (17), where *nessuno*'s [uNEG] feature is checked against *non*'s [iNEG] feature.[11]

(17) [$_{\text{TP}}$ Gianni [$_{\text{NegP}}$ *non* $_{\text{[iNEG]}}$ ha telefonato a *nessuno* $_{\text{[}\sout{\text{uNEG}}\text{]}}$]]

Given the assumption that n-words are analysed as semantically non-negative indefinites that carry a feature [uNEG] (cf. Ladusaw 1992, Brown 1999, Zeijlstra 2004), it follows that the negative operator must c-command them in order to yield the correct readings. Consequently, it means that if the negative marker carries a feature [iNEG] no n-word is allowed to precede it (and still yield an NC reading). However, in Strict NC languages such as Czech, the negative marker may be preceded by an n-word. Consequently, this negative marker cannot be the phonological realisation of the negative operator. It then follows that the negative marker itself carries [uNEG] and that it has its [uNEG] feature checked by an abstract negative operator Op$_{\neg}$, as shown in (18).[12]

(18) Dnes Op $_{\neg\text{[iNEG]}}$ *nikdo* $_{\text{[uNEG]}}$ *ne*volá $_{\text{[uNEG]}}$ Czech
today n-body NEG.calls
'Today nobody calls.'

The [uNEG]/[iNEG] distinction directly explains the Strict NC vs. Non-strict NC pattern that one finds amongst NC languages. Thus I argue that negative markers in Non-strict NC languages, like Italian *non* and Spanish *no*, carry a feature [iNEG], whereas negative markers in Strict NC languages, such as Czech *ne* and Polish *nie*, carry a feature [uNEG].

3.2 Further evidence

I now present some further evidence for the assumption that the difference between Strict and Non-strict NC languages reduces to the semantic value of their negative markers. First, it can be shown that negation behaves differently in Strict and Non-strict NC languages with respect to the scope of quantifying DPs. This is shown in (19). Although Czech *moc* ('much') dominates the negative marker, it is outscoped by negation. This reading is however not obtained in a similar construction in Italian, where *molto* ('much') remains in the scope of negation. This is a further indication that Italian *non*, contrary to Czech *ne*, is a phonological realisation of Op$_{\neg}$.

[11] Note that here a feature checking mechanism is adopted in which checking may take place between a higher interpretable and a lower uninterpretable feature (cf. Adger (2003)).

[12] Note that this analysis requires that an abstract Op$_{\neg}$ is also available in Non-strict NC languages, for instance in constructions such as (16c). Here the abstract negative operator dominates the preverbal n-word. Adding the negative marker *non* would lead to a double negation reading (which is actually available if the preverbal n-word is stressed). Given that Italian has an abstract negative operator next to the overt negative operator *non*, the following question immediately arises: why can't the abstract operator license postverbal n-words as well, given rise to sentences such as *'*Gianni ha telefonato a nessuno*', which is in fact ruled out. The explanation is the following: the abstract negative operator is induced in the lowest position in the clause. In the case of a single postverbal n-word, it would occupy a VP in situ position. However, this does not give rise to a sentential negation: the reading that comes about in something like 'there is a calling event, but no individual that has been called.' This leads to a semantic contradiction. See Herburger (2001) and Zeijlstra (2004) for a more detailed description and explanation of these facts.

(19) a. Milan moc nejedl. Czech
Milan much NEG.eat.PERF
¬> much: 'Milan didn't eat much.'
much > ¬: 'There is much that Milan didn't eat.'

b. Molto non ha mangiato Gianni. Italian
much NEG has eaten Gianni
¬> much: 'Gianni didn't eat much.'
much > ¬: 'There is much that Gianni didn't eat.'

Second, in some Strict NC languages the negative marker may be left out if it is preceded by an n-word, something to be expected on functional grounds if the negative marker carries [uNEG] (if an n-word precedes it, the negative marker is no longer needed as a scope marker). This is for instance the case in Greek (a Strict NC language) with *oute kan* ('NPI-even'). If *oute kan* precedes the negative marker *dhen*, the latter may be left out. If it follows *dhen*, *dhen* may not be removed (cf. Giannakidou 2005). This forms an argument that Greek *dhen* is in fact not semantically negative. As Greek is a Strict NC language, this confirms the assumption that in Strict NC languages the negative marker carries [uNEG].

