Theoretical Linguistics Programme, Budapest University (ELTE)

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1. Introduction: Towards the Most Radical Lexicalism[1]

The title of this introductory section refers to Lauri Karttunen's (1986) article *Radical Lexicalism;* the author whose earlier article *Discourse Referents* (Karttunen 1976) had essentially contained the basic ideas of the theory that has become well-known as the Kamp—Heim Discourse Representation Theory (DRT) (Kamp 1981, Heim 1982, 1983, Kamp és Reyle 1993, van Eijck és Kamp 1997).

DRT is a successful attempt to extend the sentence-level Montagovian model-theoretic semantics (Dowty *et al.* 1981), which had not only failed to exceed this level but had also been unsuccessful in the treatment of certain types of anaphoric relations, to the discourse level.[2] Its essence lies in the discovery that the failure of the immediate interpretation of sentences / discourses in the static Montagovian world model is to be attributed to the fact that the discourse just under interpretation is permanently becoming part of the world in which it is being interpreted[3]; thus a level of discourse representation *must* be inserted in between the language to be interpreted and the world model serving as the "ground" of interpretation. The insertion of this level, however, has given rise to a double problem of *compositionality* (language→DRS, DRS→world model), at least according to the very strict sense of the Fregean principle of compositionality introduced by Montague (Groenendijk and Stokhof 1989, 1990, 1991). As for the DRS→world model transition Zeevat (1991a) was the first to provide a compositional solution, which could successfully be built in the new version of DRT (van Eijck and Kamp 1997). As for the language→DRS transition, however, Kamp and his co-author (p195) admit that no (properly) compositional solution could be found in the last two decades: "DRT has often been criticized for failing to be 'compositional'. ... Given the form in which DRT was originally presented, this charge [concerning the language→DRS transition] is justifiable, or at least it was so in the past." "Does DRT provide a way of analyzing fragments of natural language which assigns these fragments a semantics that is compositional with respect to these fragments themselves, a semantics that is compositional with respect to a *natural syntax* [emphasized by me] for these fragments? The original formulation of DRT did not seem to provide such an analysis, and it was even suggested at the time that a compositional treatment of the natural language fragments then

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[1] The final version of this article was written during my stay in Wassenaar at NIAS (Netherlands Institute for Advanced Study in the Humanities and Social Sciences, Royal Netherlands Academy of Arts and Sciences) in the fall of 1998. Special thanks are due to this friendly institute for the quiet environment and excellent library facilities. I am also grateful to Zoltán Bánréti for permanent encouragement, Anna Szabolcsi, László Kálmán, Viktor Trón, Anna Medve, Anita Viszket and seven anonymous reviewers of earlier versions of this paper for their useful comments on GASG, and the Hungarian National Scientific Research Fund (grant no. OTKA F026658) for their contribution to my travel costs among others.

[2] "With its emphasis on representing and interpreting discourse in context, discourse representation theory has been instrumental in the emergency of a *dynamic perspective* on natural language semantics, where the centre of the stage, occupied so long by the concept of truth with respect to appropriate models, has been replaced by context change conditions, with truth conditions defined in terms of those. ... This shift has considerably enriched the enterprise of formal semantics, by bringing areas formerly belonging to *informal pragmatics* [emphasized by me] within its compass" (van Eijck és Kamp 1997).

[3] Note that it is also worth-while and plausible (Alberti 1996a) to regard the *hearer's information state,* unceasingly changing under the influence of discourses, as permanently becoming part of the world because in this way we simply avoid the problem of *intensionality:* speaking about somebody's beliefs (about, for instance, Hob and Nob's superstitious beliefs in Geach's (1962) famous examples) is nothing else than speaking about their information states and the referents that *do* exist there (see also Alberti 1999; Zeevat (1987a, 1988) is also essentially seeking the key to the treatment of *belief sentences* in this direction).

considered would be impossible" (van Eijck and Kamp 1997: 215). The new chance to find this "natural syntax" lies in a *unification categorial grammar*, similar to that described by Zeevat (1987b) and, independently of the former, by Karttunen (1986). So we have returned to our first thread, the idea of radical lexicalism.

The failure of elaborating a properly compositional solution to the language→DRS transition arises from the incompatibility of the strictly hierarchically organized generative syntactic phrase structures (PS; e.g. Chomsky 1957, 1995) with the basically unordered DRSs (or ones ordered but in an entirely different way). Although Zeevat (1991a, 3.1) mentions the idea that the kind of lambda abstraction applied in the Montague Grammar (Partee *et al.* 1990, Part D) must provide a compositional solution in DRT, too, he himself refuses the possibility of this approach as one that "seems to conflict with the general ideology of Discourse Representation Theory, which is "naive" in the sense of Davidson. Under such an approach it seems one does not want to refer to all manner of abstract semantic entities, such as properties, properties of properties and the like in natural language semantics [typed logics with lambda abstraction are the hotbed of such things]. Instead one is forced to have a relatively meagre ontology: say objects and sentences." The *naiveté* of DRT is to be regarded as a contentful constraint concerning the hypothesized capacity of human languages.

The reason why the (Classical) Categorial Grammar (CCG; see e.g. Partee *et al.* 1990, 21.4) seems to be compatible (or at least not hopelessly incompatible) with DRSs is that, in this system, language-specific information (about how words can combine to form constituents, and then sentences), stored in PS-rules in the transformational generative theory, is stored in the Lexicon, the reduced syntax only "concatenates": it permits the words with compatible lexical information to combine (this operation of concatenation is referred to as *Function Application).* The problem with CCG is that it has only a context free generative capacity, which is held to be insufficient for the description of human languages (Shieber 1985). There seem to be two ways to increase the generative capacity of CCG: to let in, nevertheless, in opposition to the original goals, a few combinatorial means (though non-language-specific ones such as Function Composition, Commutativity, Type Raising, Geach Rule; e.g. Steedman 1988) or to introduce the technique of *unification,* applied e.g. in Prolog (Karttunen 1986 (CUG), Zeevat 19897b (UCG). It is straightforward in the spirit of what has been said so far that DRT is (more) compatible with CUG/UCG insisting on a reduced syntax.

Karttunen (1986) is successful in the application of CUG to a few phenomena of Finnish, a non-configurational language with a rich morphology: the unification of *morphological features* implies correct interpretations in the cases discussed. It is these features that are relevant to interpretation; but there arises an unpleasant side effect: the "spurious ambiguity" of PS trees built by the grammar. The problem obviously lies in the vacuity of these analysis trees.[4] Zeevat (1991b: 23) also reports problems with non-configurationality: "The parts where our approach [UCG] does less well are conjunction[5]... as well as problems with *non-configurationality."*

[4] "It is convenient to represent the analysis of a phrase as a tree that shows how the resulting feature set was derived. However, the structure of the analysis tree ... has no linguistic significance in our system; in this respect analysis trees are different from PS trees as they are traditionally construed in linguistics. *All that matters is the resulting feature set* [emphasized by me]. Because no functor has any priority over others with respect to order of application, the same result can often be obtained in more than one way. ... From the parser's point of view, this is a "spurious ambiguity" because the ... analyses yield exactly the same set of features. In a more complicated sentence, spurious ambiguities multiply very quickly" (Karttunen 1986: 19-20).

[5] As for conjunction (or coordination), it is just the area where Hudson (1984: 217-218) reports to have failed to find a treatment in harmony with the originally intended goals of his Word Grammar (i.e. to get rid of constituent structures

This article is devoted to the demonstration of a grammar whose basic idea has been inspired just by the viewpoint of compositional compatibility with DRSs *(GASG:* Alberti 1990, 1996a,b, 1997b, 1998a) and which differs from UCG in one relevant point: even the last syntactic operation, Function Application, is to be omitted from syntax, as a total triumph of our radical lexicalism.[6] What remains is the pure unification. PS trees, accompanying the whole history of generative linguistics (and transformations, of course), disappear; which promises an "automatic" solution to Kartunen's (1986) problem of "spurious ambiguities," but there arise several questions at once: how is it possible now, for instance, to account for (non-free) word order and the stubbornly constituent-like coordinate structures (see footnote 5)? This article is intended to provide exhaustive answers to questions like these and to prove the suitability of GASG for playing the role of the "natural syntax" of DRT; which would mean averting the last strong argument against this promising discourse representation theory.

After Section 2, which contains an introduction to DRT, we would like to demonstrate the descriptive advantages of GASG over arbitrary PS Grammars in two areas (related to each other in an interesting way): the one problem concerns the extreme freedom of movement characteristic of certain adverbs in non-configurational languages (3.3), which gives rise to recourse to weakly motivated "stylistic rules" in PSGs (e.g. É. Kiss 1992: 169-171), whereas the other problem arises just in highly configurational languages, where it is semantic (scopal) relations that enjoy an extent of freedom very difficult to define *(inverse scope problem;* e.g. Szabolcsi 1997). Section 4 provides solutions to the problems that will have been mentioned so far, including the question of coordination as well (4.5). Subsection 4.6 is devoted to a comparative analysis of English, German and Dutch multiple infinitival constructions; especially the latter, the "cross-serial" Dutch construction, is of a distinguished relevance to the capacity of new grammars because its description requires an (at least) mildly context sensitive grammar (Partee *et al.* 1990, Section 21).

In Section 5 it will be argued that studying the possibility of a GASG-like grammar is not only a legitimate research program but an unavoidable meta-theoretical task forced upon us by the four-decade scientific tendency in the course of which the Lexicon is occupying more and more areas at the loss of syntax in *every* important branch of the family of generative theories, which originally used to be so radically syntax-centered (5.1). 5.2 discusses the possibility of partially reconstructing PS trees on the basis of GASG analyses. The last two subsections deal with the semantic counterpart of morphosyntactic unification, which will be called *copredication,* in a typological perspective (Lehmann 1988) and then in a lexical-semantic perspective (Pustejovsky 1995). In the latter area we would like to call attention to the possibility for embedding the very effective Qualia Structures in DRT.

2. DRT

2.1 The Magical Power of Representationalism

As the introduction has (had to) become quite long (because the interpretation and importance of the "radical lexicalism" of GASG could be elucidated only if embedded in the context of the two-decade history of the Discourse Representation Theory, this second section,

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entirely): "As may be imagined, I have tried hard to find a way of doing this without constituent structure, but since I have failed, I must explain why it seems to be necessary, and what implications it has for my general rejection of constituency-based analyses."

[6] GASG = *Generative* and/or *Generalized Argument Structure Grammar.*

devoted to the introduction of the theory, need not be very long.[7] Nevertheless, we regard it as an unavoidable task to cite the famous "donkey sentence" here (2.1.a): it is not only intended to illustrate the problem with the standard Montagovian logic which triggered off the development of DRT (Kamp 1981), but to elucidate the theory's background philosophy, whose further generalization we consider to promise solutions to a wide range of problems (see footnotes 3, 8 and Subsection 5.4).

While the male pronoun and the neutral pronoun in the *then* clause of (2.1.a) clearly refer to the farmer and the donkey in the *if* clause, respectively, the formula in (2.1.b), which is the straightforward (and compositional) predicate-logical representation of the sentence, cannot express this meaning.

(2.1) a. If a farmer owns a donkey (then) he beats it.
b. $(\exists x \exists y.(\text{farmer}(x) \ \& \ \text{donkey}(y) \ \& \ \text{owns}(x, y)) \ \rightarrow \ (\text{beats}(x, y))$

For the last occurrence of variable x (in *beats(x, y))* has nothing to do with the earlier occurrences of x because the latter are bound variables (bound by the existential quantifier ∃, in the scope of which they are) whereas the last x is a free variable. In the traditional predicate logic there is no way to identify a free variable with a preceding bound variable (i.e. to make sure that they take the same value) even if they are occurrences of the same symbol. And the problem is not only technical at all. As in every well-founded and properly formalized theory, the "stubborn resistance" of formalism is a clear indication of some basic theoretical problem; it is just this property, *falsifiability,* that characterizes well-done theories.

The formula associated with the *if* clause expresses the existence of "at least one farmer" and "at least one donkey," which is correct in a truth-conditional sense since the reference to a farmer and the reference to a donkey do not exclude other farmers and donkeys from the model. It cannot be explained, then, why *he* can refer to an arbitrary member of a (perhaps large) group of male people, and why *it* can refer to an arbitrary member of another potentially large group as if there were nothing else in the model but a single farmer and a single donkey.

The solution that the Kamp—Heim Theory has offered is based on the insertion of a partial model containing *discourse referents* (Karttunen 1976) between syntax and world model. The partial model, called *discourse representation structure* (DRS), assigned to the *if* clause is a very small world with two referents, the former being a farmer, the latter being a donkey, and the former owning the latter. The intuition is clear: the speaker and the hearer do not speak about the whole real world immediately, but only about a very small abstract world they are building in the course of their conversation. In this small world there *is* only one farmer and one donkey, so it can be known who beats who; and then this small abstract situation can be applied to several farmer—donkey pairs.

The introduction of DRSs solves the problems like this at the cost of relinquishing the insistence on the comfortable working hypothesis according to which there is a world to be described, on the one hand, and there is a "linguistic product" to be interpreted (an utterance), on the other, and they can be strictly separated. At the very moment of its utterance, a linguistic product has already been a part of the world it describes. Since the one-sentence discourse in (2.1), for instance, can be continued this way: *At least* ***it*** *is the custom in Texas.* And this *it* refers

[7] We have managed, for instance, to show the minimal list of key publications in the field.

to neither a farmer, nor a donkey, nor a stick good for beating donkeys, nor any "normal" entity of the world, but a *fact* (or belief) referred to, and created, by the conditional sentence itself.[8]

In the illustration of DRSs below, the technique is already that of the nineties (Kamp and Reyle 1993, van Eijck and Kamp 1997) (though the formula-like notations contain the more traditional symbols of conjunction ($\wedge$) and conditional ($\rightarrow$) (Zeevat 1991a)), and the sentences are such that serve our later goals better.

(2.2) a. Yesterday an English boy visited a pretty Dutch girl.
b. Every English boy visited a pretty Dutch girl.

(2.3) a. $x \wedge y \wedge e \wedge n \wedge t \wedge$ yesterday(t) $\wedge$ english(x) $\wedge$ boy(x) $\wedge$ pretty(y) $\wedge$ dutch(y) $\wedge$ girl(y) $\wedge$ visit(e,x,y) $\wedge$ $e \sqsubseteq t \wedge t<n$

b.

x, y, e, n, t
yesterday(t)
english(x)
boy(x)
pretty(y)
dutch(y)
girl(y)
visit(e,x,y)
$e \sqsubseteq t$
$t<n$

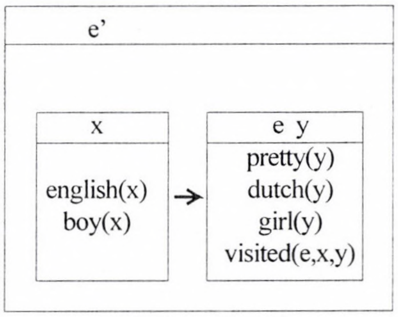
c.

x, y, e, n, t
dutch(y)
boy(x)
$e \sqsubseteq t$
visit(e,x,y)
$t<n$
pretty(y)
yesterday(t)
english(x)
girl(y)

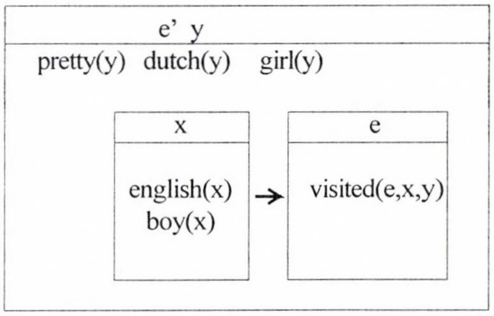
(2.4) a. $e' \wedge ((x \wedge$ english(x) $\wedge$ boy(x)) $\rightarrow$ (e $\wedge$ y $\wedge$ pretty(y) $\wedge$ dutch(y) $\wedge$ girl(y) $\wedge$ visited(e,x,y)))

b. $e' \wedge y \wedge$ pretty(y) $\wedge$ dutch(y) $\wedge$ girl(y) $\wedge$ ((x $\wedge$ english(x) boy(x)) $\rightarrow$ (e $\wedge$ visited(e,x,y)))

A.



B.



Our first comment on the representations above concerns the relation between the formula-like notations (2.3.a, 2.4.a,b) and the spectacular "boxed" notations (2.3.b,c, 2.4A,B): they are

[8] We would like to refer here to Alberti (1996b), which provides an attempt to define the *hearer' information state*, permanently changing in the course of discourses, as a (very huge and complex) DRS, in which the hearer's "just activated" world model not only serves as a ground of the interpretation of following sentences but is permanently changing in the process of interpretation. A seven-variable simultaneously recursive technique of defining is used, in which sets of different sorts of referents, relations, worlds and "cursors" are to increase each other. The expression "life-long DRS" is due to an anonymous reviewer selected by Anna Szabolcsi, the guest-editor of *Acta Linguistica Hungarica*. I would like to thank them for the expression.

equivalent.[9] The apparent difference is that in the boxes *referents* (x, y, e, etc.) are separated in upper "shelves" whereas in the formula-like notation referents and atomic formulas are not separated at all, and are even permitted to appear as non-distinguished members of conjuntions, which might seem to be a careless treatment, is an intentional and elegant means of building DRSs in a compositional way (Zeevat 1991a, van Eijck and Kamp 1997): referents are to be regarded as special DRSs with vacuous sets of atomic formulas, but in the course of interpretation they are automatically separated from statements ("conditions").

In connection with this topic, we would like to return to the "naive logic" of DRT, mentioned in the introduction: it is a "weakened" predicate logic, which lacks the usual powerful quantifiers $\exists$ and $\forall$ *in a certain sense,* but it has been proved that in an appropriate predicate-logical translation they can appear in a restricted form: the box structure implies the existential binding of certain referents and the universal binding of others. The point here is that DRT uses a *restricted* predicate-logical language, and this restriction ("naiveté") is a contentful hypothesis on Universal Grammar.

Thus one important task of, say, the (equivalent) formulas in (2.3) is to introduce referents, "characters of our small drama," which can also be referred to later: the boy (x), the girl (y), the current time of the utterance (n), the day before the utterance time (t), and even the fact of the visit itself (e).[10] The role of the atomic formulas then is to associate pieces of information with these referents, as coats are hung on pegs, according to Landman's (1986) famous simile: x turns out to be a boy, who is English; y turns out to be a girl, who is Dutch and who is pretty; t turns out to be the day before the utterance time; and finally it turns out that there is a situation e in the course of which x visits y, and this situation e took place within the time interval t ($e \sqsubseteq t$).

It is a crucial virtue of DRT to be noticed that it offers a comfortable and plausible technique to treat temporal anaphora: the expression of past tense, as demonstrated above, contains simplifications, of course, but the possibility of cutting eventualities into pieces that can be referred to separately promises a straightforward treatment of intricate aspectual phenomena. It is to be regarded as a fundamental capacity of human languages to enable us to refer to pieces of eventualities in a highly developed way; time referents and referents of pieces of eventualities are *present* in conversations, witnessed by the examples below (Pustejovsky 1995: 74), which is a strong argument in favor of the *representationalism* characteristic of DRT:

(2.5) a-d. Peter ran home at 1.30 / by 3.00 / in 90 minutes / for an hour.

Running home is an *accomplishment,* a telic action, with a starting-point (1.30: (2.5.a)), a preparatory phase (it lasts 90 minutes according to (2.5.c)), a culmination point (3 o'clock: (2.5.b)), and a result state following the culmination point (Kamp and Reyle 1993: 558). Language enables us to refer to even this result state: the pleasant period of being at home lasts an hour according to the sentence variant (2.5.d). The representationalist approach can ensure a suitable framework for such further types of information as presupposition, cultural/encyclopedic background knowledge or contextual information to accommodate them. This *suitability* is naturally only the beginning of solving these problems but serves as a further strong argument in favor of the representational character of DRT.

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[9] The equivalence between DRSs (2.3.b) and (2.3.c) is intended to call attention to the unordered nature of the inner architecture of (the basic type of) DRSs: they describe the same small worlds, independently of the order of contained formulas. This characteristic property of DRSs will be discussed thoroughly in 2.2.

[10] It is possible to refer to the visit, too: e.g. ... *I don't believe it. English boys are too stiff to make friends with foreigners, and Dutch girls are not pretty at all.*

Let us return to the sentence in (2.2.b) and the corresponding DRSs in (2.4). Here we have ignored temporal and aspectual details, which are not relevant to what follows, in order to concentrate on *ambiguity.* In the case of the (2.4.a,A) reading, only a referent indicating a *sum of events* (Zeevat 1991b: 111) has been introduced to the *main* DRS: only this referent is accessible (for singular pronouns) from "outside", i.e. from a following sentence (2.6.a); a particular boy—girl pair is not accessible from outside (2.6.b). This fact is accounted for by introducing the referents of boys and girls only into embedded DRSs, which are "still smaller worlds" in the "small world." (2.6.c) illustrates the fact that, remaining inside the sentence (i.e. inside the smallest world), the boy—girl pair remains accessible. Finally, (2.6.d) shows the difference between the two readings of sentence (2.2.b): there is only one girl according to the (2.4.b reading)[11], and this girl is accessible also from outside, indeed, so her referent is to be introduced into the main DRS.