(20) a. O Jannis *(*dhen*) dhiavase *oute kan* tis Sindaktikes Dhomes Greek
the Jannis NEG reads even the Syntactic Structures
'Jannis doesn't read even Syntactic Structures.'
(example from Giannakidou 2005)

b. *Oute kan* ti Maria (*dhen*) proskalese o pritanis
even the Maria NEG invite the dean
'Not even Maria did the dean invite.'

Finally, the semantic emptiness of negative markers solves a problem put forward by Watanabe (2005) against Giannakidou's (2000) analysis of fragmentary answers. Giannakidou (2000, 2002) argues that n-words in Greek are semantically non-negative. Hence, she has to account for the fact that n-words in fragmentary answers like in (21a) yield a reading that includes a negation. She argues that this negation, expressed by *dhen*, is deleted under ellipsis. Hence the assumption that n-words are semantically non-negative can be maintained. Watanabe (2005) argues that this analysis violates the condition that ellipsis may only take place under semantic identity (cf. Merchant's (2001a) notion of e-GIVENness). However, as the question does not contain a negation, it may not license ellipsis of the negative marker *dhen*. If on the other hand, *dhen* is semantically non-negative, the identity condition is met again. The abstract negative operator then induces the negation in the answer. Note that in Non-strict NC languages, such as Spanish or Italian, the negative marker never follows an n-word, and therefore no negative marker can be deleted under ellipsis in the first place.

(21) a. Q: Ti ides? A: [Op¬ [*TIPOTA* [~~dhen ida~~]]] Greek
what saw.2SG? N-thing [NEG saw.1SG]
'What did you see?' 'Nothing!'

b. Q: ¿Qué viste? A: [Op¬ [*Nada* [~~vi~~]]] Spanish
what saw.2SG? N-thing [saw.1SG]
'What did you see?' 'Nothing!'

3.3 A few words on syntax

Finally, a few words on the syntactic status of negative markers need to be said. All three analyses that have been discussed in section 2, as well as my own analysis that I present in section 5, crucially rely on the distinction between negative markers that are syntactic heads (X^0) and those that have phrasal status (XP). I follow the standard analysis (Haegeman 1995 (1995), Zanuttini 1997, 2001, Merchant 2001b, Zeijlstra 2004 amongst many others) that negative adverbs (such as Dutch *niet*, German *nicht*, French *pas*) are XPs, whereas weak or strong preverbal negative markers as well as affixal negative markers have X^0 status (Italian *non*, Spanish *no*, Polish *nie*, Czech *ne*, Greek *dhen*, French *ne*). The tests on which these analyses are grounded are blocking of verbal movement or blocking of clitic climbing (negative markers X^0 do, negative markers XP do not, cf. Zanuttini 1997, 2001) or the possibility to adjoin to XP phrases such as 'why' (negative markers X^0 do not, negative markers XP do, cf. Merchant 2001b). The syntactic status of negative markers has been widely discussed in the literature and will therefore not be repeated here. The reader is referred to Zeijlstra (2004) for an evaluation of analyses concerning the syntactic status of negative markers.

Negative markers can thus be distinguished in two respects, each with two possible values: they have either X^0 or XP status and they have either a value [iNEG] or [uNEG].[13]

3.4 Typological generalisations

Based on the notions discussed above, a number of languages have been investigated for the syntactic status of their negative markers, and their semantic value. Moreover it has been investigated whether these languages allow TNIs or not. The results are shown in table 1 below.

Based on (1) the two following typological generalisations can be drawn:

(22) **G1**: Every language with an overt negative marker X^0 that carries [iNEG] bans TNIs.
G2: Every language that bans TNIs exhibits an overt negative marker X^0.

These typological generalisations indicate that both the semantic value of the negative marker and its syntactic status play a role in determining whether and why a language bans TNIs. **G2** has already been observed by Zanuttini (1997), **G1** is to my knowledge a novel observation. In the next section I present an analysis that is based on these generalisations. It turns out that the explanation (in line of Han (2001)) for the ban onTNIs lies in the fact that the requirements that negative X^0 markers block verbal movement across the marker and that Op_{IMP} may not be outscoped by a negative operator are in conflict. The ban on TNIs in class III languages cannot directly be explained along these lines. I demonstrate that other factors play a role here, and that their classification as Class III languages is sometimes only superficially correct.