(2.6) a. Every English boy visited a pretty Dutch girl. ... *It* happened on November 21.
b. ... *He received a cup of hot coffee from her.
c. ..., from which he received a cup of hot coffee.
d. ... She is called Bettie.

Thus the DRS demonstrated in (2.4.B) contains the referent y of the girl on the highest box level; it is this way by which DRT can account for the difference between the two readings, and especially the difference in possibility for referring to the girl from outside (2.6b,d). This latter factor can be expressed in the course of the *dynamic interpretation* of DRSs, whose intricate details are not, but its possibility *is,* relevant to our discussion.

The existential/universal binding of referents, mentioned earlier, is relevant in the course of a *static* (model-theoretic) interpretation of DRSs. In the case of (2.3), there is a homogeneous existential binding, which is a general characteristic of the main (outermost) DRS box: *there is* an English boy, and *there is* a Dutch girl, and *there occurred* a situation in the course of which the former visited the latter. The readings of (2.2.b) illustrate a rule according to which, out of the DRS pairs linked together by the symbol of conditional (→), it is the left-hand DRSs, and not the right-hand ones, in the case of which a universal binding appears. Thus (2.4.A) says that for *every* English boy *there is* a pretty Dutch girl such that the former visited the latter. Whereas according to (2.4.B), *there is* a pretty Dutch girl such that for *every* English boy it is true that the latter visited the former.

2.2 The Problem of Compositionality

The insertion of a level of discourse representation in between the morphosyntax and the world model thus has provided an elegant solution to a wide range of classical linguistic and/or logical problems; moreover, I argue elsewhere (Alberti 1996b, 1999) that the representation of the hearer's information state permanently changing in the course of discourses as a very huge and complex "life-long" DRS may open further linguistic areas — and all advantages are due to the fact that the solution DRT offers is not a purely technical one but captures the deeply anaphoric nature of human language.

The introduction of the DRS level, however, has also entailed an unpleasant consequence: instead of one transition (language→world model), there have been two transitions at which the

[11] This reading is usually called the *specific* interpretation by logical semanticists (Kamp and Reyle 1993: 228); generative semanticists rather call it *inverse scope* (Szabolcsi 1997).

satisfaction of the principle of compositionality is to be guaranteed: the transitions language→DRS and DRS→world model. It is worth mentioning that Montague also introduced a mediate level between language and world, whose "language" is a typed logic with lambda abstraction, but he could prove that this level is only an eliminable auxiliary representation. It has also been suggested that the DRS level, similar to Montague's auxiliary logic in some respects, should be eliminated in the hope of avoiding the double problem of compositionality (Groenendijk and Stokhof 1989, 1990, 1991). A solution like this, however, would result in the "representationalist" hopes discussed in 2.1 disappearing, too. Therefore the approach to be preferred lies in the solution of the double problem of compositionality.

As for the language→world model transition, the approach initiated by Zeevat (1991a) has been successfully built in an improved version of DRT (van Eijck and Kamp 1997). The crucial element of the approach is just the surprising possibility for connecting referents and formulas, mentioned in 2.1, where both a single referent and a single atomic formula can be regarded as a minimal DRS.

The language→DRS transition seems to be a (still) more stubborn problem. It is enough to compare even the simplest type of DRSs, those containing no embedded DRSs (e.g. 2.3), with analysis trees of an arbitrary PS Grammar in order for us to see the antagonism: the DRS in (2.3.b), for instance, is an *unordered* set of statements, whose content would not change at all if its formulas are mixed (2.3.c)[12], whereas it is a characteristic property of PS trees that the words corresponding to predicates are grouped into *constituents* in them. The pair [English boy] in (2.2.b), for instance, forms a constituent in any PSG, in opposition to, say, the pair [English girl] or [pretty yesterday]. Whereas the corresponding <english(x), boy(x)> pair of statements in the DRS enjoys no distinguished role in any sense compared with the <english(x), girl(y)> pair or the <pretty(y), yesterday(t)> pair. All three pairs are simple subsets of the set of statements the DRS in question consists of.

Although the DRSs in (2.4) show signs of having some structure —one might think that the left-hand box in (2.4.A) contains the subject NP *(an English boy)* and the right-hand box the VP *(visited a pretty Dutch girl)*, the right-hand box of (2.4.B) makes it clear that the goal is not to express the VP. Moreover, if *a pretty Dutch girl* is replaced with *a grandchild of Peter's,* there would be an atomic formula *Peter(z)* introduced in the main DRS, separated from the counterparts of the other elements of the VP, which should remain in the right-hand box in the case of the non-specific reading[13], because a proper name is held to be necessarily specific. Thus the inner structure of DRSs is to express special semantic aspects, which radically differ from the usual and plausible constituent structure of PS trees.

As the Fregean principle of compositionality has been formulated by Montague as a *homomorphism* between levels, and homomorphism means "similar structure / morphology," the strictly compositional treatment of the syntax→DRS transition means nothing else but finding a homomorphic mapping between non-homomorphic levels; that is, our task would be to verify ("finding" is equivalent to verification in the sense in question) the homomorphism of non-homomorphic things. It seems to be a contradiction.

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[12] The <dutch(y), boy(x)> sequence in (2.3.c), for instance, does not refer to a Dutch boy (due to the different referents), but keeps on referring to a Dutch person and another (!) person who is claimed to be a boy. Nor does the <english(x), girl(y)> sequence at the bottom of the box in question refer to an English girl, but it refers to an English person and another person who is female. The four statements together, thus, keep on referring to an English boy (x) and a Dutch girl (y).

[13] The formula of the DRS belonging to the reading in question is:

$$e' \wedge z \wedge \text{peter}(z) \wedge ((\text{english}(x) \wedge \text{boy}(x)) \rightarrow (e \wedge y \wedge \text{grandchild-of}(y,z) \wedge \text{visited}(e,x,y)))$$

Three (more or less imaginable) ways out will be discussed below.

According to the first one, the Fregean principle of compositionality should be associated with another mathematical formulation, which would be not an algebraic homomorphism but a calculable, systematic and/or algorithmizable connection between levels. Kamp seems to have intended to follow this way in the eighties and in the first half of the nineties, but his "confession" cited in the introduction shows that he himself has not considered the field of the language→DRS transition to be a great success, though serious attempts have been made at applying G(eneralized) PSG, for instance (Kamp and Reyle 1993).[14] Further, it seems that a huge group of logicians and semanticists will never accept another measure of compositionality then the very strict one proposed by Montague. All these circumstances might be regarded as a problem that belongs to the sociology of science, but the sometimes fairly clumsy GPSG→DRS "systematic" transition and the lack of clear directions of its extension beyond the small fragment discussed (which is "very small" to syntacticians) suggest a deeper incompatibility.

The second potential way out of the contradiction concerning homomorphism points towards the furnishing of DRSs with a richer and syntax-oriented structure, by an appropriate "boxing" of groups of atomic formulas belonging to the same syntactic constituents. The original semantic task of these boxes, however, is so fundamental a feature of DRT that a proposal like this seems to be equivalent to its liquidation. The representation in (2.3.b) clearly shows that a DRS is nothing else but a small *partial world model,* which is built by the speaker in order for him to avoid identifying the characters of his story again and again according to a total (model of) world. The (real) world is full of English boys and pretty Dutch girls... And the structure of a world model must not depend on the sentences that we are just about to interpret in it.

The third way is the development of an appropriate syntax compositionally adequate to DRSs, counter to aligning DRT with a given syntax or attempting to reconcile the current version of DRT with (the current version of) a particular syntax. This way, however, leads to the refusal of PSGs. It leads to the assumption that Chomsky (1957) chose the wrong way when he concluded, from the insufficient generative capacity of the context free PSG (where there are no traces / copies), that the PS-tree-building apparatus should be completed with some powerful means, with *transformation,* for instance; but the special means of any *mildly context sensitive* grammatical approaches may be mentioned here (Partee *et al.* 1990, Section 21).[15] Whoever attempts to follow this third way should renounce PS trees, violating the most stubborn taboo of the half century of generative linguistics.[16]

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[14] The following citation comes from this book (p24): "...our choice of syntactic theory has been guided by opportunism. We have opted for a syntax that assigns to each of the sentences of the English fragment with which we will deal a syntactic structure that suits the needs of the interpretation procedure which we will describe in the following chapters. ... But in choosing a particular set of syntactic rules which define these syntactic structures we have been largely obvious to the more profound questions which motivate much of contemporary syntactic theorizing." It is to be added that the Index of Subjects of this 700 page long book lacks the expression *compositional(ity).*

[15] The principle of scientific conservatism has led Kálmán and Rádai (1996), Hungarian representatives of the family of *Construction Grammars,* to the same conclusion: they argue that the introduction of transformation has been based on an inadequate formalization of pre-Chomskyan American (descriptive) linguistics and has resulted in an unjustified deviation from the earlier paradigm. GASG may be regarded as a special construction grammar, whose starting-point is the traditional *lexical sign* and remains bound to this concept more closely, though certain non-word-level "constructions" are permitted in GASG too.

[16] It is worth quoting here Dowty's (1996: 12, 53) opinion from *Toward a minimalist theory of syntax* about the legitimacy of PS trees, which Chomsky (1995: 403) seems to consider "inescapable on the weakest interface conditions": "I suspect syntacticians today have almost come to think of the "primary empirical data" of syntactic research as phrase structure trees, so firm are our convictions as to what the right S-structure tree for most any given

That this way may be worth following is suggested not only by the empirical problems sketched in Section 3 below but also by the overwhelming four-decade tendency, characteristic of *every* important branch of the family of generative theories including the Chomskyan mainstream as well (Chomsky 1995), in the course of which syntax is fading into the background, becoming more and more reduced and vacuous, parallel with a permanent enrichment of lexical representations; the Minimalist Program (Chomsky 1995) is a large step in this direction. There is some hope, thus, that the inner development of the science of syntax converges to the same morphosyntactic system as that which can be regarded as the compositionally adequate "natural syntax" of the DRT semantics.

GASG is an attempt to reach these aims *within* the *generative* paradigm: by means of a *finite* rule system (stored in the Lexicon), which can account for the potential existence of an *infinite* number of grammatical sentences, on the one hand, and imply their intonation together with the precise word order, and their semantic (DRS) interpretation, on the other.

2.3 UCG

In this subsection we are going to deal with the Unification Categorial Grammar (UCG), whose usage in DRT has been propagated since the end of the eighties by Zeevat (1991a), and now Kamp (van Eijck and Kamp 1997) also considers a grammar like this to promise the best chance to capture the language→DRS transition in a properly compositional manner. This tendency, as we have emphasized on several occasions, is to be regarded as the "triumph" of radical lexicalism (Karttunen 1986).

UCG is a *monostratal* grammar, which is based on the formalized notion of the Saussurean *sign:* a structure that collects a number of levels of linguistic description and expresses relations between the levels by sharing variables in the description of the level information (Zeevat 1991b: 145). The set of well-formed expressions is defined by specifying a number of such signs in the lexicon and by closing them under rule applications (i.e. the selected lexical signs can be combined to form sentences via a finite number of rule applications). The structural levels may include phonology, syntactic analysis, semantic analysis and others. In monostratal grammars the syntactic and semantic operations are just aspects of the same operation. A prime example of such grammars, besides UCG, is HPSG (e.g. Borsley 1996).[17]

UCG, as has been mentioned in the introduction, is to be regarded as a variant of a classical categorial grammar with an increased generative capacity. For the generative capacity of CCG does not exceed that of the context free grammar type whereas the capacity of the Universal Grammar is to be assumed to exceed this capacity according to Shieber's (1985) proof based on the existence of constructions such as the Zurich German (and Dutch) multiple infinitival structures showing *cross-serial dependencies.* It is just the successful analysis of these constructions that serves as an evidence in favor of the increased capacity of UCG (in comparison

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sentence is. But speakers of natural languages do not speak trees, nor do they write trees on paper when they communicate. The primary data for syntax are of course only *strings* of words, and everything in syntactic description beyond that is part of a theory, invented by a linguist." The author's aim is "getting linguists to question our automatic assumptions about constituents and our basis for assuming as a methodological principle that languages must always have a phenogrammatical syntactic structure describable by phrase structure trees."

[17] It is worth noticing that the Minimalist Grammar is not far from this description at all (moreover, its representationalist variant, where *traces* of transformed constituents are replaced with multiple *copies* of the same constituent (Brody 1995), essentially functions as a monostratal grammar). The groups of MP features moving together in order to get checked play the role of variables of monostratal grammars mediating between levels — within a framework whose feature formalism is still quite obscure.

with that of CCG) in Zeevat's (1991b: 142) relevant article. In order to verify the appropriate generative capacity of GASG, we will also devote a subsection (4.6) to the analysis of cross-serial dependencies (compared with other sorts of infinitival dependencies).

The increase of generative capacity depends on the technique of the *unification* of variables. Let us consider the following Dutch infinitival constructions in subordinate *dat* clauses:

(2.7) a. ...(dat) Jan Marie♣ bier♦ zag♣ drinken♦.
...(that) J. M. bier saw drink-inf
n n n s/n/n/(s/n) Y/n/(Y/(s/n))
"...(that) Jan saw Mary drink bier."

b. ...(dat) Jan Marie♣ de kinderen♠ bier♦ zag♣ laten♠ drinken♦.
...(that) J. M. the children bier saw let-inf drink-inf
n n n n s/n/n/(s/n) X/n/(s/n)/(X/(s/n)) Y/n/(Y/(s/n))
"...(that) Jan saw Mary let the children drink bier."

Each verb and the object that belongs to it *(see Mary; drink bier; let the children)* are marked with the same symbol in order to illustrate the essence of cross-serial dependencies: the lines or arcs connecting the identical symbols would cross each other (♣♠♦...♣♠♦...), counter to the *nested dependencies,* for instance, characteristic of the German infinitival constructions (♣♠♦......♦♠♣).

The single syntactic operation in CCG is the combination of pairs of adjacent elements setting out from sequences of words of (potential) sentences. The "linguistic knowledge" is stored in *categories* of words: it is described in these categories (e.g. *x/y)* with which kind(s) of expression (y) a given word is prepared for combining to form a constituent (.../y) and what kind of category this resulting constituent will have (x/...). In the examples above, nominal expressions are associated with (the atomic) category n, so they are not able to take the initiative in constructing constituents. Counter to *zag* "saw," for instance, whose category is s/n/n/(s/n), which enables it to combine with constituents of category s/n to form a constituent of category s/n/n; and this latter expression can become a sentence by "eating" two further nominal expressions (s/n/n + n = s/n; s/n + n = s). Thus "saw" is assumed above to be able to extend into a sentence by (combining with) two nominal expressions and a VP-like one (s/n), which captures precisely its capacity for taking arguments: *sy saw sy do(ing) sg.* The lower case notation of categories, unusual in PSGs, comes from the Prolog tradition where constants are denoted by lower case letters and variables are denoted by capitals.

Variables substituting for category names appear in category labels of infinitives; it is the point where UCG goes beyond the apparatus of CCG. Let us concentrate on the category Y/n/(Y/(s/n)) of (both occurrences of) *drinken.* This category enables *drinken* in (2.7.a) to combine with *zag* of category s/n/n/(s/n), by a substitution Y = s/n/n; the category of the resulting constituent will be Y/n, which equals the specified category s/n/n/n due to the unification technique that passes on the specified value of a variable to other occurrences of the same variable. The constituent [zag drinken] (of category s/n/n/n) is thus properly suitable for "eating" the three nominal expressions *(Jan, Marie, bier).* In (2.7.b) the category of *drinken* is the same: Y/n/(Y/(s/n)), but now it ought to combine with a constituent ([zag laten]) of category s/n/n/n/(s/n)[18]; nevertheless, a substitution Y = s/n/n/n makes this combination possible, and the category Y/n of the resulting constituent is specified now into a category s/n/n/n/n. Thus the

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[18] *Laten* can combine with *zag* by substituting s/n/n for variable X.

expression [zag laten drinken] in (2.7.b) is just suitable for combining with as many as four nominal expressions *(Jan, Marie, de kinderen, bier);* obviously, that has been the goal.

To sum up, the essential point here is that *drinken* (or other infinitives) may stand at the end of a chain of verbs and infinitives of an *unbounded* length in "more developed" versions of the sentence type demonstrated in (2.7), at least theoretically[19], and its proper category obviously depends on the length of the given chain. Although it is permitted in CCG for a word to be associated with *many* category labels, but not with *infinitely many;* while there are infinitely many possible chain lengths (1, 2, 3...). The Gordian knot has been cut in UCG by assigning *drinken* only a single category but an underspecified one containing a variable; this way the expression in question is able to combine with expressions of infinitely many different categories (but not at all arbitrary ones!). Here the way of using variables (and the technique of unification, due to which the specification of an occurrence of a given variable results in all other occurrences of this variable specifying in the same way at once) does not differ from the usual (Prolog-like) one characteristic of monostratal grammars, which serves the (basic) purpose of treating such morphological dependencies as agreement and case marking.

This point is just suitable for turning to Karttunen's (1986) unification categorial grammar, which he has happened to call CUG. The article discusses a few syntactic phenomena of Finnish, a language with a rich morphological system and a (hence) fairly free word order. The starting problem is the Finnish version *Jussi rakasti Liisaa* of the English sentence *John loved Lisa,* whose all six word order variants are grammatical. This total freedom can be accounted for by the uniform assignment of V/V category to all kinds of nominal arguments (e.g. subject, object), which is intended to mean (at least now) that a nominal argument can combine with the verb standing either on its left side or on its right side. It is the task of morphology to provide restrictions: successful combination of the verb with one of its arguments (in which the initiative is assumed to be taken by the argument) requires proper agreement and case marking; and, as a result of this combination, the variable in the lexical sign of the verb expecting an argument marked with just the case in question will be specified. That is the benefit of unification; and we have also managed to get rid of the rigid insistence of traditional CCG on expecting certain arguments from a given side.

(2.8) a. $[_V [_V$ John-nom loved] Liisa-part]
b. $[_V$ John-nom $[_V$ loved Liisa-part]]

Due to its unification technique, thus, UCG can capture the decisive role of morphology excellently; there is some problem with the "categorial" technique, however, as is reported by Karttunen himself (1986: 20; see fn.4 again). As is shown by the alternative analysis trees above, "spurious ambiguities" appear, which multiply frightfully quickly in more complicated sentences (potentially producing thousands of alternative analysis trees). This phenomenon is a clear indication of a deeper theoretical problem.[20]

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[19] To define constraints on the length of such verb chains is not a proper treatment in generative linguistics; the factual boundary of grammaticality (which is undoubtedly not far from the sentence version in (2.7.b)) is to be attributed to the finite human computing and/or perceptual capacity.

[20] Karttunen (1986: 20) mentions that "it is possible to instruct the parser to apply an equivalence test that prevents redundant analyses from being entered on the chart." Such help for the parser, however, does not solve the theoretical problem. Zeevat (1991b: 151) has mentioned a (perhaps) related idea according to which alternative analysis trees may be applied for the explanation of scopal ambiguities; but he has been led to the conclusion that it is possible to account for lesser scopal orders than necessary; furthermore, he has failed to prove that the scopal orders resulting from his method coincide with the linguistically relevant ones.

This theoretical problem lies in the fact that syntax, deprived of the information concerning sentence cohesion in favor of the unification mechanism and reduced to the primitive task of combining adjacent words, will produce linguistically irrelevant constituents. The resulting constituents in (2.7), [zag drinken] and [zag laten], are also very hard to regard as linguistically contentful, significant constituents. It is worth returning to Karttunen's (1986: 19) remark on trees: they look like PS trees but they are only "analysis trees"; and he adds "all that matters is the resulting [morphological] feature set."

The basic idea of GASG is that this latter remark on trees and feature sets should be taken seriously: adjacency of words is to be taken into consideration and registered in the course of analysis exclusively and precisely in the linguistically significant cases. We argue, further, that the corresponding technique is to be based on an approach where adjacency and order among words, which can be called the *pure syntactic* relations, are treated by, instead of the usual categorial apparatus, the same technique of unification as morphological cohesion. And what will be then the "engine" combining words to form sentences (since in CGs the lexical features of words only serve as filters to avoid inappropriate combinations)?

There is no need for a separate engine at all! The engine must be *unification* itself, which is capable of running Prolog programs properly. The rich description of a lexical sign (say, out of a group of lexical signs selected from the Lexicon in order to combine them to form a sentence) serves a double purpose: it characterizes the *potential environment* of the given sign in possible grammatical sentences in order for the sign to find the morphologically (or in other ways) compatible elements and to avoid the incompatible ones in the course of forming a sentence, and the lexical description characterizes the sign itself in order for other words to find (or not to find) it, on the basis of similar "environmental descriptions" belonging to the lexical characterizations of these other words. And while the selected words are finding each other on the basis of their formal features suitable for unification, their semantic features are also being unified simultaneously; so by the end of a successful building it will have been verified that a particular sequence of fully inflected words constitutes a grammatical sentence, and its semantic representation, a DRS, will also have been at our disposal. The realization of this plan requires only one more idea...