[13] In Zeijlstra (2006), it is argued that in Non-strict NC languages negative markers do not have a formal feature [iNEG], but a semantic feature [NEG]. However, as the interpretation of an element carrying [iNEG] is identical to the interpretation of an element carrying [NEG], I disregard this distinction in this paper, as nothing crucial in this analysis hinges on it.

Class	Language	Neg. marker N^0	Neg. marker [iNEG]	TNIs allowed
I	Spanish	yes	yes	no
	Italian	yes	yes	no
	Portuguese	yes	yes	no
II	Czech	yes	no	yes
	Polish	yes	no	yes
	Bulgarian	yes	no	yes
	Serbo-Croatian	yes	no	yes
	Standard French	yes	no	yes
III	Greek	yes	no	no
	Romanian	yes	no	no
	Hebrew	yes	no	no
	Hungarian	yes	no	no
IV	Dutch	no	yes	yes
	German	no	yes	yes
	Norwegian	no	yes	yes
	Swedish	no	yes	yes
V	Bavarian	no	no	yes
	Yiddish	no	no	yes
	Quebecois	no	no	yes

Table 1: Status of negative markers in 19 languages

4 Analysis

I argue that both the ban on TNIs and its cross-linguistic distribution can be explained on the basis of the following three well-motivated assumptions. First, I assume that Op_{IMP} must take scope from C^0, a standard analysis in the syntax of imperatives (cf. Han (2001)).[14] Second, I adopt the classical observation that operators that encode illocutionary force may not be operated on by a (semantic) negation. In this respect, the analysis presented here reflects Han's analysis. Third, I adopt the HMC (Travis' (1984)), an instance of relativized minimality (cf. Rizzi 1990). Now I demonstrate how for each combination of $\pm X^0$, $\pm$[iNEG] the correct results are predicted.[15]

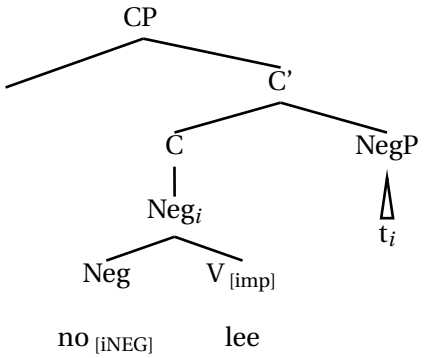
[14] Strictly speaking, it does not have to be C^0 from which the Op_{IMP} takes scope from. Crucially, the [IMP] feature on V_{imp} triggers the verb to move to a particular position which has many similarities to C^0 in non-imperative clauses. The fact that this position must be the highest in the clausal structure follows from its semantics. As Op_{IMP} encodes the illocutionary force rather than the propositional content of the sentence, it cannot be located below other functional projections. The presented analysis is blind to the distinction between C^0 or a particular imperative position (call it Imp^0). In the rest of this paper I conveniently talk about movement to C^0 without committing myself to it.

[15] An anonymous reviewer has pointed out that the ban on TNIs also applies to imperative conditionals, i.e. expressions of the form '*Don't move or I'll shoot!*' The present analysis requires that in these constructions an Op_{IMP} is present as well. This is however not uncontroversial. The question how the conditional reading of those constructions follows from the illocutionary force of an imperative remains

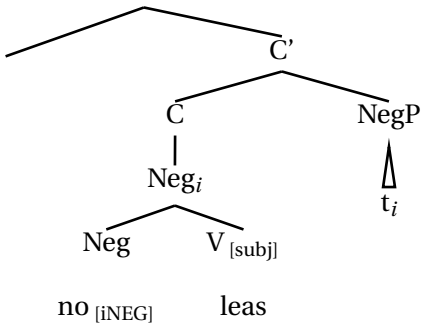
4.1 Class I languages

The first class of languages consists of languages that exhibit a negative marker X^0, which carries an [iNEG] feature. To these languages Han's analysis applies. V_{imp} mustraise to C^0 and as the negative marker Neg^0 must be attached to V^0, this negative marker c-commands [IMP]. Given the syntactic head status of the negative marker, V_{imp} cannot escape out of this unit. This is illustrated for Spanish in (23)a. If, however, the imperative verb is replaced by a subjunctive, nothing leads to ungrammaticality, since the subjunctive does not carry along a feature that encodes illocutionary force, and thus it may be c-commanded by the negation (see (23)b). Obviously, this does not yield the semantics of a prohibitive. However, I assume, following Han, that the prohibitive reading is enforced through pragmatic inference. The language speakers need to fill the functional gap and use the non-imperative construction with the subjunctive as a replacement. The SNI does not yield the reading of a prohibitive, but is then used as one.[16]

(23) a. * (*TNI)



b. (SNI)



Note that the first typological generalisation (G1) immediately follows: since the negative head adjoins to V_{imp} and V_{imp} must raise to C^0, Op_{IMP} cannot avoid being outscoped by negation. Thus every language with an overt negative marker X^0 that carries [iNEG] bans TNIs.

subject of study.

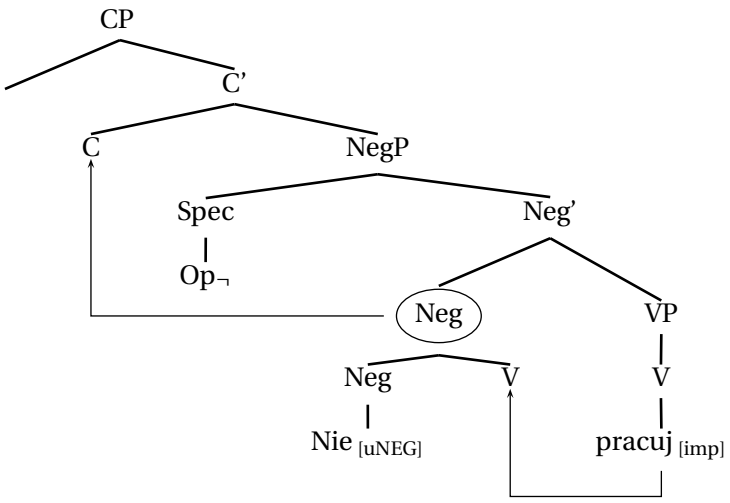
[16] Han (2001) suggests that the fact that the subjunctive encodes an irrealis, plays a role in the imperative interpretation. This is however contradicted by the fact that (for instance) an indicative can fulfil this function as well (Italian plural SNIs exhibit an indicative).

4.2 Class II languages

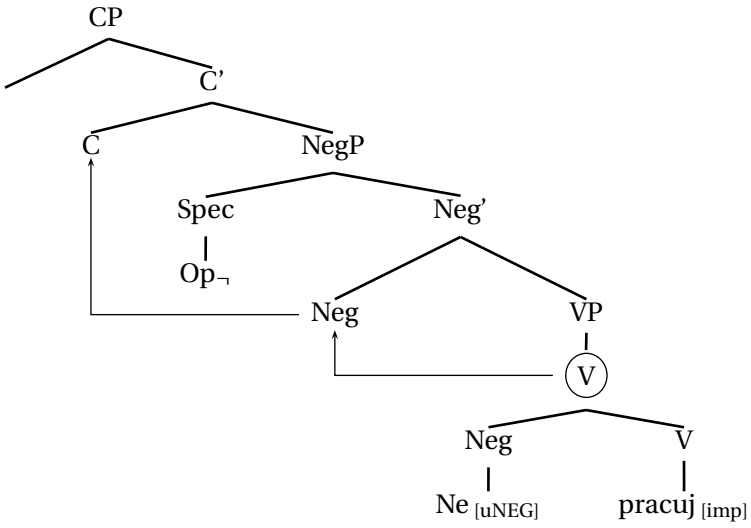
Languages that have negative markers X^0 which carry [uNEG], differ with respect to the ban on TNIs. Czech, Polish, Bulgarian and Serbo-Croation for instance accept TNIs, whereas Romanian, Hungarian, Greek and Hebrew disallow them. In this subsection I discuss the first kind of languages.