3. PS Trees (What do They Represent?)

3.1 Constituents

In the previous section we argued that the DRT, which has provided elegant answers to a wide range of semantic questions and stubborn problems, cannot dispense with an ideal (compositionally adequate) (morpho-) syntax; it has proved to be an illusion (or, say, a "productive working hypothesis") to think that it requires only hard work and logical technique to associate DRT with an arbitrary generative syntax. For the compositional alignment of semantics and syntax, since Montague, has meant homomorphism, i.e. an essential structural identity, which is not something to be created, but something that either exists or does not exist.

Then we discussed to what extent UCG satisfies the requirements concerning the "ideal syntax" of DRT. It satisfies these requirements to a certain extent but we judged the categorial technique building PS (or analysis) trees to be redundant and, what's more, a source of fundamental theoretical problems. The relevant authors themselves mention stubborn problems and boundaries.

These arguments ensure a legitimate *theoretical* reason for an attempt to elaborate a (radically / totally lexicalist) grammar, whose "prototype" called GASG will be demonstrated in

Section 4. It has also been mentioned that the fifth section contains arguments in favor of GASG based on a *meta-theoretical* examination of generative aspirations. Nevertheless, we do not intend to evade discussing some practical, descriptive problems of PSGs either. This third section is devoted to the (general) analysis of such problems, which will serve in the fourth section to illustrate the descriptive advantages of the GASG approach.

Let us start the analysis of descriptive problems of PSG by demonstrating what can represent PS trees *properly*. The sentence in (2.2.a) serves as an illustration:

(3.1) Yesterday [[an ♣English ♣ boy] ♣ visited ♣ [a ♣ pretty ♣ Dutch ♣ girl]].

The adjectives *pretty* and *Dutch* provide further information about the girl so syntax has an unquestionably legitimate reason for setting them in the neighborhood of each other. The words *English* and *boy* must be adjacent to each other, too, for the same reasons. The finite verb refers to a special relation between a visitor and a host; so it legitimately occupies the position between the phonological realization belonging to the visitor and that belonging to the host, forming a constituent with them.[21] Finally, *yesterday* expresses a statement concerning the whole situation: *yesterday it happened that an English boy visited a pretty Dutch girl.* It cannot occupy the places marked with ♣ because in this way it would spoil either the semantically motivated unity of the verb with its arguments or the unity of the sequences of words characterizing the visitor and the host. The verb must not spoil the unity of these sequences belonging to the participants of the visiting situation either. Andindeed, it does not do that.

3.2 Transformations

Nevertheless, certain words or expressions are permitted to spoil the internal unity of the verb and its arguments. *Shall, will, had,* a wide range of further auxiliary verbs, and expressions like *seemed to* may serve as illustrations; though the semantically motivated analysis of sentences like (3.2) below is as follows: *It will happen / had happened / seemed that an English boy...:*

(3.2) a. ♦ [[An ♣English ♣ boy] WILL visit ♣ [a ♣ pretty ♣ Dutch ♣ girl]] ♦.
b. ♦ $[_{XP}$ [......] ♣ X ♣[......]] ♦.
c. [An English boy]$_i$ WILL [$\varnothing_i$ visit [a pretty Dutch girl]]

Will cannot occupy any of the positions marked with ♦, those accepted by *yesterday,* but it occupies a position adjacent to the verb. This position is also distinguished in PSG: it is adjacent to the *head* of the given constituent. Connection with head can also be motivated semantically, by means of Davidsonian, or eventuality, arguments, demonstrated in (2.3-4): the unity of {will(e), visit(e,x,y)} is due to the eventuality argument denoted by e. We predicate of the visiting eventuality e that it will happen in the future. Thus, if an element would like to express its semantic connection with an XP unit, it can occupy "legitimately" the four kinds of positions marked in (3.2.b) above: those adjacent to the (intact) XP (♦) or those adjacent to the head of the XP (♣).

The conflict discussed above can also be interpreted as follows: the semantic element *visit(e,x,y)* would like to express three semantic connections in the syntax, its connection with its Davidsonian argument, that with its Agent, and that with its Patient; but human language, which aligns with the linear flow of time, enables us to realize only two connections, so either the "upper connection" (marked with ♣ in 3.2.b) remains unexpressed (or at least "not immediately expressed"), as in 3.1, or the "lower connection" is spoiled as in (3.2.a).

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[21] The very general discussion, unfortunately, permits only underspecified and/or simplified PSG analyses.

Chomsky (1957), however, has insisted on the intact representation of the characteristic capacity of PSG for expressing lower connections (3.1), which is satisfied by artificial (logical and programming) languages too; hence, he has introduced the operation of *transformation,* by means of which it is possible to produce the situation illustrated in (3.2.c): here *will* does not spoil the unity of the verb with its arguments since it remains outside the VP. And the movement of the subject can be accounted for by referring to the classical subject—predicate decomposition, or the modern theme—rheme (topic—comment) rhetorical decomposition.

In Hungarian, for instance, the auxiliary of future tense also occupies the position adjacent to the verb stem, even at the cost of separating the verb stem from its perfective prefix:[22]

(3.3) ⁺Meg fog-lak ⁺látogatni (⁺téged).
vpref$_{perf}$ will-1sg$_{SUBJ}$2sg$_{OBJ}$ visit-inf (you-acc)
"I shall/will visit you."

3.3 Stylistic Rules

A new kind of challenge for PSG, already supplied with the powerful weapon of transformation, is the great freedom of word order characteristic of *non-configurational* languages.

(3.4) a. ⁺Nekem ⁺[egy csinos holland lány-t] mutat-ott be Péter.
to-me a pretty Dutch girl-acc show-past-3sg$_{SUBJ}$indef$_{OBJ}$ vpref$_{in}$ P.
"As for me, it is a pretty Dutch girl that Peter (has) introduced to me.
b. ♣ Péter ♣ be-mutat-ott ♣ nekem ♣(TEGNAP) egy csinos holland lány-t ♣.
P. vpref$_{in}$-show-past-3sg$_{SUBJ}$indef$_{OBJ}$ to-me yesterday a pretty Dutch girl-acc
"Yesterday Peter introduced a pretty Dutch girl to me."

How is it possible, for instance, to account for the Hungarian sentence in (3.4.a), which seems to be very far from the neutral word order demonstrated in (3.4.b)? Well, it requires (at least) three transformations to produce the mixed word order but it is not impossible at all ((3.5.a), on the basis of É. Kiss (1998)): the dative argument is removed from the VP in order to play the role of the rhetorical topic of the sentence, the object is selected to serve as an informational focus, and the verb is removed from the VP in order to incorporate into a phonetically empty focus operator, the head of a *focus projection,* whose development is assumed to require the presence of some phonetic content in the F head. These transformations, or at least the first two, are motivated simultaneously by intonational and semantic facts: the sentence is grammatical only with a special intonational pattern highly different from the neutral pattern, and the meaning, compared to that of the neutral version in (3.4.b), has been enriched by two semantic elements (rhetorical topic, informational focus; see the English translation). This sentence can be uttered only under special circumstances, indeed, evidence for the presence of the semantic elements mentioned.

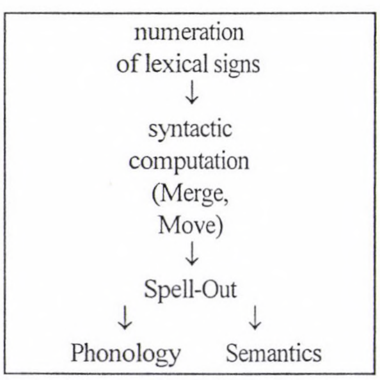
(3.5) a. [$_{TP}$ Nekem$_k$ [$_{FP}$ egy csinos holland lányt$_i$ mutatott$_t$ [$_{VP}$ be $\varnothing_t$ Péter $\varnothing_k$ $\varnothing_i$]]].
b. Péter [$_{VP}$ bemutatott nekem TEGNAP egy csinos holland lányt].
c. ♦ [$_{XP}$ [......] ♣ X ♣[......] ... ♠ ... [......]] ♦.

[22] *Meglátogatni* "visit" (perfective verbal prefix + visit + inf. suffix) is to be regarded as one (phonological) word in Hungarian because it contains only one stressed syllable (which is the first one as in the case of every (stressed) Hungarian word). The insertion of the auxiliary so "successful" that in example (3.3) it constitutes a phonological word with the verbal prefix: ⁺*meg foglak* ⁺*látogatni* (+ denotes the stressed syllables). This phenomenon is also true of other (more contentful) verbal prefixes and a group of less auxiliary-like finite verbs: e.g. ⁺*haza akarok* ⁺*menni* "I want to go home" (home want-1sg go-inf).

The real problem arises in the case of the (neutral) sentence in (3.4.b). All positions marked with symbol ♣ are available for the Hungarian counterpart of the English temporal adverb, which remains outside the VP. The Hungarian adverb can spoil the unity of the VP: it is permitted to occupy all distinguished positions marked in (3.2.b) (in these cases the verbal prefix and the verb stem behave as a unit); moreover, it can also occupy a position between two arguments (marked with ♠ in (3.5.c)). And this last case is the worst because the given position can be attributed to no special role. Otherwise, it causes no difference in meaning which of the marked positions of (3.5.c) is occupied by the temporal adverb. Hence, the adverb spoils the unity of VP "senselessly."

The phenomenon illustrated in (3.4.b) leads to having recourse to weakly motivated "stylistic rules" in PSG (É. Kiss 1992: 169-171), in comparison with the phenomena in (3.3, 3.4.a) where simultaneous semantic changes and changes concerning word order and/or intonation can be pointed out; so these latter kinds of phenomena can be called *mutually motivated*. In the case of the former kind of phenomenon, however, we find only a surprising word order which is not motivated on the semantic side. The expression "stylistic rule" amounts to hardly more than the mere labeling of the problem, and it has such an enormous generative capacity that threatens to inflate the thoroughly elaborated and multiply-motivated transformational methods. It is not clear, either, how analyses based on stylistic rules can be *falsified*. Our analysis by means of GASG will be mutually motivated in the sense mentioned above, so it is to be preferred to an analysis based on stylistic rules in respect of the "extent of motivation."

3.4 Scopal Ambiguities



The potential lack of mutual motivation is worth looking for also on the "symmetrical side" of the Chomskyan minimalist architecture of human grammar (see on the left side). In 3.3 we discussed a phenomenon that concerned the transition from Spell-Out to Phonology, so was irrelevant to Semantics. A good example of the case where the post-Spell-Out way towards Semantics is concerned was demonstrated in (2.2), whose (2.4.b) reading requires the inversion of the subject>object (configurational) hierarchy, typically assumed to be valid at Spell-Out. Because of framework-dependency of analyses, an original example of Szabolcsi's (1997: 116) will be discussed here:[23]

(3.6) a. More than three men read more than six books.

b. $[_{AgrSP} \text{[men]}_i \; [_{AgrOP} \text{[books]}_j \; \ldots [_{VP} \ldots \; \varnothing_i \; \ldots \; \varnothing_j \; \ldots]]]$

As Szabolcsi points out, the phenomenon of inverse scope cannot be accounted for by a "semantically blind" post-Spell-Out rule of scope assignment, which would place any scope-taking expression of a sentence to a position as high as is required by the given reading ("Quantifier Raising"), because the inverse scope reading is often simply not available. The empirically correct solution, however, has a terrible cost: in comparison with the configuration at Spell-Out shown in (3.6.b), the subject should be *lowered* into the position of its trace in order for

[23] "Here inverse scope is very difficult but ... can be forced by context" (Szabolcsi 1997: 116).

Semantics to "see" the object in a position higher than that of the subject ("Reconstruction" explanation).[24]

What is relevant to us is that neither the "semantically blind" earlier explanation based on "Quantifier Raising," nor the empirically better one based on "Reconstruction," which is forced to have recourse to the terribly powerful weapon of lowering, is "mutually motivated." Counter to GASG, in which there will be a mutually motivated explanation at our disposal, which can account for all four kinds of constructions discussed in 3.1–4, accounted for by different means in PSG, by a single means, tracing their differences back to precisely captured linguistic *parameters.*

4. GASG: Generative/Generalized Argument Structure Grammar

4.1 Morphology and Semantics Across Languages

We would like to start demonstrating GASG with a comparative analysis of a (simple?) sentence in English, Dutch and Hungarian. Morphology and semantics are concentrated on in this first subsection; and our main aim is to illustrate how to derive the same semantics (DRS) from radically different morphological sources. In all further subsections we will deal with purely syntactic questions in order to prove that renouncing PS trees does not entail renouncing syntax at all; on the contrary, it is PSG that in certain cases forces a too rigid and/or irrelevant structure upon us.[25]

Let us consider the sentence(s):

(4.1)	a.	I shall visit you.			
	b.	Ik zal	jou	bezoek-en.	
		I shall	you	visit-inf	
	c.	$^{+}$Meg	fog-lak	$^{+}$látogatni.	
		$vpref_{perf}$	will-$1sg_{SUBJ}2sg_{OBJ}$	visit-inf	(you-acc)

A reasonable practical formulation of the problem of generating sentences is as follows: does a linearly ordered set of fully inflected words selected from the lexicon of a human language, furnished with an intonational pattern characteristic of the given language, amount to a sentence (according to native speakers), and if it does, how can it be assigned an appropriate semantic representation?

Example (4.1.c), for instance, demonstrates a sequence of fully (and properly) inflected Hungarian words. They are assumed to belong to *signs* (see the §2 of 2.3) stored in the lexicon of Hungarian, where they get a parallel syntactic, morphological, phonological and semantic description related to each other by shared variables. As for phonology, only partial information

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[24] "Inverse scope may also be due to reconstruction: a phrase can be lowered into the position(s) of its trace, typically, into its VP-internal position. The simplest assumption is that any kind of lowering is restricted to undoing semantically insignificant movement, i.e. an expression can be lowered from its case position but not from RefP, DistP, or ShareP", writes Szabolcsi (1997: 115), relying on Beghelli and Stowell's (1997: 78) theory, whose (only) arguments in defense of lowering are as follows: "On a somewhat more technical level, we assume that scope positions can be reached either directly, through (leftward/upward) movement, or by (rightward/downward) reconstruction to a lower link in the chain of the QP." "[note 7] Of course, this theory requires a suitable notion of Minimality to regulate movement. We do not explore the matter here; the reader is referred to Beghelli (1995) for a particular proposal in this direction."

[25] Our discussion is based on thoroughly analyzed linguistic examples because the crucial point (here) is not a particular grammar with a given formal apparatus but the idea that a grammar needs nothing else but unification, i.e. all kinds of syntactic means (transformation, Function Application (CG), PS tree, etc.) can be dispensed with. A formal framework can be based on the notion of *lexical sign* as it was defined in Subsection 2.3 (see Alberti 1988b, Section 1).

will be taken into consideration: ±stressed state of words, which is relevant to the logical—rhetorical interpretation of Hungarian sentences (fn. 22).[26] As for morphology, each fully inflected word is assigned a separate lexical sign (as is assumed in the Minimalist Program, too). Obviously, these signs in the lexicon are arranged in an *inheritance network* where different inflected versions of the same stem are "close" to each other.[27] Idioms consisting of any number of words belong to a single lexical sign because, *per definitionem,* their meaning is not compositional; and the requirement of compositionality amounts to drawing the borderline between the lexicon and computation so that non-compositional connections between words remain in the lexicon. Prefixed verbs in Hungarian, such as *meg-látogatni* "visit" in (3.1.c), are worth regarding as idioms in the above sense.[28]

To start with, let us consider the simplest lexical sign of the English sentence, which also serves as an illustration of the general form of lexical signs in GASG.

(4.2) Λ1 = <{belong(v1, "i")},
{n.pronoun(v1), 1.sg(v1), ref.spec.def(v1), nom(v1), arg.subj(α1.1, v1, V1)},
{∧(α1.0, i=X1, Q1.subj(X1)},
{corr(v1, i=)}>

A lexical sign in GASG is an ordered quadruple <{...},{...},{...},{...}> of sets of Prolog-clauses. What is relevant to us is that, in addition to formulas of a simple first-order predicate logic (Partee *et al.* 1990: 140), a Prolog-clause can also contain variables substituting for predicate names or other symbols of the logicosyntactic meta-language almost without syntactic restrictions (e.g. ex. (2.7)). As for variables, we write them in capitals here, following the Prolog tradition; so names are written in low-case letters.

The first set of the quadruple consists of simple formulas declaring that a particular symbol, the (an) *own word* of the lexical sign *can belong to* a particular word (an intoned sequence of sounds) in sentences.[29] In order to generate a sentence containing the word "I," for instance, we should use a numeration, as the input of computation, which contains the (a) lexical sign (one of) whose own word(s) belongs (belong) to this word.

The second set of the quadruple (see the second row (r2) in (4.2)) is to provide a *formal* characterization (phonological, morphological and (purely) syntactic) of the word(s) that the given lexical sign belongs (belong) to, i.e. the own word(s), and a set of *environmental words,* permitted to occur "in the neighborhood" of the own word in potential grammatical sentences. (4.2.r2) provides the following pieces of information, respectively: the own word of the lexical sign is a noun and especially a pronoun, it is a first person singular number form, it is a referential, specific and especially definite element, it is in the nominative case, and it is the subject argument of an environmental word denoted by variable V1; α's are going to be ignored in this subsection but the further subsections are practically devoted to them.

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[26] We do not deal with intonation in the case of English and Dutch sentences; these topics are postponed to future research.

[27] This lexical network is to be regarded as a (constant) part of the "hearer's life-long DRS" mentioned in fn. 3, which has *(must have!)* access to components of some kind of Qualia Structures (Pustejovsky 1995), cultural/encyclopedic knowledge and contextual information.

[28] Prefixed verbs show a wide variety in respect of the extent of compositionality from *haza-megy* "home-go" to *be-rúg* "get drunk" (lit. "into-kick"). In the "quite compositional" groups, meaning might be calculated, perhaps in an intermediate component between the traditional lexicon and the area of (syntactic) computation. Nevertheless, it will never cause practical problems to store a little more things in the lexicon than necessary.

[29] Lexical signs of idioms have more than one own word.

The third set of the quadruple that a lexical sign consists of is responsible for the semantic characterization of a word or idiom. Similar to the formal characterization, a lexical sign has *own predicates* and *environmental predicates* at its disposal to capture intricate semantic relations. The semantic characterization typically contains atomic Prolog-clauses connected by logical connectives such as $\wedge$ (conjugation) and $\rightarrow$ (conditional). (4.2.r3) says that a referent variable denoted by X1 coincides with "i," a distinguished referent name that refers to the speaker, and it also says that this X1 is to refer to the subject referent of an environmental predicate, denoted by a predicate variable Q1. It will turn out in 4.2 that this semantic description is nothing else than the formulation in the GASG language of the Montagovian construal of nominal expressions as generalized quantifiers.

The fourth set (4.2.r4) consists of formulas declaring that a particular own word or environmental word *corresponds to* a particular own predicate or environmental predicate. "i=" refers to a predicate saying "... coincides with me, the speaker."

We know that certain details are far from trivial; nevertheless, we had better continue with another lexical sign because some features can be elucidated in the course of demonstrating the process of computation. The lexical sign that belongs to "you" is very similar to that of "I."

(4.3) Λ2 = <{belong(v2, "you")},
{n.pronoun(v2), 2.sg(v2), ref.spec.def(v2), acc(v1), arg.obj(α2.1, v2, V2)},
{∧(α2.0, y=X2, Q2.obj(X2)},
{corr(v2, y=}>

According to the formal characterization (4.3.r2), the own word is a pronoun, a definite expression, and should serve as an object in grammatical sentences. Further, it is 2.sg. and in the accusative case; one might think, of course, that *you* can denote a plural personal pronoun and/or such in the nominative case. That is true but according to the most straightforward (but not necessarily the best) approach other lexical signs should belong to these (phonologically identical) versions, because there are cases in the given language (English) when the singular form differs from the plural one *(I—we),* and the nominative form differs from the accusative one *(me—I).* Referent name y in the semantic description also refers to a singular pronoun in accusative, and "y=" predicates a referent (variable) to coincide with the hearer. It is also predicated of this referent variable that it refers to the object of an environmental predicate denoted by Q2.

Lexical sign Λ3 belongs to the infinitive "visit," which also coincides phonologically with other (forms of the same) word. Nevertheless, the *visit—visits* difference ensures (a certain amount of) legitimacy to speaking about a separate infinitive form.

(4.4) Λ3 = <{belong(v3, "visit")},
{inf.tr(v3), evtype.ach(v3),
n(α3.1, V3.11), acc(α3.2, V3.11), arg.obj(α3.3, V3.11, v3), prec(α3.4, v3, V3.11), adjc(α3.5, v3, V3.11),
ref(α3.6, V3.12), prec(α3.7, V3.12, V3.11), adjc(α3.8, V3.12, V3.11),
arg.inf(α3.9, v3, V3.0)},
{∧(α3.0.1, visit(x3, X3.1, X3.2), x3), ∧(α3.0.2, visit(...), Q3.0.inf(x3)), ∧(α3.0.3, visit(...), Q3.1(X3.1)),
∧(α3.0.4, visit(...), Q3.2(X3.2)))},
{corr(v3, visit), corr(V3.11, Q3.2)}>

The own word is the infinite form of a transitive verb and can be classified as an achievement in respect of *eventuality type*.[30] Variable V3.11 denotes an environmental word: a noun in

[30] Eventuality types are relevant to aspectual descriptions, and promise a solution to problems like the one mentioned in (2.5). A detailed examination of particular types, unfortunately, goes beyond the scope of this paper; only it will be discussed that certain words are responsible for (certain) aspectual features of given sentences.

accusative, which should serve as the object of the own word (4.4.r3); further, the own word should precede *(prec)* and be adjacent to *(adjc)* its potential object (4.4.r3). The sentence to be analyzed does satisfy these requirements; but it will turn out later that a wide range of sentences which do not seem to satisfy these requirements (at first sight) *do satisfy* them due to the mysterious α's.

Another variable (V3.12) refers to an environmental word which provides referentiality *(ref)* and immediately precedes (prec, adjc) the potential noun (4.4.r4). What is it? To put it in simple terms, the D from the DP that *visit* subcategorizes for. *I shall visit teacher* is not a grammatical sentence. The grammatical versions *I shall visit a/the teacher* differ from it in containing a determiner, an element that ensures *referentiality* to the argument of the verb. *Teacher* is a predicate, and only a determiner can make it suitable for *referring to* a person. Thus, *visit* expects not only a noun in accusative but an element ensuring referentiality as well. Hence, *visit a/the teacher* are well-formed VPs; but what about *visit you?* Remember *you* has been said to be not only a noun but a referential element as well. In personal pronouns and proper names the functions (being nominal and referential) are present simultaneously. Then the last problem concerns the fact that in the formal description of *visit* two environmental words are referred to. The solution is simple: the possibility is not excluded at all that two environmental words of the same lexical sign be unified with one and the same own word; and in order to make it possible, we should define prec (precedence) and adjc (adjacency) as (names of) reflexive relations.

Finally, there is a reference to an environmental word (V3.0) that longs for an infinitive argument (4.4.r5).

There is no reference to a subject in the formal characterization, however, because it is not the infinitive that "shows a formal sensitivity" to it (agrees with it, for instance). In the semantic characterization, on the contrary, we refer to the potential subject referent (X3.1) and a potential environmental predicate concerning it (Q3.1; 4.4.r6) because a visiting situation necessarily requires two participants: a visitor and a host. X3.1 is a referent variable that should be unified with a referent name that belongs to the visitor in the visiting situation, whose Davidsonian (or eventuality) referent is denoted by x3 and whose object referent (variable) is denoted by X3.2.

The four formulas in the semantic characterization of Λ3 declare the following, respectively: first of all, an eventuality referent is introduced (x3); then it is predicated to be the infinitive argument of an environmental predicate denoted by Q3.0; according to the third formula, the subject referent satisfies a relation whose predicate name should be unified with Q3.1; and finally there is a similar statement about the object referent (X3.2).

It is worth noticing in connection with eventuality referents that both x3 and the eventuality referent of the whole sentence can be referred to in later sentences. The following sentence (as a potential continuation of 4.1.a) illustrates the latter case: ... *Believe IT, please!* And a further continuation can illustrate the former case: *...I did IT last week, too, didn't I?* Here *IT* obviously refers to a "timeless" visiting situation.

There are two statements on correspondence: the own word v3 corresponds to the predicate name *visit,* and the potential accusative noun (V3.11) corresponds to a predicate (Q3.2) concerning the variable to be unified with the object referent (X3.2).

Let us turn to *shall,* which is a finite auxiliary in the present tense (4.5.r2) though it refers to the future; but this fact is accounted for by the semantic characterization. Syntactically, the subject of the sentence belongs to *shall* because the latter agrees with the former. Generally two environmental words should refer to the "DP" of the subject (see 4.4.r3-4): a nominal one and a referential one; but here the particular form of the auxiliary makes it clear that now a first person pronoun fills both functions. NUM is a variable in the type of categories with *sg* and *pl* as possible values (4.5.r3; cf. *I/we shall...).* The potential subject (V4.1) is claimed to immediately precede (prec, adjc in 4.5.r3) the own word.[31]

(4.5) Λ4 = <{belong(v4, “shall”)},
{fin.pres(v4), aux(v4),
n.pron(α4.1, V4.1), nom(α4.2, V4.1), 1.NUM(α4.3, V4.1), prec(α4.4, V4.1, v4), adjc(α4.5, V4.1, v4),
arg.subj(α4.6, V4.1, v4),
arg.inf(α4.7, V4.0, v4), prec(α4.8, v4, V4.0), adjc(α4.9, v4, V4.0)}
{∧(α4.0.1, [t ∧ n<t ∧ X4.0⊆t](x4), x4), ∧(α4.0.2, [...), Q4.0.eve(X4.0)),
∧(α4.0.3, Q4.0.CHAIN.subj(X4.1), Q4.1(X4.1))},
{corr(V4.0, Q4.0), corr(V4.1, Q4.1)}>
P1.inf(X) and P2.eve(X): P1.inf = P2 (P2.subj = P1.inf.subj)

According to (4.5.r5), *shall* has an infinitive argument and the environmental word that belongs to it (V4.0) is claimed to immediately follow the own word.

The semantic contribution of the auxiliary in DRT can be formulated as follows (4.5.r6): it introduces a temporal interval, denoted by t above, which follows the utterance time (n), and eventuality X4.0 takes place within t. These pieces of information together can be regarded as a complex predicate with x4 as its eventuality referent and X4.0 as its infinitive referent. According to the second semantic formula, X4.0 occupies just the eventuality argument of the environmental predicate (Q4.0) that corresponds to the infinitive environmental word V4.0 (4.5.r9).

The last semantic formula, with the empty string as value of variable CHAIN, creates the semantic connection between the (semantic) subject of the infinitive and the environmental predicate (Q4.1) that the syntactic subject of the auxiliary corresponds to. Simply saying, the subject belonging to the auxiliary in a morphosyntactic sense is declared to belong to the infinitive in a semantic sense. Variable CHAIN has the same function as Zeevat’s category variables in (2.7). In the case of sentence (4.1.a), its value is the empty string because the infinitive argument Q4.0 of *shall* is (already) the semantic “regent” of the subject. In a sentence like *I shall have visited you,* however, the semantic regent of the subject is only the perfective argument of the infinitive argument of *shall,* so the proper value of CHAIN here is *perf.*[32]

In addition to a numeration of lexical signs, a linear order of own words should be given as an input of computation if our task is to say whether a sequence of fully inflected words constitute a sentence or not, and/or what kind of semantic (DRS) representation the sentence has in the first case. (4.6.a) below shows the sequence of words given in (4.1.a). Practically, it should be proved that (4.1.a) is a grammatical English sentence, indeed, and its DRS should be calculated.

Thus the input of computation is a huge set of logical formulas (Prolog-clauses) concerning constants and variables of different types (4.2-6.a). The question of grammaticality is equivalent to the question as to whether this huge set of formulas (together) can be satisfied, i.e. whether it is possible that all these formulas are true; or, more exactly, *whether every variable can be unified with a constant so that the resulting formulas are all given as true (or can be traced*

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[31] We would like to emphasize again that this description does not make it impossible to account for the inverse version *shall I...,* due to the α’s still ignored.

[32] This approach requires the following straightforward notational identification: if referent X occupies both the infinitive (or perfective) argument of predicate P1 (P1.inf(X) or P1.perf(X)) and the eventuality argument of predicate P2 (P2.eve(X)), then P1.inf = P2 (or P1.perf=P2); practically, we have identified predicates with their eventuality arguments. For instance, *shall(e’, e) ∧ visit(e,x,y)* has been identified with *shall(e’, visit(e,x,y).* We do not intend to enter into details, however; our primary aim in this subsection (and basically in the whole article) is no more than demonstrating a new kind of grammar and elucidating its (potential) advantages by means of not very complicated sentences, but we should prove at the same time that this grammar is suited to account for non-trivial linguistic phenomena.

back to such formulas). As succeeding in accounting for the grammaticality of a sentence amounts to finding one or more successful unifications of our input variables with our input constants, the "proof," or computation, automatically provides one or more fully specified DRSs (as many as the number of successful unifications) as the sum of the (originally underspecified) DRSs of the input lexical signs.

The computation thus requires no kind of linguistic technique: neither Move, nor Merge, nor traces, nor copies, nor Function Application, nor Function Composition, nor Type Raising. All linguistic information is stored in lexical signs; and the only question is whether the sum of information carried by the lexical signs selected to be members of particular numerations (and an input word order to be tested) is provably consistent or not (in the technical sense written in italics in the previous paragraph). The linguist's task is to elaborate the proper lexical signs, i.e. the proper *lexicons,* of human languages.

(4.6)	a.	v1, v4, v3, v2				
	b.	v1:	V.4.1			"i"
		v2:	V.3.11	V.3.12		"you"
		v3:	V4.0			"visit"
		v4:	V3.0			"shall"
		i=:	Q3.1	Q4.1		the speaker is...
		y=:	Q3.2			the hearer is...
		visit:	Q1	Q2	Q4.0	... visit ...
		[t ∧ n<t ∧ _⊑t]:	Q3.0			it will happen...
		i:	X1	X3.1	X4.1	speaker's ref.
		y:	X2	X3.2		hearer's ref.
		x3:	X4.0			ref. of visit
		x4:	?			visit in future
	c.	(i ∧ y ∧ n ∧) t ∧ x3 ∧ x4 ∧ visit(x3, i, y) ∧ n<t ∧ x3⊑t				final DRS

(4.6.b) above demonstrates the single possible unification of variables in (4.2-5) with constants (of the proper types). To start with, variable V4.1 is characterized in Λ4 as a first person pronoun in the nominative case. No doubt, the own word of Λ1, the first person *singular* pronoun in nominative, is the only successful candidate. V3.11 is expected to be a noun in the accusative preceded by V3.12, a referential element. Both should be unified with the own word of Λ2 *(you),* because pronouns are nominal as well as and referential expressions, and precedence and adjacency are regarded as (predicate names of) reflexive relations, so it is true that *prec(v2, v2).* V4.0 is characterized as an infinitive in the description of lexical sign Λ4, so it can be nothing else but the own word of *visit,* which is immediately preceded (4.5.r5) by the own word of Λ4, indeed, according to the input sequence (4.6.a) under examination. And variable V3.0, the potential regent of *visit,* is the own word that belongs to the auxiliary *shall.*

Now we know that v1=V4.1; and it is given that the environmental word V4.1 corresponds to the environmental predicate Q4.1 (4.5.r8), on the one hand, and own word v1 corresponds to the strange own predicate "i=" (4.2.r4), on the other, so the two predicates, the environmental one and the own one, should be identical: Q4.1 refers to the same predicate as "i=." As this latter predicate is the only one-place predicate name with the semantic subject of *visit* as its argument, Q3.1 should coincide with it ("i="), too. The equation v2=V3.11 implies the identity of the corresponding predicates: "y="=Q3.2. Predicate *visit* turns out to be the regent of the subject (Q1), the regent of the object (Q2) and the argument of the auxiliary (Q4.0). (4.6.b.r8) captures this last relation in the opposite way.

As for the referent variables, X1 is explicitly declared to be identical with the distinguished referent i of the speaker (4.2.r3); X3.1 and X4.1 occupy the only argument positions of Q3.1 and

Q4.1, respectively, which are both identical with predicate "i=" so these two referent variables should also collapse with referent name i. X2 equals y according to (4.3.r3), and X3.2 is the only argument referent of Q3.2, which is the same as predicate "y=." X4.0 is characterized as the eventuality argument of Q4.0, which has turned out to coincide with *visit,* whose eventuality argument is occupied by x3; so variable X4.0 finds referent name x3.

And what about x4, the referent name occupying the eventuality argument position of the finite element of the sentence? Nothing could be unified with it. As x4 has been regarded as a referent *name,* it causes no computational problem; only variables *must* be unified with something because, say, a p(...X...) formula is to be interpreted as a condition on an entity to be found, i.e. it says that *there is* a name x satisfying the statement p(...x...). Notice that x4 is just the eventuality referent that belongs to the whole sentence (4.1.a), as was mentioned a little earlier; and a new sentence is typically held to declare the *existence* of an eventuality which can be referred to later, so it is worth being given a referent name.[33]

Having successfully unified the variables with constants, we have managed to prove that (4.1.a) shows a grammatical English sentence. And its semantic representation is also at our disposal: as a "sum" of the formulas consisting of predicates and referents. Subsections 4.4 and 4.5 will provide a more detailed interpretation of the way of summation. As in the example we are dealing with, only conjunctive connections are mentioned (∧), we should only collect the specified formulas in a DRS. The result can be seen in (4.6.c) above.

Six referent names have been mentioned in the input lexical signs. Three of them have been introduced explicitly by special (degenerate) formulas discussed in 2.1: those of a time interval (t) and two eventualities, also discussed earlier. The other three are regarded as being always present in discourses: the speaker's referent (i), the hearer's referent (y), and that of the utterance time (n).[34] The formula *visit(x3, X3.1, X3.2),* introduced as a part of the semantic characterization of Λ3, has received a specified form due to unification: *visit(x3, i, y).* The last two atomic formulas in (4.6.c) come from lexical sign Λ4 (4.5.r6). Ignoring the precise interpretation of x4, the DRS formula says the following: there will be a visiting eventuality after the reference time with the speaker as visitor and the hearer as host.

Let us turn to the Dutch sentence. The input lexical signs are almost the same:

(4.7) Λ1 = <{belong(v1, **"ik"**)},
{n.pronoun(v1), 1.sg(v1), ref.spec.def(v1), nom(v1), arg.subj(α1.1, v1, V1)},
{∧(α1.0, i=X1, Q1.subj(X1)},
{corr(v1, i=)}>

Λ2 = <{belong(v2, **"jou"**)},
{n.pronoun(v2), 2.sg(v2), ref.spec.def(v2), acc(v1), arg.obj(α2.1, v2, V2)},

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[33] Considering this question in a broader context, however, the "sentence referent" seems to be worth regarding as a referent *variable* which must be identified with an earlier referent. This "earlier referent" should belong to the formula of a *rhetorical relation* (e.g. *elaboration, narrative continuation, presentative etc.;* see Kamp and Reyle 1993: 528). If the hearer's information state is held as a life-long DRS, this compulsory application of intermediate rhetorical formulas from sentence to sentence expresses that the hearer should always decide what role a new sentence plays in (and relative to) the current discourse. "Rhetorical connectives" should also be stored in the lexicon as lexical signs. Their formal characterization may contain reference to own words such as *there* in English and connectives, temporal and locative adverbs, tense and aspect features, etc. Questions as to (conditions of) the extent of their "explicitness" are also relevant (Grondelaers and Brysbaert 1998).

[34] The hearer's information state contains a "co-ordination system" with constant referents such as i, y, n and the referent of the current location, and temporary referents such as the Reichenbachian *reference point,* discussed in Kamp and Reyle (1993: 523), and salient topic referents.

{∧(α2.0, y=X2, Q2.obj(X2)},
{corr(v2, y=}>

Λ3 = <{belong(v3, **"bezoeken"**)},
{inf.tr(v3), evtype.ach(v3),
n(α3.1, V3.11), acc(α3.2, V3.11), arg.obj(α3.3, V3.11, v3), **prec(α3.4, V3.11, v3),** adjc(α3.5, v3, V3.11),
ref(α3.6, V3.12), prec(α3.7, V3.12, V3.11), adjc(α3.8, V3.12, V3.11),
arg.inf(α3.9, v3, V3.0)},
{∧(α3.0.1, visit(x3, X3.1, X3.2), x3), ∧(α3.0.2, visit(...), Q3.0.inf(x3)), ∧(α3.0.3, visit(...), Q3.1(X3.1)),
∧(α3.0.4, visit(...), Q3.2(X3.2)))},
{corr(v3, visit), corr(V3.11, Q3.2)}>

Λ4 = <{belong(v4, **"zal"**)},
{fin.pres(v4), aux(v4),
n.pron(α4.1, V4.1), nom(α4.2, V4.1), **PERSON.sg(α4.3, V4.1), prec(α4.4, v4, V4.1),**
immprec(α4.45, V4.1, v4),
adjc(α4.5, V4.1, v4), arg.subj(α4.6, V4.1, v4),
arg.inf(α4.7, V4.0, v4), prec(α4.8, v4, V4.0), adjc(α4.9, v4, V4.0)}
{∧(α4.0.1, [t ∧ n<t ∧ X4.0⊑t](x4), x4), ∧(α4.0.2, [...), Q4.0.eve(X4.0)),
∧(α4.0.3, Q4.0.CHAIN.subj(X4.1), Q4.1(X4.1))},
{corr(V4.0, Q4.0), corr(V4.1, Q4.1)}>

Let us concentrate on the slight differences, marked above with writing in bold letters, which have no influence on the selection of variables and constants in word, predicate and referent types. The phonetic forms of words are different from those of their English counterparts but it might permit even a total isomorphism. Another difference is that less lexical signs belong to *jou* (which has a distinct nominative form *(jij)* and a distinct plural form *(jullie))* than to *you,* but this fact is irrelevant now because we have been examining a fixed input numeration of lexical signs. A real interpreter, however, should also cope with the task of selecting the proper set of signs from the lexicon. This procedure causes no theoretical problem for GASG: in the case of the English example, say, if the input numeration contains the lexical sign that belongs to the nominative *you* there will be no successful unification (because 1. the two potential subjects ought to be unified, and constants must not be unified[35], 2. the infinitive could find no object), and if it contains the sign of the plural (accusative) *you* we will get, fortunately, a grammatical sentence with a slightly different interpretation.

The following difference to be mentioned concerns the order of the own word of *bezoeken* and the environmental word of the potential object in its formal characterization (4.7.Λ3.r3). The relevant formula captures the fact that the Dutch infinitive tends to follow its arguments, counter to the English one.

As for the difference between *shall* and *zal,* it is a funny detail that (affirmative) *shall* determines the person, but not the number, feature whereas *zal* determines the number, but not the person, feature. The difference is precisely accounted for by the two complex predicates *1.NUM* and *PERSON.sg.*

The formulas with *prec* and *immprec* as predicates in (4.7.Λ4.r3-4) are intended to capture a characteristic property of Dutch: that it is a V2 ("verb second") language. According to the formula with *prec,* the auxiliary precedes its syntactic subject whereas the *immprec* formula says just the opposite: the subject should immediately precede the auxiliary. The α parameters are responsible for deciding which of the two formulas should be satisfied; what is relevant now (but

[35] In the case of a sentence like *Peter and Mary will visit you,* the unification of the own word that belongs to Peter with the one that belongs to Mary can be avoided by introducing a *set referent,* for which the connective is responsible. The question, of course, is far from trivial.

see 4.3) is that the sentence we deal with requires the *immprec* formula to be true, but when another expression (a *focused* one, for instance) occupies the position immediately preceding the finite element of the sentence, the *prec* formula should be satisfied, i.e. the subject should follow the finite element: e.g. *Jou/*Je zal ik bezoeken* "It is you that I shall visit."

As has been mentioned, words, predicates and referents in both constant and variable types are the same as their counterparts in the English analysis (4.6), and the "equation system" of unification is also the same (there are slight differences in the way of verifying certain equations, in connection with the formal differences mentioned above). The resulting DRS will then be the same, too, no doubt:

(4.8)	a.	v1, v4, v2, v3				
	b.	v1:	V.4.1			"ik"
		v2:	V.3.11	V.3.12		"jou"
		v3:	V4.0			"bezoeken"
		v4:	V3.0			"zal"
		i=:	Q3.1	Q4.1		the speaker is...
		y=:	Q3.2			the hearer is...
		visit:	Q1	Q2	Q4.0	... visit ...
		[t ∧ n<t ∧ _⊑t]:	Q3.0			it will happen...
		i:	X1	X3.1	X4.1	speaker's ref.
		y:	X2	X3.2		hearer's ref.
		x3:	X4.0			ref. of visit
		x4:	?			visit in future
	c.	(i ∧ y ∧ n ∧) t ∧ x3 ∧ x4 ∧ visit(x3, i, y) ∧ n<t ∧ x3⊑t				final DRS

The Hungarian sentence, however, differs from the former two so radically that individual differences in lexical signs are not worth marking:

(4.9) Λ3 = <{belong(v3.1, "⁺meg"), belong(v3.2, "⁺látogatni"},
{vperf(v3.1), evtype.ach(v3.1), str(+, v3.1),
inf.tr(v3.2), str(+, v3.2),
¬adjc(v3.1, v3.2), prec(v3.1, v3.2), phonword(α3', v3.1, v3.2),
arg.inf(α3.9, v3, V3.0)},
{∧(α3.0.1, visit(x3, X3.1, X3.2), x3), ∧(α3.0.2, visit(...), Q3.0.inf(x3)), ∧(α3.0.3, visit(...), Q3.1(X3.1)),
∧(α3.0.4, visit(...), Q3.2(X3.2)))},
{corr.pref(v3.1, visit), corr.stem(v3.2, visit)}>

Λ4 = <{belong(v4, "foglak")},
{fin.pres(v4), aux(v4),
inf.tr(α4.1, V4.1), prec(α4.2, v4, V4.1), adjc(α4.3, v4, V4.1),
evtype.EVTYPE(α4.4, V4.2), phonword(α4.5, V4.2, v4), str(α4.6, +, V4.1), arg.inf(α4.7, V4.1, v4)}
{∧(α4.0.1, [t ∧ n<t ∧ X4.0⊑t](x4, X4.0), x4), ∧(α4.0.2, [...), Q4.0.eve(X4.0)),
∧(α4.0.2, Q4.0.CHAIN.subj(X4.1), i=X4.1), ∧(α4.0.3, Q4.0.CHAIN'.obj(X4.2), y=X4.2)},
{corr.pref(V4.2, Q4.0), corr.stem(V4.1, Q4.0)}>

First of all, there are only three own words altogether and, moreover, two of them belong to the same lexical sign (the infinitive; see fn. 28 again). The one own word of lexical sign Λ3 *(meglátogatni* "to visit") is a perfective verbal prefix, denoted by v3.1, which is responsible for the eventuality type of the sentence (now fn. 30 should be considered again). The other own word is a transitive infinitive (v3.2). Both are stressed (4.9.Λ3.r2-3).[36] They are not adjacent to each other

[36] In the case of the Hungarian example, as has been mentioned, we also provide a simple analysis of phonological features.