In Slavic languages, such as Czech, Polish, Bulgarian and Serbo-Croatian, the negative marker is always in preverbal position. Slavic languages however differ with respect to the phonological strength of the negative marker. Polish *nie* is phonologically strong and can be said to be base-generated in its own position Neg^0 that c-commands VP. Czech *ne* is weaker than Polish *nie* and it is thus unclear whether *ne* originated in Neg^0 or has been base-generated as a head adjunction onto V. In both cases, these negative markers are semantically non-negative and negation is thus induced from $Op_{\neg}$. I assume as in Zeijlstra (2004) that this $Op_{\neg}$ occupies a Spec,NegP position. The clausal structure therefore does not block TNIs. In Polish V_{imp} moves to Neg^0, attaches to *nie* and as a unit $[_{Neg}$ *nie*-$V_{imp}]$ moves along to C^0. $Op_{\neg}$ remains in situ in Spec,NegP and Op_{IMP} takes scope from C^0. If Czech *ne* is base-generated in Neg^0 the analysis of Czech TNIs is similar to the one of Polish. If Czech *ne* is head-adjoined to V^0, the complex verbal unit $[_V$ *ne*-$V_{imp}]$ moves through Neg^0 (and all other intermediate head positions) to C^0, from where Op_{IMP} takes scope. $Op_{\neg}$ is located in Spec,NegP. Thus, both in Polish and Czech (regardless of the position *ne* has been base-generated in) the scopal condition $Op_{IMP} > Op_{\neg}$ is met. This is illustrated below in for Polish in (24) and for the latter analysis of Czech in (25).

(24) Polish



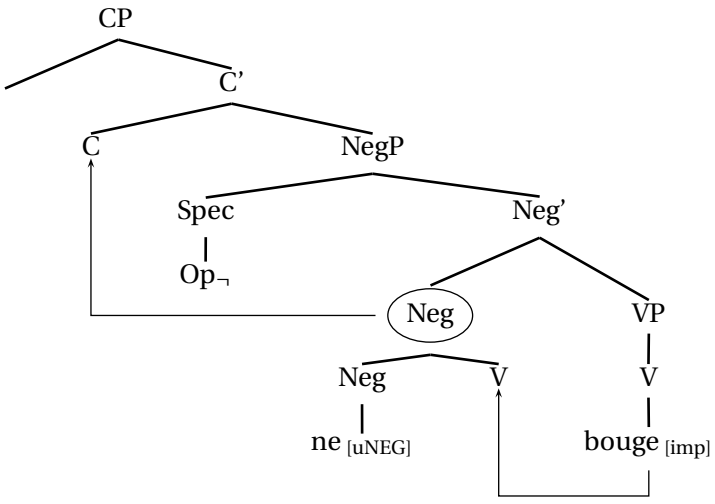
(25) Czech



Another language that has a negative marker X^0 that carries [uNEG] and allows TNIs is Standard French. Standard French differs from the above mentioned language in that it has two negative markers: *ne* and *pas*. Following standard analyses about French (Rowlett (1998) among many others), *pas* is taken to be the realisation of the negative operator, whereas *ne* is semantically non-negative. This explains why French negative imperatives may move along with V_{imp} to C^0. Standard French is analysed similarly to Polish, except for the fact that the negative operator is not realised covertly, but overtly.

(26) Ne bouge pas! Standard French 'Don't move!'
NEG move NEG

(27) Standard French



4.3 Class III languages

The third class of languages under discussion consists of (amongst others) Romanian, Hungarian, Greek and Hebrew. These languages also exhibit X^0 negative markers carrying [uNEG] features, but contrary to what would be expected they ban TNIs. Hence, additional explanations are required to account for the ban on TNIs in these languages. Of the four languages studied here, three languages have an additional negative marker

for subjunctives. Hungarian *nem* is replaced by *ne* in subjunctives,Greek *dhen* is replaced by *mi* and Hebrew *lo* alternates with *al*. Let us first focus on Hungarian. Hungarian imperative verbs are fine with this second negative marker *ne*, as is shown in (28).

(28) a. * *Nem* olvass! Hungarian
Neg read.IMP
'Don't read!'

b. *Ne* olvass!
Neg read.IMP
'Don't read!'