(4.9.Λ3.r4). The prefix precedes the stem. And according to the last formula in (4.9.Λ3.r4), the prefix and the stem constitute a phonological word.

This latter formula, however, is not true of the Hungarian sentence in (4.1.c), and it is in contradiction with two formulas of Λ3 mentioned earlier: those saying that the verb stem is stressed and that the two own words are not adjacent to each other. This formula is an inheritance of the finite verb *meglátogat* "visit" in the lexical network. As lexical sign Λ3 belongs definitely to the split version of *meg+látogatni,* one might think that the requirement in question should be omitted in some way. Due to α's, however, we need not have recourse to such a non-monotonic treatment.

The last formula that belongs to the formal characterization of Λ3 concerns an environmental word, denoted by V3.0, whose infinitive argument v3.2 is.

The semantic formulas seem to describe another lexical sign at first sight. The own predicate *(visit)* has two arguments in addition to the Davidsonian one, which is introduced (into the would-be DRS) by the first formula. The second one says that this Davidsonian argument coincides with the infinitive argument of an environmental predicate (Q3.0). The last two formulas contain references to further environmental predicates (Q3.1, Q3.2) concerning the subject and the object. Both own words correspond to the own predicate *visit* but in distinct ways (4.9.Λ3.r8). Although in Hungarian transitive semantic regents typically provide formal information on both of their arguments, here the auxiliary will complete these tasks, so no correspondence rules concern environmental predicates Q3.1 and Q3.2.

The own word v4 of the other lexical sign (Λ4) is characterized as a finite auxiliary verb. There are two environmental words: V4.1 is a transitive infinitive (the suffix *-lak* makes it unquestionable) immediately following the own word, and V4.2 is an element determining eventuality type and constitutes a phonological word with the own word which serves as the second (unstressed) element in this relation.[37]

The semantic characterization consists of four formulas. The first one expresses the future tense and the introduction of the eventuality referent of the whole sentence as in the case of the English and the Dutch sentence. The second formula is also similar to its English or Dutch counterpart: the infinitive argument of the auxiliary is identical with the eventuality argument of an environmental predicate, denoted by Q4.0, which an infinitive environmental word corresponds to (V4.1). According to the third formula, with the empty string as the value of variables CHAIN, the subject of Q4.0 coincides with the speaker; whereas the fourth formula says that the object of Q4.0 coincides with the hearer (if CHAIN' is unified with the empty string, too).[38]

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[37] Here the two own words of the infinitive (Λ3) will play the role of the determiner of eventuality type *(meg)* and that of the transitive infinitive *(látogatni).* In Hungarian, nevertheless, there are also verbs and infinitives with no prefix, e.g. *aludni* "to sleep." An infinitive like this is identical with the determiner of its eventuality type. Hence, both roles should be played by the pure verb stem., which is possible due to the α's. The infinitive should constitute a phonological word with the auxiliary: e.g. $^{+}$*Aludni fogok* "I'll sleep."

[38] Variables CHAIN and CHAIN' are not empty in the lexical sign of *foglak* in the "successful" numeration that belongs to the sentence *Meg foglak akarni látogatni* "I shall want to visit you (a bit later)" (lit. "prefix shall-1sg_{SUBJ}2sg_{OBJ} want-inf visit-inf"). Another question concerns the number of lexical signs that may belong to *foglak* since Λ4 in (4.9) is a version that does not allow the subject and the object to appear in a phonetic form though any or both of them can appear in grammatical sentences. The straightforward (but not necessarily the best) solution is assuming the simultaneous existence of four (related) versions of *foglak* in the lexicon. Although this treatment of the problem is not elegant at all there are at least two arguments in favor of it: the pronouns in question tend to be permitted to appear only in operator positions (focus, contrastive topic), and whereas the phonetically null object unambiguously refers to the singular second person, if the object appears in the neighborhood of *foglak,* it can be either a singular or a plural form of *you* (this latter observation is due to András Komlósy (p.c.)).

To find the proper unification is not a difficult task due to the small numeration; what the Hungarian sentence serves as an excellent illustration of is that the same semantic content may be distributed among words in sentences in radically different ways across languages. Out of the three Hungarian own words below (v3.1, v3.2, v4), only v4 corresponds to v4 in (4.6) though the Hungarian v4 includes the English v1 and v2 in a certain sense. Whereas v3.1 and v3.2 are two parts of a split word that roughly corresponds to the English v3. We would like to emphasize here that it is human language (and not GASG) that permits such an intricate system of connections among lexical signs that requires a free multidirectional transmission among formal and semantic linguistic representational levels inside and outside lexical signs. A system based on unification is excellently suitable for the description of these intricate connections. We argue that any restriction on the multidirectional transmission mentioned above is a means alien to the nature of human language, which obscures existing connections. In other words, whereas in GASG even the slightest details of the connection between form and meaning can be represented, we are not forced at all to regard the two representational levels as mirror reflections of each other.

Furthermore, GASG offers a straightforward strategy for formalizing the task of *translation.* Suppose, for instance, the source of translation is the (one-sentence) English text in (4.1.a) and the target language is Hungarian. Firstly, the appropriate numeration of English lexical signs should be found on the basis of *belong* relations and formal characterizations contained by lexical signs. The specified DRS can serve as an intermediate level.Then a compatible Hungarian numeration of lexical signs should be found on the basis of correspondences and semantic characterizations. And it determines a(n intoned) sequence of fully inflected Hungarian words due to the concomitant formal characterizations ((4.1.c) in the case of the task mentioned). It is a great advantage that this method does not have even the slightest bias towards a naive translation from words into words, from syntactic factors into syntactic factors, from morphological features into morphological features.

It is now time to enter into details of (4.10). The a. part shows the input numeration of lexical signs with a fixed order of own words. (4.10.b) demonstrates the unique possible unification of variables in word, predicate and referent types with constants of the corresponding types. On the basis of their morphosyntactic and phonological characterization, V4.2 and V4.1 can and should be unified with the determiner of the eventuality type of the infinitive and the stem, respectively, while the environmental word (V3.0) in Λ3 should be unified with the own word of the auxiliary. As for environmental predicates, Q3.1 and Q3.2 are easy to unifiy with the strange own predicates "i=" and "y=" (discussed earlier) on the basis of a previous appropriate unification of referents; the only surprising factor is that in the Hungarian analysis the two predicate names in question belong to the lexical sign of the auxiliary as own predicates. It can be checked that the resulting DRS is the same as the ones that belong to the English and the Dutch sentence (4.6,8.c):

(4.10)	a.	v3.1, v4, v3.2			
	b.	v3.1	V4.2		"+meg "
		v3.2:	V4.1		"+látogatni"
		v4:	V3.0		"foglak"
		i=:	Q3.1		the speaker is...
		y=:	Q3.2		the hearer is...
		visit:	Q4.0		... visit ...
		[t ∧ n<t ∧ _⊆t]:	Q3.0		it will happen...
		i:	X3.1	X4.1	speaker's ref.
		y:	X3.2	X4.2	hearer's ref.
		x3:	X4.0		ref. of visit
		x4:	?		visit in future
	c.	(i ∧ y ∧ n ∧) t ∧ x3 ∧ x4 ∧ visit(x3, i, y) ∧ n<t ∧ x3⊆t			final DRS

To sum up, compatibility (or *unifiability)* of an (ordered) set of lexical signs that consists of representational levels containing constants and variables in word, predicate, referent, category and other types serves as a proof of the fact that a certain sequence of fully inflected and (intoned) words constitutes a well-formed sentence; the result of the unificational procedure which is the by-product of the proof mentioned above provides a morphosyntactic analysis on the formal level —an alternative to PS trees— and provides the DRS belonging to the given sentence on the semantic level. The secret of word order lies in the α parameters ignored so far...

4.2 Recessive Syntactic Rank Parameters

In Section 3 we surveyed the word order possibilities available for linguistic elements that need to be adjacent to each other in sentences (for semantic reasons); and we could point out three distinct types. The decisive differences between the types lay in their "PS-representability": cases that belong to type I (3.1) can be accounted for without transformations, whereas the description of those that belong to type II (3.2-3.4.a) requires transformations, and in the case of type III we should have recourse to "stylistic rules" (3.4.b). The treatment of the three types in GASG will require no distinct representational means but will be a straightforward consequence of a difference in syntactic parameters that can be expressed as simple numbers.

(4.11.a) below serves as a reminder of the problems and the types. Suppose a word z "longs for" being adjacent to a word x, which forms a constituent with words yi (i=1, 2,..., n) also longing for being adjacent to it (possibly among others). If z occupies a place marked with ♦, not spoiling the "lower connection," we can say that it has followed the type I solution, whereas occupying a ♣ position amounts to a type II solution where the "upper connection" is preferred (i.e. remains/becomes explicit). The type III solution can be characterized as a possibility for z to be inserted in between words of the XP below also at other positions such as the one marked with ♠ where different positions of insertion do not give rise to changes in meaning.

(4.11) a. = (3.5.c) ♦ $[_{XP}$ [... y1...] ♣ x ♣[... y2...] ... ♠ ... [... yn ...]] ♦.
b. adjc(αi, yi, x), for i=1,2,..., n; adjc(α, z, x)

(4.11.b) formulates these requirements concerning adjacency in the GASG approach. The simultaneous satisfaction of all the n+1 requirements is naturally a "physical" nonsense; human language, however, seems to tend to find an optimal solution. This intuition can be captured formally by means of *syntactic rank parameters,* numbers expressing *to what extent* grammatical sentences should satisfy the requirements they (the numbers) are associated with. (4.12) below provides a possible (recursive) definition of (the satisfaction of) relation adjc (in the course of a unificational procedure with a numeration N with a linearly ordered sequence of own words as its input):

(4.12) Members z and x of a given numeration N *satisfy* the lexical condition adjc(α, z, x) if every word y that can be found between them in the linearly ordered sequence of N is a *legitimate element,* which is true if a. or b. below is true:
a. a condition adjc(β, y, z) or adjc(β, y, x) has been satisfied where β≤α
b. a condition adjc(γ, y, w) has been satisfied where w is a legitimate element in the above sense.[39]

[39] Whether it should be stipulated that γ≤α depends on the concrete choice of syntactic rank parameters.

In this approach the three types of adjacency depend on the choice of syntactic rank parameters in a trivial way (notations of (4.11) are used below):

(4.13) Type I: $\alpha > \alpha i$ (for every index i)
Type II: $\alpha < \alpha i$
Type III: $\alpha = \alpha i$ (for certain indices i)

A detailed analysis of sentence (4.13.a) below will serve as an illustration (completed with remarks on (4.13.b,c) and the sentences in (4.1). Let us start with the sentences in (4.1). The specified versions of the relevant formulas in the English lexical signs are the following: adjc(α3.5,"visit","you"), adjc(α4.5,"I,""shall"), adjc(α4.9,"shall,""visit"). Due to the favorable precedence relations and the fact that the subject has not been regarded as a syntactic dependent of the infinitive, these three formulas are not in conflict, the word order *I shall visit you* satisfies all of them. As for the Dutch example, the formulas adjc(α3.5,"visit","you") and adjc(α4.9,"shall,""visit") are in conflict because the infinitive should be preceded by the object as well as the auxiliary. The difference in grammaticality between the perfect *Ik zal jou bezoeken* and the incorrect **Ik jou zal bezoeken* suggets that parameter α3.5 should express a higher rank: α3.5<α4.9.[40] The Hungarian example will be discussed in 4.3, and 4.6 is devoted to the problem of word order showing cross-serial dependencies (2.7).

(4.14) a.=(2.2.a)=(3.1) Yesterday an English boy visited a pretty Dutch girl.
b.=(3.2) (+4.1) ♦ [[An ♣English ♣ boy] WILL visit ♣ [a ♣ pretty ♣ Dutch ♣ girl]]♦.
c.=(3.4.b) ♣ Péter ♣ be-mutat-ott ♣ nekem ♣(TEGNAP) egy csinos holland lány-t ♣.
P. vpref$_{in}$-show-past-3sg$_{SUBJ}$indef$_{OBJ}$ to-me yesterday a pretty Dutch girl-acc
"Yesterday Peter introduced a pretty Dutch girl to me."

Now let us consider a proper input numeration belonging to sentence (4.13.a).

(4.15) Λ1 = <{belong(v1, "boy")},
{n.common(v1), 3.sg(v1), arg.GRF1(α1.1, v1, V1)},
{∧(α1.0, boy(X1), Q1.GRF1(X1)},
{corr(v1, boy)}>

Λ2 = <{belong(v2, "girl")},
{n.common(v2), 3.sg(v2), arg.GRF2(α2.1, v2, V2)},
{∧(α2.0, girl(X2), Q2.GRF2(X2)},
{corr(v2, girl)}>

Λ3 = <{belong(v3, "visited")},
{finite.past(v3), v.tr(v3), evtype.ach(v3),
n(α3.11, V3.11), arg.subj(α3.12, V3.11, v3), prec(α3.13, V3.11, v3), **adjc(α3.14, v3, V3.11),**
ref(α3.15, V3.12), prec(α3.16, V3.12, V3.11), **adjc(α3.17, V3.12, V3.11),**
n(α3.31, V3.31), arg.obj(α3.32, V3.31, v3), prec(α3.33, ,v3, V3.31), **adjc(α3.34, v3, V3.31),**
ref(α3.35, V3.32), prec(α3.36, V3.32, V3.31), **adjc(α3.37, V3.32, V3.31)},**
{∧(α3.0, visit(x3, X3.1, X3.3), x3 ∧ T<n ∧ x3⊆T), ∧(α3.01, visit(...), Q3.1(X3.1)),
∧(α3.03, visit(...), Q3.3(X3.3)))},
{corr(v3, visit) , corr(V3.11, Q3.1) , corr(V3.31, Q3.3)}>

[40] It should be mentioned here that syntactic rank parameters do not serve as variables in lexical characterizations; they are constants to be fixed by linguists at the level of observational adequacy in the case of a given fragment of a language, or at the level of descriptive adequacy if a whole human language is considered. In this article so little a fragment is discussed that particular numbers are not worth proposing as parameters. Fortunately, only ordering relations between parameters are relevant to us.

Λ4 = <{belong(v4, "a(n)")},
{ref.indef(v4), 3.sg(α4.1, V4.1), n.common(α4.2, V4.1), prec(α4.3, v4, V4.1), **adjc(α4.4, v4, V4.1),**
arg.GRF4(α4.5, V4.1, V4.2)},
{∧(α4.0, x4 ∧ Q4.1(x4), Q4.2.GRF4(x4))},
{corr(V4.1, Q4.1}>

Λ5 = <{belong(v5, "a(n)")},
{ ref.indef(v5), 3.sg(α5.1, V5.1), n.common(α5.2, V5.1), prec(α5.3, v5, V5.1), **adjc(α5.4, v5, V5.1),**
arg.GRF5(α5.5, V5.1, V5.2)},
{∧(α5.0, x5 ∧ Q5.1(x5), Q5.2.GRF5(x5))},
{corr(V5.1, Q5.1}>

Λ6 = <{belong(v6, "English")},
{adj(v6), prec(α6.1, v6, V6), **adjc(α6.2, v6, V6),** n.common(α6.3, V6)},
{∧(α6.0, english(X6), Q6(X6)},
{corr(v6, english), corr(V6, Q6)}>

Λ7 = <{belong(v7, "Dutch")},
{adj(v7), prec(α7.1, v7, V7), **adjc(α7.2, v7, V7),** n.common(α7.3, V7)},
{∧(α7.0, dutch(X7), Q7(X7)},
{corr(v7, dutch), corr(V7, Q7)}>

Λ8 = <{belong(v8, "pretty")},
{adj(v8), prec(α8.1, v8, V8), **adjc(α8.2, v8, V8),** n.common(α8.3, V8)},
{∧(α8.0, pretty(X8), Q8(X8)},
{corr(v8, pretty), corr(V8, Q8)}>

Λ9 = <{belong(v9, "yesterday")},
{adv.temp(v9), **adjc(α9.1, v9, V9),** finite.past(α9.2, V9)},
{∧(α9.01, t ∧ yesterday(t) ∧ X9⊑t, Q9.eve(X9))},
{corr(v9, yesterday), corr(V9, Q9}>

Λ1 is a lexical sign whose own word can belong to the word *boy* in sentences. Its own word is a 3.sg. common noun and a potential argument of an environmental word V1. The form of common nouns in English gives no information on their grammatical function (hence, GRF1 is a variable to be unified with a grammatical label such as *subj* or *obj)*[41]. As for semantics, a referent variable X1 is claimed to be a boy, and the same referent occupies a certain argument position of an environmental predicate, denoted by Q1. Lexical sign Λ2 is isomorphic with Λ1.

(The own word v3 of) Λ3 belongs to the word *visited.* v3 is characterized as a finite transitive verb in the past tense with *achievement* as its eventuality type. The formal characterization contains references to four different environmental words: two nouns and two determiner-like elements. The subject noun (V3.11) is required to precede and be adjacent to the own word (4.15.Λ3.r3), whereas the object noun is required to be preceded by and be adjacent to the own word (4.15.Λ3.r5). The determiners should precede and be adjacent to the corresponding nouns (4.5.Λ3.r4,6). As has been mentioned, this double reference makes it possible to construe an argument as a DP: a referential expression with some nominal piece of information (which may coincide). The occurring syntactic rank parameters will be discussed a bit later together with parameters of other lexical signs. The first formula of the semantic characterization expresses that *visited* refers to an eventuality with two participants which takes place within a time interval T preceding the utterance time. Environmental predicates Q3.1 and Q3.3 refer to the nominal statements concerning the referents occupying the argument positions of the predicate name *visit.*

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[41] For the sake of simplicity, another lexical sign belongs to *boy* if it serves as a nominal predicate.

Λ4 and Λ5 are two instances of one and the same lexical sign. The corresponding names or variables, however, are to be regarded as different entities (e.g. V4.1 differs from V5.1, and referent name x4 differs from referent name x5). A lexical sign thus should be distinguished from its instances in numerations, which are also different entities; as the two indefinite articles in the sentence to be analyzed are also different entities. A similar "technical" problem is discussed thoroughly in section 7 of van Eijck and Kamp's (1997) article; a precise treatment of lexical signs and their instances in GASG ought to be based on their method.

Now let us concentrate on the linguistic contribution of the determiner. The own word (v4) of *a(n)* is a referential element, and especially an indefinite one. There are two environmental words mentioned: V4.1 is characterized as a common noun that is preceded by and adjacent to the own word, and V4.2 is the regent of this noun. Or more precisely, the argument—regent relation is of a semantic nature but it has morphosyntactic concomitants, which show a wide variety from language to language. In several languages nouns are (explicitly) case-marked so it is the nominal "head" that provides information on grammatical functions (the value of GRF4 here). In other languages, such as German, it is the determiner that (more or less) decides grammatical function (cf. *ein / einen / eines / einem* "an + masc. + nom / acc / gen / dat"). In English, both kinds of indication are very reduced, so the decisive factor is word order, which is described in the formal characterization of the lexical sign of the (finite) regent (variables GRF1 and GRF4 should be used for this reason).