Ne and *nem* are both allowed to participate in Strict NC constructions and therefore carry both [uNEG]. They behave similar to the Slavic negative markers. The only difference is that *nem* and *ne* differ in their feature make-up with respect to mood. A suggestion would be that *nem* carrries a feature [-IRR] that disallows it to participate in subjunctives/imperatives and likewise *ne* would carry [+IRR] (this is much in line with Zanuttini's (1997) analysis). Crucial is that the mood distinction of Hungarian negative markers is not related to the ban on TNIs. Strictly speaking Hungarian does allow TNIs, since imperatives and subjunctives cannot be combined with *nem* for independent reasons. Hungarian is actually a Class II language.

The situation in Hebrew and Greek is different. Greek and Hebrew also exhibit different markers for different moods, but TNIs are banned for both negative markers. Note however that the classification of TNIs has been based on the semantic value of the negative marker in indicatives (using the Strict / Non-strict NC distinction as a diagnostic criterion). However, it is not required that these negative marker have identical semantics. Below it is shown that the Greek negative marker *mi* (contrary to *dhen*) only allows n-words in postverbal position:

(29) a. * Thelo KANENAS na *mi* Greek
want.1SG n-body PRT neg
fiji
leave.3SG.SUBJ
'I want nobody to leave.'

b. Thelo na *mi* fiji KANENAS
want.1SG PRT neg leave.3SG.SUBJ n-body
'I want nobody to leave.'

It is natural to assume that in Greek the mood distinction of negative markers is similar to that in Hungarian. *Dhen* is marked [-IRR], *mi* is marked [+IRR]. Hence, TNIs could only occur with the negative marker *mi*. But, since *mi* carries [iNEG], Greek TNIs are ruled out for the same reason as their Class I counterparts. This same analysis mutatis mutandis holds for Hebrew too.

Finally, Romanian needs to be discussed. Romanian lacks an additional negative markerfor non-indicative mood. But still it disallows TNIs:

(30) * Nu lucreaza! Romanian
NEG work.IMP
'Don't work!'

Apparently, TNIs in this language must be blocked for another reason. The explanation of the ban on TNIs lies within the fact that it is a particular property of the Romanian negative marker that it forbids further verbal movement after clitisation with the finite verb. This is motivated by the fact that Romanian verbs allow inversion with respect to their clitic cluster. This can be explained by arguing that in (31b) the verb moves to a higher position, leaving its clitic cluster in a stranded position.

(31) a. M-as mira se Romanian
me-AUX.SUBJ be.surprised AUX.SUBJ
vina Ion.
come Ion
'I would be surprised if Ion came.'

b. Mira m-as se vina Ion.
be.surprised me-AUX.SUBJ AUX.SUBJ come Ion
'I would be surprised if Ion came.'

This movement is however forbidden in the case of clitisation with negative markers. Both verbal movement out of the clitic cluster and clitic inversion below Neg^0 are forbidden in Romanian, as illustrated in (32).[17]

(32) a. Nu m-as mira Romanian
NEG me-AUX.SUBJ be.surprised
se vina Ion.
AUX.SUBJ come Ion
'I wouldn't be surprised if Ion came.'

b. * Mira nu m-as se vina Ion.
be.surprised NEG me-AUX.SUBJ AUX.SUBJ come Ion
'I wouldn't be surprised if Ion came.'

c. * Mira m-as nu se vina Ion.
be.surprised me-AUX.SUBJ NEG AUX.SUBJ come Ion
'I wouldn't be surprised if Ion came.'

The data in (31) and (32) show that Romanian *nu* blocks verbal movement to a higher position than Neg^0 and thus acts differently than other clitics in Romanian. If verbal movement to a higher position is ruled out in Romanian negative clauses, this immediately explains the ban on TNIs in this language.

The discussion of the languages in this paragraph shows that the languages that seem to be counterexamples to the analysis of the ban on TNIs presented above are actually not.

4.4 Class IV languages

It follows too that if a negative marker has phrasal rather than head status, TNIs are accepted. Regardless of the position of the negative marker, it cannot block movement of V_{imp} to C^0. Hence Op_{IMP} can always take scope from C^0 and all scopal requirements

[17] Thanks to Adrien Brasoveanu (p.c.) who gave me these examples. For a more detailed analysis of the (non-)clitic behaviour of Romanian negative markers, cf. Monachesi (2000) and Alboiu (2002).

are met. In Zeijlstra (2004) it has been argued that the position of the negative marker inDutch is a vP adjunct position. The structure of a TNI in Dutch then would be like (33).