The immediate connection between determiners and regents in German serves as linguistic evidence in favor of regarding lexical signs of determiners as containing references to the regent. Nevertheless, this treatment is nothing else than the GASG formulation of the Montagovian approach based on *generalized quantifiers* (GQ), according to which the logical translation of, say, an indefinite article is $\lambda P.\lambda Q.\exists X(P(X) \wedge Q(X))$. This formula expresses that an indefinite article should be completed with a nominal predicate (e.g. *boy)* and then with another predicate (e.g. *walk)* in order to form a sentence (e.g. *A boy walks:* $\exists X(\text{boy}(X) \wedge \text{walk}(X))$). The arguments for this brilliant treatment can be read in Dowty *et al.*'s (1981) Montague book; and the application of variables in the grammatical function type (and simultaneously in the semantic characterization; e.g. GRF4) enables us to apply the GQ approach to arbitrary arguments of the main verb without being forced to make formulas of determiners more complicated.[42]

It is the logical content discussed above that the semantic characterization of Λ4 captures (in the language of DRSs, naturally): a discourse referent is introduced (x4) and there are two statements concerning it. More precisely, the second statement contains a predicate one of whose argument positions is occupied by x4, but it will turn out only in the course of the unificational procedure which is the concerned argument position. Notice, finally, that the lexical sign of the indefinite determiner has no (explicit) own predicate. Its task (in sentences) is to connect two other predicates, which are to be regarded as environmental predicates relative to it.

Lexical signs Λ6, Λ7 and Λ8 are representatives of the type of attributive adjectives. The environmental word mentioned in the formal characterization of an adjective (e.g. V6) is a noun that is required to immediately follow the adjectival own word (adjc, prec). In the semantic characterization a referent variable is mentioned (e.g. X6), which occupies the argument position of the own predicate and that of the environmental predicate the nominal environmental word corresponds to.

Finally, the own word of *yesterday* is a temporal adverb. In grammatical sentences it is required to be adjacent to a finite element (in past tense), denoted by V9 in Λ9. Its semantic task is

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[42] The logical formula above can only belong to the determiner of subjects.

to introduce a temporal referent (t), within which the eventuality belonging to the environmental predicate that V9 corresponds to takes place.

(4.16.b) below demonstrates the result of a successful unificational procedure with (4.16.a) as the ordering of own words in the input numeration. The following three environmental words should be unified with the own word of *boy* (and they also *can* be unified with it if adjacency relations are defined appropriately): the nominal element preceding the own word of *visited* (V3.11), the nominal "head" of one of the articles (V4.1), and the common noun immediately following the adjective *English* (V6). Adjacency relations are still ignored but they will be discussed soon. The own word (v2) of *girl* serves as a constant with which as many as four environmental words should be unified because two attributive adjectives belong to this noun. Five environmental words should be unified with the own word of the finite verb: V1, which is characterized as the syntactic regent of *boy,* V2, which is the regent of *girl,* V4.2 and V5.2, also mentioned as regents in formal characterizations of lexical signs belonging to determiners, and V9, which is characterized as a finite element that the temporal adverb *yesterday* tends to be adjacent to. The own words of articles are unificational targets of only environmental words mentioned in Λ3 as the potential determiners of the verb's arguments. The adjectives and the temporal adverb are not referred to in the formal characterization of other lexical signs, which is not surprising because they serve as free adjunctive expressions in sentences.

(4.16) a. v9, v4, v6, v1, v3, v5, v8, v7, v2

b.

v1:	V3.11	V4.1	V6			"boy"
v2:	V3.31	V5.1	V7	V8		"girl"
v3:	V1	V2	V4.2	V5.2	V9	"visited"
v4:	V3.12					"an"
v5:	V3.32					"a"
v6:						"English"
v7:						"Dutch"
v8:						"pretty"
v9:						"yesterday"
boy:	Q3.1	Q4.1	Q6			... is a boy
girl:	Q3.3	Q5.1	Q7	Q8		... is a girl
visit:	Q1	Q2	Q4.2	Q5.2	Q9	... visit ...
english:						... is English
dutch:						... is Dutch
pretty:						... is pretty
yesterday						... happened yesterday
x3:	X9					referent of the visit
x4:	X1	X3.1	X6			the boy's referent
x5:	X2	X3.3	X7	X8		the girl's referent
t:	T					reference time

c. $(n \wedge)\ t \wedge x3 \wedge x4 \wedge x5 \wedge boy(x4) \wedge english(x4) \wedge girl(x5) \wedge dutch(x5) \wedge pretty(x5) \wedge visit(x3, x4, x5) \wedge t<n \wedge x3 \sqsubseteq t \wedge yesterday(t)$ final DRS

It can be checked that the correspondence relations unambiguously determine which environmental predicates should be unified with which own predicates. It is also easy to calculate the proper unification in the area of referents. And the sum of the specified versions of the DRSs serving as semantic characterizations in lexical signs provides the DRS formula that was assigned to the sentence in (2.3) (or at least an *equivalent* one).

It is high time to concentrate our attention on adjacency relations, marked in (4.15) with writing in bold letters. (4.17) below provides a collection of these relations, with phonetic words substituted for the own words and environmental words that they belong to, in favor of clarity:

(4.17)	Λ3:	adjc(α3.14, visited, boy), adjc(α3.17, an, boy), adjc(α3.34, visited, girl), adjc(α3.37, a, girl)}
	Λ4:	adjc(α4.4, an, boy)
	Λ5:	adjc(α5.4, a, girl)
	Λ6:	adjc(α6.2, English, boy)
	Λ7:	adjc(α7.2, Dutch, girl)
	Λ8:	adjc(α8.2, pretty, girl)
	Λ9:	adjc(α9.1, yesterday, visited)

One source of conflict between adjacency relations is the internal structure of "DP" where both the article and the one or more adjectives would like to be adjacent to the nominal "head" (4.17.r3-7), and they should all precede it. The word order in *a pretty Dutch girl* cannot be changed (e.g. **pretty Dutch a girl, *a Dutch pretty girl,* etc.), so the relevant syntactic rank parameters should be fixed as follows: $\alpha 7.2 < \alpha 8.2 < \alpha 5.4$. The least value amounts to the highest rank and, hence, a factual adjacency. The difference in parameters between the two adjectives *(pretty, Dutch)* is a precise reflection of the fact that *pretty* is a personal property while *Dutch* refers to nationality. Although lexical signs Λ7 and Λ8 are isomorphic, as both being attributive adjectives, parameters enable us to express the slight difference, so we need not have recourse to attributing the rigidity of word order to a difference in subcategorization. The corresponding parameter in the case of a participle (e.g. *sleeping)* should be fixed as indicating a still lower rank relative to that of *pretty* in order to account for the word order *a sleeping pretty Dutch girl.* As parameters are practically characteristic of (sub-) categories of words, $\alpha 4.4 = \alpha 5.4$ and $\alpha 6.2 = \alpha 7.2$. Further, $\alpha 3.17 = \alpha 3.37 = \alpha 4.4$ because all of them characterize the extent of "attraction" between a noun and its determiner.

According to the formulas with α3.14 and α3.34 as their parameters, a regent is assumed to intend to be adjacent to (the nominal element of) its arguments. Because of the given precedence relations, the former formula gets into conflict with nothing, so the value of α3.14 is now irrelevant to us. The latter formula, however, is in conflict with several formulas. As the verb cannot spoil the integrity of the expression *a pretty Dutch girl,* $\alpha 5.4 < \alpha 3.34$ should be satisfied; the verb, hence, cannot be inserted in between the article and the noun.

As for the attraction between the temporal adverb and the main verb, the English data suggest that the adverb cannot spoil the integrity of the verb and its arguments, so the relevant parameters are to be fixed as follows: $\alpha 3.14 < \alpha 9.1$, $\alpha 3.34 < \alpha 9.1$. Thus arguments must be closer to the regent then free adjuncts. The results are summarized below:

(4.18) $\alpha 7.2 = \alpha 6.2 < \alpha 8.2 < \alpha 5.4 = \alpha 4.4 = \alpha 3.37 = \alpha 3.17 < \alpha 3.34 =(?)= \alpha 3.14 < \alpha 9.1$

Now let us return to the sentence in (4.14.b) where an auxiliary is inserted between the subject and its semantic regent. We argued, in connection with (4.1.a), that the subject need not be referred to as an environmental word in the lexical description of the infinitive, so the formula requiring *will* and *visit* to be adjacent to each other has no "rival." Nevertheless, it is also possible, and easy, to provide an analysis with the lexical sign of the infinitive containing reference to its (semantic) subject as an environmental word that is required to be adjacent to the own word. In this case the adjacency parameter of the auxiliary—infinitive upper connection is to be selected to express a higher rank (<) than the adjacency parameter of the subject—infinitive lower connection.

Now we repeat the Hungarian sentence (4.14.c) where "yesterday" is permitted to occupy any position marked with ♣ (without any difference in meaning):

(4.19)=(4.14.c) ♣ Péter ♣ be-mutat-ott ♣ nekem ♣(TEGNAP) egy csinos holland lány-t ♣.
P. vpref$_{in}$-show-past-3sg$_{SUBJ}$indef$_{OBJ}$ to-me yesterday a pretty Dutch girl-acc
"Yesterday Peter introduced a pretty Dutch girl to me."

(4.20) below serves as a summary of the adjacency relations that would play a role in an exhaustive analysis of the sentence. There is nothing new in comparison with the thorough analysis of the English sentence above: the main verb is to be adjacent to its arguments, a noun is to be adjacent to the determiner and the adjectives that belong to it, and the temporal adverb is to be adjacent to the main verb too. The difference in word order possibilities will be accounted for by a difference in syntactic rank parameters.

(4.20) adjc(α1, introduced, Peter) adjc(α2, introduced, to-me) adjc(α3, introduced, girl-acc)
adjc(α4, girl-acc, a) adjc(α5, girl-acc, pretty) adjc(α6, girl-acc, Dutch)
adjc(α, yesterday, introduced)

Hungarian is also characterized by a rigid word order inside DPs; moreover, the only possible order is identical with the English one, so $\alpha6 < \alpha5 < \alpha4$. The verb cannot spoil the integrity of this nominal unit, either, so $\alpha4 < \alpha i$ for i=1, 2, 3. It can be assumed that $\alpha1=\alpha2=\alpha3$ in harmony with É. Kiss' (1992) claim that in Hungarian arguments of the finite verb have no canonical order. The fact that only the subject can precede the verb in neutral versions of the sentence in question can be attributed to precedence relations. Finally, the straightforward solution to the problem of the extreme freedom of the temporal adverb is to fix its adjacency parameter, denoted by α in (4.20) above, as identical with that of the arguments ($\alpha=\alpha1=\alpha2=\alpha3$). In Hungarian, thus, a free adjunct is permitted to spoil the integrity of a regent and its arguments (4.13, type III).

Let us summarize the advantages of the above discussed technique based on parameters. Firstly, numbers are the simplest parameters, they are very easy to handle. Secondly, their interpretation is plausible: they express the extent of "attraction," or the "cohesive power," between (environmental and own) words (whose corresponding predicates are) related semantically. By means of these parameters, it is easy to capture cross-linguistic differences in the case of the same type of structure (e.g. " in English an argument shows a more intensive attraction to its regent than in Hungarian"), or differences among structures inside a fixed language (e.g. "in English an auxiliary shows a more intensive attraction to its infinitive argument than the arguments of this infinitive (to the infinitive)"). Further, syntactic rank parameters enable us to capture some order of preference or importance in groups of concomitant formal means (e.g. word order, adjacency, agreement, case) expressing (together) a certain sort of semantic connection (e.g. argument—regent connection). Thus the following statement, for instance, can be translated into the "language of numbers": "although both in English and in Hungarian word order, adjacency, agreement and case-marking all play a certain role in expressing argument—regent connections, in English word order and adjacency play the primary role whereas in Hungarian case-marking and agreement are the decisive factors"). Finally, it is a valuable theoretical advantage of our approach over PSG that accounting for the three types of attraction between words, summarized in (4.13), requires no distinct descriptive means; the difference of the three types can be traced back to some difference in parameter numbers; moreover, the fact that type III is a special case (in PSG) is easy to capture and explain in GASG, too: type III amounts to the *coincidence* of certain syntactic rank parameters, and coincidence is obviously a distinguished case.

It will soon become clear why adjacency parameters have been referred to in the title of the subsection as *recessive* syntactic rank parameters.

4.3 Dominant Syntactic Rank Parameters

This subsection is devoted to a postponed problem of the analysis of the Hungarian sentence in (4.1.c), repeated here as (4.21.a).

The problem concerns the perfective prefix (of verbs and infinitives), which forms a phonological word with the finite version of *visit,* as is shown by (4.21.b) below. One might think that the best analysis of (4.21.a), relative to (4.21.b), is to be based on an assumption that the auxiliary can be inserted between the prefix and the infinitive due to its higher syntactic rank parameter. The sentence in (4.21.c), however, together with the information that *meg* is permitted to occupy neither position before the (focused) object, is clear evidence against an approach like this, because it shows that if the prefix is not permitted to form a phonological word with the finite element, it *remains* in a post-verbal position. Obviously, it is the focused element that forms a phonological word with the finite element. (4.21.d) serves as an illustration of another factor: if the prefix cannot form a phonological word with the finite element (cf. (4.21.a)), it must form a phonological word with its infinitive again; it should be mentioned that in (4.21.d) no argument of the infinitive and no adjunct can be inserted in between the prefix and the infinitive.

(4.21) a. $^{+}$Meg fog-lak $^{+}$látogatni.
vpref$_{perf}$ will-1sg$_{SUBJ}$2sg$_{OBJ}$ visit-inf
"I shall visit you."

b. $^{+}$Tegnap $^{+}$Péter $^{+}$meg-látogat-t-a $^{+}$Mari-t.
yesterday P. vpref$_{perf}$-visit-past-3sg$_{SUBJ}$3def$_{OBJ}$ M-acc
"Yesterday Peter visited Mari."

c. $^{+}$Tegnap $^{+}$Péter $^{+}$Mari-t látogat-t-a meg.
yesterday P. M-acc visit-past-3sg$_{SUBJ}$3def$_{OBJ}$ vpref$_{perf}$
"It is Mary that Peter visited yesterday."

d. $^{+}$Én fog-lak meg-látogat-ni.
I will-1sg$_{SUBJ}$2sg$_{OBJ}$ vpref$_{perf}$-visit-inf
"It is me that will visit you."

The key to the explanation of the intricate system of these phenomena in GASG lies in the following definition of (the satisfaction of) the relation described by the predicate *phonword:*

(4.22) Members z and x of a given intoned sequence of fully inflected words satisfy the phonword(α, z, x) lexical condition if a. or b. below is true:

a. their is a substring [$^{+}$z x] in the given sequence of words, indeed

b. a condition phonword(β, y, x) or phonword(β, z, y) has been satisfied

where $\beta<\alpha$.

The word order of sentence (4.21.b) can be accounted for by assuming that the formal characterization of the lexical sign belonging to the finite version *meglátogatta* of "visit" contains a *phonword* formula like the one in Λ3 in (4.9.r4): phonword(α3', "prefix," "visit"). It is the opposite assumption that would require a long explanation because this *phonword* formula is worth regarding as a shared feature of the finite and infinitive variants of "visit" in the lexical inheritance network. The only remaining problem is that the adverb and the subject in (4.21.b) would like to be adjacent to the verb stem; the plausible solution here is to complete the definition of adjacency in (4.12) with the following c. point: "a condition phonword(δ, y, z), phonword(δ, y, x), phonword(δ, z, y) or phonword(δ, x, y) has been satisfied." That is, a *phonword* condition overrides the conflicting *adjacency* conditions (perhaps depending on the syntactic rank parameters that belong to them).

The word order of sentence (4.21.a) = (4.1.c) can be accounted for by the following fixation of the parameters of the competing *phonword* formulas in (4.9): $\alpha4.5 < \alpha3'$. Thus the auxiliary, in whose lexical sign the prefix of its infinitive argument is mentioned as an environmental word, "wants" to form a phonological word with this prefix more than the own regent of the prefix. The auxiliary verb needs a *verb carrier* (Kálmán and Nádasdy 1994).

(4.21.c,d) show that the focused element of a sentence is the strongest candidate for the stressed position of the phonological word whose unstressed position is occupied by the finite element of the sentence. In order to account for the word order in (4.21.c), it should be assumed that the original place of the verbal prefix can be found behind the verb: prec(α, regent, prefix), and a condition like this can also be overridden by a *phonword* condition. We can follow É. Kiss (1992, 1998) in assuming that a (finite) regent precedes all of its arguments, including the prefix (topicalization or focusing can override this condition, obviously).

Now the word order of sentence (4.21.d) is already a consequence of what has been said so far: Three *phonword* conditions occur in the course of computation: phonword($\delta1$, $I_{focused}$, finite-aux), phonword($\delta2$, prefix, finite-aux), phonword($\delta3$, prefix, infinitive), where $\delta1<\delta2<\delta3$. As the first condition is of the highest rank, it should necessarily be satisfied. It is impossible, thus, for the second condition to be satisfied. Hence, nothing prevents the third condition from being satisfied.

We have ignored, however, an important detail in connection with focus: *where* is the condition of rank $\delta1$ mentioned above? In the lexical sign of which word in (4.21.c) or (4.21.d) can this piece of information be found?

One might think the examples suggest that the proper name *Marit* and the pronoun have a "focused" lexical variant. Thus the focused version of each (inflected) word ought to be assumed to have a separate lexical sign. A solution like this, however, based on the doubling of the lexicon, is far from being elegant. It would be more elegant to assign a lexical sign to the "focus operator." The formal characterization of this lexical sign should contain references to at least two environmental words: the *identified* element (*Marit* in (4.21.c), *én* in (4.21.d)) and the finite element. Their primary property is that they are required to form a phonological word.[43] But what will play the role of the own word in the lexical sign of focus? Well, it has simply no own word. Taking idioms (Subsection 4.1) into consideration, too, it can be said that n own word can belong to a lexical sign where n is a natural number, including 0. Lacking own words, nevertheless, does not imply at all that inserting the given lexical sign in a sentence has no consequences (neither) on the formal side, since a lexical sign can contain references not only to the positions of environmental words relative to the own word(s), but to the positions of environmental words relative to each other as well, including phonological-word formation.

Definitions (4.12) and (4.22) are representatives of two distinct types of conditions in formal characterizations of lexical signs: if we fail to satisfy the adjacency condition in a primary way (i.e. the concerned words are adjacent to each other indeed), the condition should be satisfied *to a lesser extent:* the concerned words must be as near to each other as possible —hence, a condition like this will be called a *recessive* one; whereas *phonword* condition will be called *dominant:* it is either fulfilled perfectly, or is not fulfilled at all ((4.21.c) is the clearest example). Syntactic rank parameters, thus, can function in a recessive or in a dominant way in the above sense, depending on whether the satisfaction of the concerned condition has *grades* according to its definition, or not.

[43] Alberti (1998b) provides a thorough discussion of the topic.

It is time to make a remark on further α's occurring in formulas in 4.1-2. They are also syntactic rank parameters. Every formula of formal or semantic characterization where variables (i.e. environmental words or environmental predicates) are referred to (among others) has contained such parameters — in favor of generality. Theoretically, all these formulas can be overridden; but in this article all the concerned parameters can be assumed to take the trivial value 1.

We would like to emphasize, further, that the "non-primary usage" of formulas with rank parameters, in the sense mentioned above, does not amount to a distinguished case for unificational technique relative to the primary usage. Counter to PSGs, where a condition that could not be satisfied in a primary way (e.g. the condition concerning the integrity of *meg+látogat(ni)* in (4.21.a,c)) is to be regarded as having been satisfied in a "fictive past tense" of (the fictive process of) computation, i.e. in some kind of "deep structure." In GASG, thus, the potential possibilities that have not been realized (explicitly) by the end of the computational process of a given sentence will have remained in the lexicon, whereas in PSGs, and especially in transformational PSG, these aborted possibilities will have become explicit parts of the sentence structure — in the form of traces or copies. As long as there appear psycholinguistic tests capable of indicating the presence of an arbitrary assumed trace or copy, linguistic approaches dispensing with traces/copies are to be preferred.

Finally it is to be noted that the sentence-initial position of English wh-words can be accounted for by assuming that the lexical sign of a wh-word contains a formula requiring the own word to immediately precede the finite element (of potential sentences) that can override the formula type according to which arguments should follow their regent. The phenomenon of subject—auxiliary *inversion* characteristic of interrogative sentences with no wh-word can be accounted for by means of a lexical "interrogative operator," which has no own word but contains references to the finite auxiliary as well as the semantic subject of the non-finite verb and requires the former to precede the latter.

4.4 Semantic Rank Parameters

This subsection is devoted to the semantic problem sketched in 3.4, which was said there to be symmetrical with the type III syntactic problem in a certain sense. We repeat the essence of the problem: a fixed word order (and, hence, a fixed phrase structure at a certain point of computation, presumably at Spell-Out) may come with more than one (logical) meaning ((2.2,4), (3.6)). The above reference to symmetry has already suggested the solution to be proposed: ambiguity is to be attributed to the coincidence of certain rank parameters occurring in semantic characterizations of lexical signs.

A detailed analysis of (2.2), repeated here as (4.23) will serve as an illustration of the proposal. We are in a lucky position to use the lexical signs demonstrated in (4.15) with the slight modification of replacing Λ4, the lexical sign of one of the indefinite articles, with the lexical sign of *every,* demonstrated in (4.23.b).

(4.23) a. Every English boy visited a pretty Dutch girl.

b. Λ4 = <{belong(v4, "every")},
{ref.**def**(v4), 3.sg(α4.1, V4.1), n.common(α4.2, V4.1), prec(α4.3, v4, V4.1),
adjc(α4.4, v4, V4.1),
arg.GRF4(α4.5, V4.1, V4.2)},
{→(α4.0, x4 ∧ Q4.1(x4), Q4.2.GRF4(x4))},
{corr(V4.1, Q4.1}>

There are two differences between the lexical signs of *a(n)* and *every* (4.15.Λ4, 4.23.Λ4): firstly, the latter is (usually held to be) a definite element,[44] secondly, a conditional connective → joins the complex formula x4∧boy(x4) to visit(...x4...). Another difference in the input is the lack of *yesterday.* We will completely ignore the temporal and aspectual aspects of the analysis of (4.23.a) in order to concentrate our attention on parameters in semantic characterizations.[45] These differences give rise to only a very little change in the table of unification relative to (4.16.b): the rows of v9, *yesterday* and t, and the reference to Q9 in the row of *visit,* should be deleted. How is it possible then to produce two distinct DRSs on the basis of these data?

In (4.16.c) we did not bother about the order of atomic semantic formulas because we could do that: (logical) conjunction ∧ is a commutative and associative operation, and there occured no other logical connectives. These properties are not true of conditional, however, so the order and grouping of formulas have become very interesting.

Let us review (the specified versions of) the relevant formulas in (4.15) and (4.23.b):

(4.24) ∧(α1.0, boy(x4), visit(...x4...)) ∧(α2.0, girl(x5), visit(...x5...))
∧(α3.01, boy(x4), visit(...x4...)) ∧(α3.03, girl(x5), visit(...x5...))
→(α4.0, boy(x4), visit(...x4...)) ∧(α5.0, girl(x5), visit(...x5...))
∧(α6.0, boy(x4), english(x4)) ∧(α7.0, girl(x5), dutch(x5)) ∧(α8.0, girl(x5), pretty(x5))

The first six formulas say that a boy and a girl take part in a visiting situation. Similar, but not identical, formulas come from the semantic characterization of the verb, that of the noun, and that of the determiner. We follow the Montagovian approach based on *generalized quantifiers* in assuming that it is the task of the determiner to decide in what logical connection the own predicate of the noun and the own predicate of the verb stand. Thus the formulas with α4.0 and α5.0 should have priority over the first four formulas: α4.0 < α1.0 or α3.01, and α5.0 < α2.0 or α3.03. The "false" formulas with α1.0 and 3.01, where ∧ can be found instead of →, is to be regarded as having been overridden by the correct formula with α4.0 (see (2.4)), so the semantic ranks in question have behaved as *dominant* parameters.[46]

In harmony with (2.4), (at least now) it is assumed that the semantic integrity of "DPs" cannot be spoiled by the argument—verb connection: α6.0 = α7.0 < α8.0 < α4.0 or α5.0. The relation between ranks is to be interpreted *recessively:* all the concerned atomic formulas should be joined together but the order of joining depends on ranks. And now the explanation for the ambiguity of sentence (4.23.a) is straightforward: α4.0=α5.0. We get the following two bracketings, which correspond to the formulas in (2.4.a,A) and (2.4.b,B):

(4.25) a. ...∧**((x4 ∧ boy(x4)) ∧ english(x4))** → [*(((x5 ∧ girl(x5)) ∧ dutch(x5)) ∧pretty(x5))* ∧ visit(x3, x4, x5)]
b. ...∧*(((x5 ∧ girl(x5)) ∧ dutch(x5)) ∧pretty(x5))* ∧ [**((x4 ∧ boy(x4)) ∧ english(x4))**→ visit(x3, x4, x5)]

As for possibilities for generalization, if identical recessive semantic rank parameters are assumed to be associated with every formula declaring the connection between the predicate of the verb regent and that of the nominal element of its arguments, we get the "Quantifier Raising"

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[44] This assumption can serve as an explanation of the difference in grammaticality between *There is a/*every boy in the kitchen.*.

[45] We do not say that there are no problems in the ignored part. Temporal referent variable T, introduced in Λ3, for instance, can find no temporal referent (name) to be unified with. We follow Kamp and Reyle (1993: 523) in assuming that the context should always provide a temporal reference point (if there is no explicit reference point such as *yesterday).* See also fn. 33.

[46] In this way ∧ has been regarded as a default connection between statements. Perhaps it would be better to introduce variables also in the logical connective type, which would give rise to formulas like this: CONN(α, boy(X), visit(...X...)). The value of CONN (∧ or →) would be specified only in semantic characterizations of determiners.

approach of PSGs to the problem of ambiguity, mentioned in Subsection 3.4. This approach, however, has proved to give rise to overgeneration (e.g. Szabolcsi 1997, Zeevat 1991b: 152). The empirically better "Reconstruction" approach (see also 3.4), which is based on a distinguished and comparative consideration of determiners in sentences, is very easy to formulate in GASG, because it is the general case to use different recessive semantic rank parameters in lexical signs of different determiners whereas the coincidence of these parameters is the special case.[47] The following generalized formula (in lexical signs of determiners), based on the corresponding ones in the semantic characterization of Λ4 and Λ5 in (4.15) and (4.23), is to capture the general semantic relation between (the predicate of) the nominal element that belongs to the given determiner and (the predicate of) their regent (§ denotes $\wedge$, $\rightarrow$ or perhaps other logical connectives):

(4.26) $\S(\alpha_{D,GRF}, N(x), V.GRF(x))$

where GRF is a variable to be unified with the name of a grammatical function, N and V are also variables to be unified with a nominal predicate and a verbal predicate, respectively, and the recessive semantic rank parameter α (can) depends (depend) on the type of the determiner whose lexical sign contains this formula and the grammatical function of the argument. The role of logical—rhetorical operators (e.g. focus, topic in Hungarian; see Szabolcsi (1997: 118)) in disambiguating scope hierarchy can be accounted for by placing peculiar dominant semantic rank parameters in semantic characterizations of (the lexical signs of) the operators in question.

To sum up the first four subsections of Section 4, we have proposed a system of solutions to the problem types discussed in Section 3, which has been based on recessive and dominant syntactic and semantic rank parameters; we have argued that these rank parameters are easy to handle, have a straightforward interpretation, are suitable for formulating universal generalizations, and require no special treatment in the course of unificational computation — so they are favorable in a theoretical viewpoint and their descriptive capacity promises to capture a wide range of stubborn linguistic problems.

4.5 Coordination

As was mentioned in the introduction, coordination is a problematic area in UCG (199b: 23), because it seems that in this area *constituents* are concerned, which are very hard to capture from the viewpoint of individual lexical signs. In GASG, however, we have managed to find a (radical lexicalist) means to capture the content of the notion of constituent: recessive syntactic rank parameters. Their application, thus, promises new results in the field of coordination.

(4.27.a-c) below demonstrate a small group of symptomatic data:

(4.27) a. the pretty Dutch (and English) girls and women
b. the pretty Dutch girls and English women
c. the pretty Dutch girls and the cheerful English women
d. adjc(α1, the, N), adjc(α2, pretty, N), adjc(α3, dutch, N); $\alpha 3 < \alpha 2 < \alpha 1$
e. idcat(β, W1, W2), prec(γ1, W1, and), prec(γ2, and, W2), adjc(γ3, W1, and), adjc(γ, W2, and)

[47] Notice, nevertheless, this "coincidence" has a definite synchronic task in languages with a rigid word order: to make scope hierarchy independent, at least to a certain extent, of both determiner type and the (configurational) hierarchy of grammatical functions. Although argument structures of regents provide some chance to interchange the order of scopes of determiners — the hierarchy *subject* > *object* > *oblique argument* can often be modified by passivization (obj>{subj, obl}), locative alternation (subj>obl>obj) or by the composition of these two operations (obl>{subj,obj}), it is impossible to arrange, by operations like these, three arguments in an arbitrary hierarchy (Alberti 1997a).

f. $\rightarrow(\delta, X\in Z)$, N(X))
g. $\wedge(\delta i$, Ai(X), N(X))

(4.27.d) provides the adjacency formulas of the definite article, the *pretty/cheerful* type of adjectives, and the adjective type referring to nationality, respectively. The proposed order of the recessive syntactic rank parameters (αi for i=1, 2, 3) has been argued for in Subsection 4.2, on the basis of the rigid word order of the expression *the pretty Dutch girls.*

(4.27.e) is a collection of the relevant formulas in the syntactic characterization of the lexical sign that belongs to *and.* What the first formula guarantees is usually formulated in PSGs as follows: extensions of the same basic category (e.g. N) can be coordinated; and they add that these extensions should be of the same grade (e.g. N'), which can be accounted for in our approach by assuming the coexistence of a wide range of versions of lexical signs belonging to *and* with different rank parameters. In the version of (4.27.a) with ignored parentheses, the roles of the "heads" W1 and W2 in the case of the expression *Dutch and English* are played by adjectives whereas in our other examples the heads are nouns. From now on, W1 and W2, these two environmental words in the lexical sign of *and,* will be referred to as *heads,* which can be regarded (now) simply as a mere definition in the coordination theory of GASG. The following two formulas in (4.27.e) declare that the conjunction is required to be between the two heads.[48] The fourth formula declares the adjacency of the first head (W1) and the conjunction; rank $\gamma 3$ is irrelevant to us because this formula has no "rivals." The γ parameter in the last formula, however, plays a key role in our coordination theory because it decides what should be inserted in between (the own word of) the conjugation and the second head (W2).

If $\alpha 1<\gamma$, for instance, DPs are coordinated (4.27.c). The coordination of Ns in (4.27.a), however, requires a parameter γ of a very high rank: $\gamma<\alpha 3$, because this coordination only extends to the pure N heads. In order to account for sentence (4.27.b), the following order should be fixed: $\alpha 3<\gamma<\alpha 1$; here the ordering relation between $\alpha 2$ and γ has no influence on word order, but there is a semantic ambiguity to be captured: the property of prettiness does not necessarily concern the English women. By this latter remark, however, we have got in the field of semantics.

The successful coordination theory of PSG(s) relies on a perfect correspondence between the syntactic scope of the conjunction and its semantic scope. The ambiguity of sentence (4.27.b), for instance, can be explained by the alternative construals according to which the first coordinated constituent is either the inner N' or the outer N' of the following sub-tree: $[_{N'}$ pretty $[_{N'}$ Dutch girls]]; and semantics will create two distinct *plural objects* exactly on the basis of the alternative N' constituents.[49] How is it possible to formulate this correspondence in the "language" of rank parameters, where the notion of *constituent,* at least as a primary term, does not exist?

First of all, a study should be made of what the contribution of particular coordinated members is to the formation of plural objects. In alternative interpretations of (4.27.b), the set of *English women* should be joined either to the set of *Dutch girls* or to the set of *pretty Dutch girls.* The task of forming sets is carried out by the conditional formula in (4.27.f): the atomic formula N(X) that belongs to the nominal head is to be linked to the formula $X\in Y$, with this latter formula as the premise of a conditional; plural object Y is defined in this way. The A(X) formulas belonging to the attributive adjectives, however, also need to be linked to the N(X) (via logical conjunction ($\wedge$); see (4.27.g)). If $\delta>\delta i$ (for i=1, 2), the conjunctional formulas are to be applied

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[48] Discussing the case of n-ary coordination (n>2) would go beyond the scope of this paper.

[49] Different ways of forming plural objects are thoroughly discussed in e.g. Kamp and Reyle (1993, Section 4); in this article no more can be discussed than the method of collecting the formulas serving as input data needed to form plural objects.

first (4.28.a); if $\delta 1>\delta>\delta 2$, the one adjective gets out of the conclusion part of the conditional formula (4.28.b); whereas in the case of $\delta i>\delta$, only the formula belonging to the noun remains in the conclusion part (4.28.c):

(4.28) a. $X\in Y \rightarrow (\text{pretty}(X) \wedge \text{dutch}(X) \wedge \text{girl}(X))$
b. $\text{pretty}(\mathbf{X}) \wedge (X\in Y \rightarrow (\text{dutch}(X) \wedge \text{girl}(X)))$
c. $\text{pretty}(\mathbf{X}) \wedge \text{dutch}(\mathbf{X}) \wedge (X\in Y \rightarrow (\text{girl}(X)))$

Thus the different sets denoted by Y consists of the *pretty Dutch girls,* the *Dutch girls,* and the *girls.* From a technical point of view, it is of a great importance that in (4.28.b,c) the (free) occurrences of variable X outside the conditional formula (bold X's) are not bound to the bound occurrences of X (inside the conditional formula); so bold X's can practically be regarded as different from normal X's, and the formulas can be used in this way in the further course of plural-object formation. As was mentioned in an earlier footnote, we will not enter into details of this process; the essential point is that, having set out from the same group of atomic formulas, different plural objects can be produced due to semantic ranks, and the process can be controlled by (assigning different values to) the recessive semantic rank parameter δ.

Having pointed out that syntactic parameter γ can control properly the sentence-internal placing of the conjunction and semantic parameter δ can control the process of plural-object formation as properly, there is one question left: what is their connection inside the lexical sign that belongs to the conjunction? Notice that a high syntactic rank (the conjunction is near to the second head, i.e. the coordinated constituent is small) necessarily comes with a high value of the semantic parameter (the conclusion part of the conditional formula is small, as in (2.48.c)); the simplest way of capturing this connection is to select these two parameters to be identical: $\delta=\gamma$. It is also worth assuming that $\delta i=\alpha i$ (i=1, 2). In this approach, it would be enough to store in the lexicon a single lexical sign that belongs to *and* with nominal heads[50], with a shared $\delta=\gamma$ rank parameter whose value is permitted to be fixed after selecting the lexical sign from the lexicon.

To sum up, we have sketched a treatment of problems in the field of coordination where no constituents are referred to. The syntactic positions of *and* have been accounted for by means of recessive syntactic rank parameters, the varying possibilities for plural-object formation have been explained by means of recessive semantic rank parameters, and the close relation between the two parameters has been created by means of the technique of identifying parameters ensured by unificational computation.

4.6 Infinitival Constructions Across Languages

This subsection is devoted to a comparative analysis of English, German and Dutch multiple infinitival constructions; especially the latter, the "cross-serial" Dutch construction, is of distinguished relevance to the capacity of new grammars because its description requires a (at least) mildly context sensitive grammar (Partee *et al.* 1990, Section 21).

Remember our starting-point in 2.3 was the observation that the generative capacity of CCG (Classical Categorial Grammar) and CFG (Context Free Grammar) had proved to be insufficient relative to the capacity of the Universal Grammar: The original proof (Shieber 1985) was based on the existence of constructions such as the Zurich German (and Dutch) multiple infinitival structures showing *cross-serial dependencies.* The successful analysis of these

[50] Semantics of conjunctions with nominal heads, because of plural-object formation, seems to differ radically from semantics of conjunctions coordinating heads belonging to other categories, so an entirely uniform treatment of all versions of *and* (still) seems to be impossible.

constructions had served as evidence in favor of the increased capacity of UCG (in comparison with that of CCG) in Zeevat's (1991b: 142) relevant article. In order to verify the appropriate generative capacity of GASG, we should also provide an analysis of cross-serial dependencies, and this construction is worth comparing with other sorts of infinitival dependencies occurring in (basically) configurational languages.

The English (4.29-30.a), German (b) and Dutch (c) data below illustrate the types of infinitival constructions showing *regular, nested* and *cross-serial dependencies,* respectively.[51]

(4.29) a. ...(that) J. saw♣ M♣. drink♦ beer♦
b. ...(daβ) J. M.♣ bier♦ trinken♦ sah♣
c. ....(dat) Jan Marie♣ bier♦ zag♣ drinken♦.

(4.30) a. ...(that) Jan saw♣ Mary♣ let♠ the children♠ drink♦ beer♦.
b. ...(daβ) J. M.♣ die Kinder♠ bier♦ trinken♦ lassen♠ sah♣
c. ...(dat) Jan Marie♣ de kinderen♠ bier♦ zag♣ laten♠ drinken♦.

The three word order variants will be accounted for by demonstrating the relevant formulas of the lexical signs belonging to the concerned verb and infinitive types in the three languages. Lexical signs Λ3 and Λ4 in (4.2) can serve as a starting-point. Λ0 and Λ1 below are the "prototypes" of a verb or infinitive with three arguments, a (semantic) subject, a (syntactic) object and an infinitive, and an infinitive with a (semantic) subject and an object, respectively. The σ's are only auxiliary parameters with values + and -; prec.-(α,u,w) is identical with prec(α,w,u), and + can be omitted with no consequences. They help to characterize the same verb/infinitive type in the three languages by means of a single underspecified lexical sign. The differences among the three language types will be traced back to the α syntactic parameters and the σ auxiliary parameters.

Formulas of the underspecified lexical sign Λ0 declare that there is a (transitive) own word (v0) and three environmental words: a subject, an object and an infinitive, which should be adjacent to the own word, on the one hand, and should precede, or be preceded by, the own word, on the other. The semantic characterization makes it clear that the syntactic object (see *corr(V0.2, Q0.2))* semantically belongs to the infinitive argument as its (semantic) subject.

(4.31) Λ0 = <{belong(v0, "saw"/"let"/...)},
{±finite(v0), tran(v0),
arg.subj(α0.11, V0.1, v0), prec.σ0.12(α0.12, v0, V0.1), adjc(α0.13, v0, V0.1),
arg.obj(α0.21, V0.2, v0), prec.σ 0.22(α0.22, v0, V0.2), adjc(α0.23, v0, V0.2),
arg.inf(α0.31, V0.3, v0), prec.σ0.32(α0.32, v0, V0.3), adjc(α0.33, v0, V0.3),...},
{...q0(x0, X0.1, X0.3)..., ...Q03.eve(X0.3)..., ...Q03.subj(X02)...,
...Q01(X0.1)..., ...Q02(X0.2)...},
{corr(v0, q0), corr(V0.1, Q0.1), corr(V0.2, Q0.2), corr(V0.3, Q0.3)}

Λ1 = <{belong(v1, "drink"/...)},
{infinite(v1), tran(v1),
arg.subj(α1.11, V1.1, v1), prec.σ1.12(α1.12, v1, V1.1), adjc(α1.13, v1, V1.1),
arg.obj(α1.21, V1.2, v0), prec.σ1.22(α1.22, v1, V1.2), adjc(α1.23, v1, V1.2), ...}
{...q1(x1, X1.1, X1.2)..., ...Q11(X1.1)..., ...Q12(X1.2)...},
{corr(v1, q1), corr(V1.1, Q1.1), corr(V1.2, Q1.2)}

[51] We call the English type *regular* because the $(\Sigma^2)^*$ language is regular (i.e. a language of type 3 according to the Chomsky-hierarchy) where Σ denotes the alphabet of the language.

Formulas of the underspecified lexical sign $\Lambda 1$ declare that there is a transitive infinitive own word (v1) and two environmental words: a (semantic) subject and an object, which should be adjacent to the own word, on the one hand, and should precede, or be preceded by, the own word, on the other. References to the subject in the formal characterization of $\Lambda 1$ and the infinitive version of $\Lambda 0$ are superfluous, because the case and other formal properties of this "subject" are determined elsewhere, but this method is more comfortable and harmless (in languages without pro-drop)).

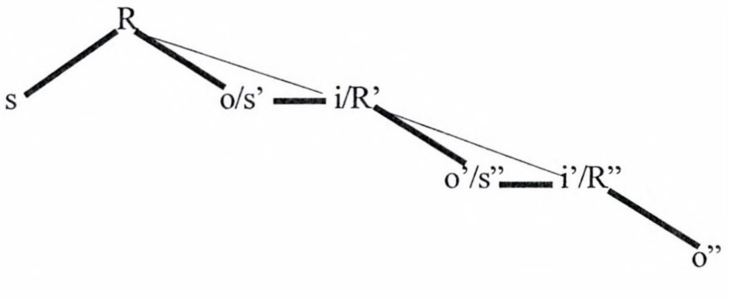
The differences among the three language types depend on differences in the following rank parameters and auxiliary parameters:

(4.32)

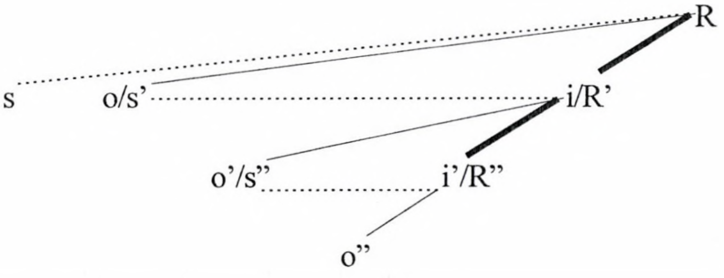
	regular (sRoi)	nested (soiR)	cross-serial (soRi)
$\sigma 0.12 = \sigma 1.12$	-	-	-
$\sigma 0.22 = \sigma 2.22$	+	-	-
$\sigma 0.32$	+	-	+
$\alpha 0.13 = \alpha 1.13$	**1**	3	3
$\alpha 0.23 = \alpha 1.23$	**1**	2	2
$\alpha 0.33$	**2**	1	1

In English a regent is preceded by its subject and precedes its further argument(s) ("sRoi" above refers to this order). In German a regent (in a subordinate clause) is preceded by all its arguments. In Dutch only an infinitive argument can follow the regent. The σ auxiliary parameters precisely account for these observations. As for α's, the adjacency parameters are relevant. The difference between English and the two languages of the Continent lies in the fact that in the latter the regent—infinitive connection is of the highest rank (the numbers denote only the order of ranks, but not the ranks themselves).[52] The figures below help to check that we have predicted the factual word order in all three types.