(33) [$_{CP}$ slaap $_{[imp]\,i}$ [$_{vP}$ niet t_i]] Dutch

Note that typological generalisation G2 follows from this analysis. If in a particular language there is no negative marker X^0 available, movement of V_{imp} to C^0 can never be blocked. Consequently, all languages that ban TNIs exhibit an overt negative marker X^0.

4.5 Class V languages

The analysis of Class IV languages extends to Class V languages: NC languages without a negative head marker, such as Bavarian, Quebecois and Yiddish. Given the explanation for G2, it is not expected that TNIs are banned in these languages either. As shown in (34) verbal movement to C^0 cannot be blocked and therefore TNIs are allowed.

(34) a. Kuk nit! Yiddish
look.IMP NEG
'Don't look!'

b. [$_{CP}$ Kuk $_{[imp]\,i}$ [$_{VP}$ nit [$_{VP}$ t_i]]

4.6 Concluding remarks

It has been shown that the three assumptions that I presented in the beginning of this section (Op_{IMP} takes scope from C^0, Op_{IMP} may not be c-commanded by a negative operator and the HMC) predicts correctly in which TNIs are excluded, thus correctly predicting the typological generalisations **G1** and **G2**.

5 Further evidence: diachronic change

In Non-strict NC languages with a negative marker X^0 (carrying [iNEG]) TNIs must be banned. This holds for instance for Italian. However, it is known that Old Italian allowed TNIs (as pointed out by Zanuttini (1997) and shown in (35)). The analysis presented above predicts that is impossible that the negative marker *non* in Old Italian carries a feature [iNEG]. In other words, the analysis predicts that Old Italian *non* must have carried [uNEG]. Consequently, Old Italian cannot have been a Non-strict NC language. This prediction is indeed borne out. Old Italian was a Strict NC language, as shown in (36).

(35) a. Ni ti tormenta di questo! Old Italian
NEG yourself torment.2SG.IMP of this
'Don't torment yourself with this!' (example taken from Zanuttini 1997)

b. * Non telefona a Gianni! Contemporary Italian
NEG call.2SG.IMP to Gianni
'Don't call Gianni!'

(36) a. Mai nessuno oma non si più Old Italian
N-ever n-even-one man NEG himself can
guarare
protect
'Nobody can ever protect himself.' (examples taken from Martins 2000: 194)

b. Nessuno (*non) ha detto niente. Contemporary Italian
N-body neg has said n-thing
'Nobody said anything.'

Apparently Italian developed from a Strict NC language into a Non-strict NC language. Since in Old Italian TNIs were allowed, the change from Strict NC into Non-strict NC must have caused the ban on TNIs. Similar observations can be made for the development of Portuguese that used to be a Strict NC language that allowed TNIs and transformed into a Non-strict NC language that bans TNIs (see Zeijlstra (2006) for a more detailed analysis of the development of Romance languages with respect to NC).The analysis presented above predicts that the diachronic developments with respect to the acceptance of TNIs and the kind of NC that a language exhibits are related. This prediction further supports this analysis.

6 Conclusions

In this paper I analyse the ban on TNIs as a result of three principles: (i) the fact that Op_{IMP} universally takes scope from C^0; (ii) the fact that Op_{IMP} may not be c-commanded by a negative operator and (iii) the HMC (an instance of Relativized Minimality). It follows that if a negative marker is a syntactic head and carries an [iNEG] feature, V_{imp} may not move across Neg^0, but must attach to it. Hence, the [IMP] feature remains under the scope of negation and the TNI is ruled out.

From this analysis the typological generalisations G1 and G2 are also derived. G1 follows, since (as explained above) in every Non-strict NC language with a negative marker X^0 this negative marker must carry [iNEG] and thus TNIs are ruled out. G2 follows because of the HMC. If a language does not exhibit a negative marker Neg^0, this marker can never block verbal movement to C^0 and TNIs must be allowed.

Finally, it follows that diachronic developments with respect to the kind of NC (Strict/ Non-strict) that a language exhibits may influence a language's ban on TNIs. It is shown for Italian that this prediction is indeed correct.

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