(4.33) Regular:

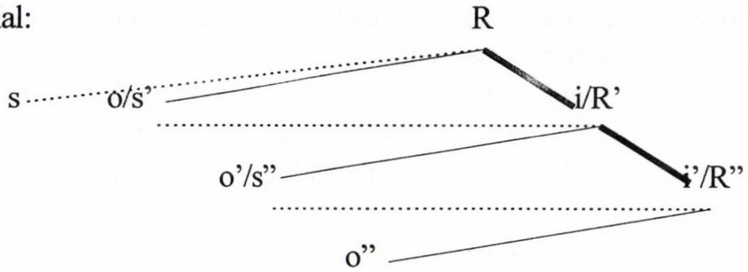


(4.34) Nested:



[52] It is a favorable property of the comparative analysis that inside one language the differences between $\Lambda 0$ and $\Lambda 1$ are practically confined to formulas concerning the infinitive.

(4.35) Cross-serial:



The fact that the English construction is qualified as being simpler than the other two constructions according to the Chomsky-hierarchy (Partee *et al.* 1990) can be accounted for by saying that the description of the English, but not the German and Dutch, phenomena requires only two ranks (4.32) (presumably due to the fact that regents can be found *between* their subject and object); and the fact that the Dutch construction is qualified as even more complicated than the German one may be explained by the fact that in the latter, but not in the former, the regent—argument order is uniform. Such cross-linguistic statements refer to the *explanatory adequacy* of GASG.

5. Concluding remarks

5.1 Syntax and Lexicon in the Family of Generative Theories

We have argued in this article for a new sort of generative grammar that is more consistently and radically "lexicalist" than any earlier generative grammar. It can be regarded as a modified Unification Categorial Grammar (UCG) from which the principal and single syntactic "weapon" of CCG, Function Application, producing PS trees, has been omitted. What has remained is the Saussure—Pollard notion of *lexical sign* and the mere technique of unification as the engine of combining signs. We have argued that, by appropriately embedding the information concerning word order in lexical signs, it is possible to create a grammar dispensing with any explicit syntax. The crucial novel idea, we think, has been the introduction of syntactic and semantic rank parameters into lexical formulas serving as the operative area of the mechanism of unification. Our main theoretical argument in favor of GASG, the totally lexicalist grammar sketched in this paper, is that it promises a better answer to the stubborn problem of compositionality as to the morphosyntax→DRS transition than PSGs. Our empirical arguments in favor of GASG concern a few weakly-motivated subtheories of PSGs such as the areas of "stylistic rules" and scope ambiguities. This short concluding section is devoted to a meta-theoretical study of the family of generative grammars, and especially the evaluation of "syntax-centrism" and "lexicalism," which will help to decide the place of GASG among generative grammars.

Our starting-point is the tendency in the course of which *generative theory,* which appeared in the fifties as a radically syntax-centered linguistic theory with a very simple lexicon (Chomsky 1957), had become by the nineties —though separated into several branches (MP, CGs, LFG, HPSG, TAG, C&S)— a theory with a highly reduced syntax and a lexicon of rich content and structure. Whenever a new non-Chomskyan branch was founded, leading points of the program were almost always the extension and a more exact and thorough formalization of the area of the lexicon, and a definite ambition to store the information concerning the syntax-semantics interface in the lexicon. In the light of these facts, the radical lexicon-centrism and the non-language-specific approach to syntax characteristic of the Chomskyan Minimalist Program (Chomsky 1995) are of even greater importance:

"The syntactic engine itself – the autonomous principles of composition and manipulation Chomsky now labels 'the computational system' – has begun to fade into the background. Syntax reduces to a simple description of how constituents drawn from the lexicon can be combined and how movement is possible (i.e. how something other than the simple combination of independent constituents is possible). The computational system, this simple system of composition, is constrained by a small set of economy principles which Chomsky claims enforce the general requirement, 'do the most economical things to create structures that pass the interface conditions (converge at the interfaces)" (Marantz 1995: 380, section 8 *The End of Syntax).*

Moreover, PS rules have disappeared. And the pieces of information to be passed on to phonology and semantics at the end of computation are strictly limited to features that had already been present at the lexical input of computation *(Principle of Lexical Inclusiveness).*

What then can be the arguments in favor of the remaining two syntactic operations *Merge,* producing PS trees, and *Move,* which is essentially the same as transformation? Chomsky (1995: 403) also raises this question, and his answer is as follows: "The operation Merge is inescapable on the weakest interface conditions, but why should the computational system C_{HL} in human language not be restricted to it? Plainly, it is not."

Thus there are no exact arguments in favor of Merge and Move, whilst it seems to us to have been admitted implicitly that a grammar dispensing with Merge and Move would enjoy the highest meta-theoretical preference *if it did exist.* The preference for dispensing Move seems to have been embedded also in the fundamental philosophy of Minimalism through the idea of *Perfect Syntax:* the computational syntax strives for being perfect in the sense that, in the course of combining lexical items, it never has recourse to superfluous moves, but the fact that there are distinct requirements at the phonological and at the semantic interface (usually) makes it unavoidable to have recourse to moves. Assigning some cost to recourse to the operation Move, computations with the same input numeration (of lexical items) will compete in respect of the sum of moving costs, and only the result of the computation with the minimal sum of costs is to be regarded as a well-formed expression, i.e. a *grammatical* sentence. Thus the ideal situation for every correct sentence would be to have a total moving cost of 0, which amounts to its having been produced without having had recourse to Move. Another serious argument against Move is the fact that the generative capacity of a grammar based on the kind of competition sketched above is very difficult to capture "mathematically," on the one hand, and seems to be horribly enormous, on the other.

These facts and arguments have led us to conclude that it is a grammar dispensing with Merge and Move that is derivable from the general generative philosophy as a conceptual minimum. GASG is nothing else than an attempt to realize this conceptual minimum: to get rid of Move, to reduce Merge to a non-PS-tree-producing unification, to store all linguistic information in the lexicon.

5.2 GASG and PS Trees

We pointed out in 4.3 that the basic difference between GASG and PSG in respect of computation lies in the fact that the "non-primary usage" of formulas with rank parameters does not amount to a distinguished case for unificational technique relative to the primary usage. Counter to PSGs, where a condition that could not be satisfied in a primary way (e.g. the condition concerning the integrity of *meg+látogat(ni)* in (4.21.a,c)) is to be regarded as having been satisfied in a "fictive past tense" of (the fictive process of) computation, i.e. in some kind of "deep structure." In GASG, thus, the potential possibilities that have not been realized (explicitly) by the end of the computational process of a given sentence will have remained in the lexicon, whereas in PSGs these aborted possibilities will have become explicit parts of the sentence structure — in the form of traces or copies. As long as there appear psycholinguistic tests capable of indicating the presence of an arbitrary assumed trace or copy, linguistic approaches dispensing with traces/copies are to be preferred.

Thus we have managed to get rid of the stubborn problem of assigning mental interpretation to traces; nevertheless, it is not impossible to reconstruct the PS tree on the basis of a GASG analysis to a certain extent, so no information seems to have lost. Below we have attempted to reconstruct the PS trees of sentences (2.2.a)=(3.1)=(4.14.a) and (4.21.a) on the basis of our GASG analyses:

(5.1) a. (Yesterday?) [[an [English boy]] visited [a [pretty [Dutch girl]]]] (yesterday?).
b. Meg_j fog-lak pro(1.sg)$_k$ pro(2.sg)$_l$ [$\varnothing_j$ látogatni $\varnothing_j$ PRO_k PRO_l].
$vpref_{perf}$ will-$1sg_{SUBJ}2sg_{OBJ}$ visit-inf

Elaborating the details of reconstruction of PS trees on the basis of GASG analyses is postponed to future research; nevertheless, there are at least three straightforward rules, illustrated above. The first rule concerns the connection between recessive syntactic rank parameters and constituents: if both v and w are required to stand in an adjacency relation with u, the former requirement is associated with a higher rank, and they should also precede u, then v forms a constituent with u earlier than w does: [w [v u]] (5.1.a). The second rule concerns the connection between dominant parameters and traces/copies: if an environmental word is required to occupy a certain position by an overridden condition, an indexed trace/copy should be placed in that position (see the chain of the prefix in (5.1.b)). Finally, the third straightforward rule ought to declare some correspondence between environmental predicates with no corresponding environmental words and different sorts of empty pronominal elements (pro, PRO; see (5.1.b)).

It is sure, however, that in certain cases (e.g. *yesterday* in (5.1.a), or *tegnap* in (3.4.b)) a GASG analysis does not give rise to a fully specified PS tree, but rather a group of PS trees. The case of the proposed lexical sign of focus with no own word refers to another problem: a non-existing own word cannot be placed anywhere. We argue, however, that these are the very cases where PSG produces "overspecified," "spurious" trees in the sense that these trees contain information that neither phonology nor semantics needs.

5.3 Copredication and Morphology

In these last two subsections the role of unification will be set in a broader context.

In our approach there are constants and variables on both the formal and the semantic side of lexical signs. On the formal side, the constant or constants in the case of a lexical sign are the zero, one or more own words, and the variables refer to participants of a potential infrasentential environment. Their successful unification means that the words we have attempted to combine are such that are suitable for occurring in each other's (not necessarily close) neighborhood. The prerequisite of unification is nothing else than satisfying grammatical statements / conditions. These conditions concern phonological / intonational properties, purely syntactic relations and morphological connections of own words and environmental words. As for intonational properties, only a very small fragment of relevant phenomena could been drawn into the scope of GASG. "Purely syntactic relations" are intended to mean ("surface") ordering and adjacency relations among words. "Morphological connections" refer to agreement and case marking. Both of these kinds of connections amount to explicit reference to compatibility / unifiability of the lexical signs that belong to the concerned words.

Before entering into details of morphology, the semantic consequences of unifying two lexical signs should be sketched in order that morphological facilities can already be scrutinized in the light of certain semantic facts. We hypothesize that combining two lexical signs always entails *copredication* on the side of semantics, by which we mean the following: The semantic side of every lexical sign is an underspecified DRS, i.e. a set of atomic formulas consisting of predicates and referents structured by (a restricted set of) logical connectives. Positions of both referents and predicates can be filled in by variables, which can be unified with (each other and) referent names and predicate names. It is in this way that two lexical signs specify each other's semantic representations. And by copredication, we mean a relation between a formula coming from the one lexical sign and a formula coming from the other such that they contain at least one unified referent pair. Further, words in a given sentence are said to *copredicate* (to be in a copredicative relation) if copredicating formulas can be found (in the above sense) in the lexical signs belonging to them.

In the sentence *Yesterday an English boy visited a pretty Dutch girl,* for instance (see (4.14–16), the words *boy* and *visited* copredicate, as is clearly shown by the following formulas in the DRS (4.16.c) of the sentence: boy(x4), visit(x3, x4, x5). That is, "his being a boy" is predicated of the same person of whom it is predicated that he visited somebody. The copredicative relation between *yesterday* and *visited* is created by the unified temporal referents t and T: yesterday(t), (x3$\sqsubseteq$t $\wedge$ visit(x3,x4,x5)). The interpretation is as follows: the visit took place within a time interval that coincides with the day before the utterance time.[53] Finally, there is no copredication between *pretty* and *yesterday,* or *pretty* and *boy:* pairwise disjoint referent sets belong to these three words in (4.15) (even after unification): {X8=x5}, {t, X9=x3}, {X1=x4}.

After this preparation, it is time to pronounce the hypothesis that words standing in some morphological relation (the one agrees with the other or bears a case marking determined by the other) *copredicate.* His comparative studies have led Lehmann (1985: 55, 58, 59) to essentially the same conclusion, according to whom "...agreement is referential in nature," "...all agreement refers to an NP," and "all agreement identifies a referent to which the carrier of agreement, the agreeing word, is related." We assert on the basis of Lehmann's theory (completed with references to the feature of definiteness) that morphological connections occurring in languages of the world extend to copredicative relations: the following *can* agree with an NP:[54] I. *(internal* agreement (in number, gender/class, definiteness and case)) its determiner, numeral, attributive adjective, possessor, certain elements in the subordinate clause belonging to it, and adverbial or infinitival elements predicating something of its referent; II. *(external* agreement (in number, gender/class, definiteness and person)) its regent of category V, N or P/Adv; further, III. *(case)* an NP can bear some case marker determined by its regent of category V, N or P/Adv.

The synchronic role of morphological connections can be explained in our approach as follows: A thought, regarded as a DRS, can be "entrusted" to words because each word recalls a small, underspecified DRS stored in the hearer's internal lexicon; understanding the message entrusted to a sentence amounts to combining these DRSs, i.e. revealing copredicative relations. An elementary way of indicating a copredicative relation between two words is placing them next

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[53] The formal connection (agreement) between *shall* and *I* (cf. X.1=X4.1) in *I shall visit you* (4.1.a-4.6) is also a case of copredication. One might think that this case in only a mere "technical" realization of copredication, which tends to "inflate" the explanatory power of the term; we argue, however, that there is an indirect but important semantic connection between *I* and *shall:* "the speaker coincides with a distinguished participant of an eventuality expected to take place after the utterance time."

[54] The intended meaning of "can" here: the phenomenon occurs in some human language.

to each other, and their order helps to further specify this relation.[55] As is shown, say, by the case of *visit* in (4.16), however, a word may copredicate with several words whilst it is impossible for it to be adjacent to more than two words. But the problem is not only of a quantitative nature. The rigid linear system of adjacency relations shows very little compatibility with the rich and varied system of copredicative relations. It is necessary, thus, to have means with capacity for referring to the copredicative relation between words that could not get in each other's neighborhood in a sentence.

These means are nothing else than the wide range of morphological connections discussed above. Morphological and purely syntactic means thus strive to indicate cases of copredication in collaboration with each other. The same kind of copredicative relation may be indicated by different means in different languages. The attributive relation, for instance, is expressed by the mere adjacency of the copredicating words not only in English but in Hungarian as well, which is otherwise famous for its very rich morphology, whereas in Russian this relation is expressed by agreement in case, gender and number (e.g. *interesn-uju knig-u* "interesting-[acc+fem+sg] book-[acc+sg]). We consider this phenomenon to serve as a strong argument for representing purely syntactic relations exactly in the same way and in the same place as morphological ones.

Nevertheless, the formal (phonological, syntactic and morphological) apparatus is less rich than the system of copredicative relations. The trick language uses to increase this apparatus is indicating copredicative relations with sets, or *conglomerates,* of collaborating formal means. By the expression "conglomerate," we would like to refer to a not necessarily uniform, but typically highly hierarchical, distribution of roles in these sets. Adjacency, for instance, is so natural an expressive means of copredication that it is always present in the conglomerate "to a certain extent." The possessor in Hungarian, for instance, tends to strive to be adjacent to the nominal head but it is prepared to let the adjective, which has no other means to refer to copredication, occupy this position (e.g. *Péter magas barátja* "P. tall friend-poss$_{3sg}$*)*. The importance of the conglomerate-like collaboration, thus, lies in the fact that if two lexical signs provide conflicting requirements, one of them can give up —partially or totally— one of its less significant expressive means; this observation serves as an empirical legitimation of the introduction of recessive and dominant rank parameters.

Thus each human language is characterized by a peculiar assigment of (structured) subsets of the (universal?) formal apparatus to (members of a universal set of?) copredication types. The wide range of agreement types serves as a basis for estimating the limits of copredicative relations. Where a type of copredication is not straightforward in one language, as indicated by only recessive adjacency parameters, studying another language can help, where the relation in question is displayed by explicit morphology.[56]

5.4 Copredication and Qualia Structures

One might think that the semantic content of our copredicative relation is vacuous or naive, in the light of phenomena discussed by Pustejovsky (1995) among others. The versions of (2.5), for instance, show that it is not enough to say that the predicate belonging to the temporal expression copredicates with the verb *run (home)* via the eventuality argument of the latter. The *long(X)∧record(X)* copredicative interpretation of the expression *long record* (Pustejovsky

[55] The words *boy* and *hit,* for instance, may copredicate in (at least) two ways: either the boy hits somebody or he is hit; it is the order of the words (in English) that enables us to choose between these two interpretations.

[56] Declension of German determiners, mentioned in 4.2, serves as an excellent illustration of the point as well as an empirical argument in favor of the Montagovian interpretation of DPs as generalized quantifiers.

1985: 129) also seems to suggest a false (or vacuous) interpretation according to which X is an element of the intersection of the set of long things and the set of records instead of the right one ("X is a record whose playing time is long"). Nevertheless, the notion of copredication need not be understood in this naive way — just in the environment of DRT.

Notice, first of all, that the copredicative interpretation above might be retained by assuming the lexicon contains a sign $long_{3928}$ with the meaning postulate "it has a $long_4$ playing time." This proposal, however, would give rise to the "sense enumeration lexicon," correctly criticized by Pustejovsky. The proposal thus should be developed in the following direction: Regarding the hearer's information state as a (huge life-long) DRS (Alberti 1996b), the hearer may be assumed to think, hearing the expression *long record,* that it has a copredicative interpretation $long_n(X) \wedge record(X)$ with a lexical sign $long_n$ that (s)he (still) does not know; so he will mobilize his lexical, cultural and/or contextual knowledge in order to reach an information state where the piece of knowledge according to which "the purpose of a record is to play it, which takes a definite amount of time" is already present in an activated form. And at this moment there is a referent at the hearer's disposal, the playing time w of records, to which $long_4$, a lexical sign known by the hearer for long, can be applied: $record(X) \wedge playing\text{-}time\text{-}of(w,X) \wedge long_4(w)$. Thus the hearer has managed to trace back the unknown meaning of $long_n$ to the well-known meaning of $long_4$. At the end of computation, he can choose between regarding $long_n$ as an *ad hoc* expression to be thrown away, or saving it in his lexicon as $long_{3928}$ with a meaning postulate based on the above mentioned formula. Hence, we could retain the original formulation of copredicative relation without being forced to have recourse to a potentially infinite ("sense enumeration") lexicon.

We would like to finish up this paper with a conjecture according to which the approach sketched above makes it possible to embed Pustejovsky's Qualia Structure in DRT, together with the embedding of cultural/encyclopedic (see Kálmán 1990) and contextual knowledge.[57]

References

Alberti G. (1990), Quantifiers and the Chronology of Unification. Paper read at the *3rd Symposium on Logic and Language,* Révfülöp, Hungary. Unpublished.

Alberti G. (1995), Role Assignment in Hungarian Possessive Constructions. In I. Kenesei *Approaches to Hungarian* **5,** 13-28.

Alberti G. (1996a), Tökéletes-e a szintaxis és a szemantika? [Are Syntax and Semantics Perfect?] In I. Terts (ed.): *Nyelv, nyelvész, társadalom. Emlékkönyv Szépe György 65. születésnapjára,* **Vol. 2.** Janus Pannonius University, Pécs, PSZM Project Office. 7-17.

Alberti G. (1996b), Generative Argument Structure Grammar: A Strictly Compositional Syntax for DRS-Type Representations. To appear in *Acta Linguistica Hungarica.*

Alberti G. (1997a), *Argument Selection.* Frankfurt am Main, Peter Lang.

Alberti G. (1997b), Egymásra találnak-e a szavak? [Do Words Find Each Other?] In J. Péntek (ed.): *Szöveg és stílus [Text and Style]; Szabó Zoltán köszöntése.* Babeş-Bolyai University, Kolozsvár, Romania. 35-43.

Alberti G. (1997c), Restrictions on the Degree of Referentiality of Arguments in Hungarian Sentences. *Acta Linguistica Hungarica* **44 (3-4).** 341-362.

Alberti G. (1998a), GASG: Minimal Syntax, Maximal Lexicon and PROLOG. Paper read at ALLC/ACH '98, July 9, 1998. In L. Hunyadi (ed.): *ALLC/ACH '98. Conference Abstracts.* KLTE, Debrecen. 81-83.

Alberti G. (1998b), GASG: The Grammar of Total Lexicalism Based on Prolog. To appear in *Studies in Applied Linguistics.* KLTE, Debrecen.

Alberti G. (1999): Total Lexicalism and Life-Long Discourse Representation Structures. Unpublished.

Beghelli, F. (1995), The Phrase Structure of Quantifier Scope. Ph. D. thesis, Univ. of California, Los Angeles.

Beghelli, F., and T. Stowell (1997), Distributivity and Negation: The Syntax of *Each* and *Every.* In Szabolcsi A. (ed.), *Ways of Scope Taking.* SLAP **65.** Kluwer, Dordrecht.

Borsley, R. D. (1996), *Modern Phrase Structure Grammar.* Blackwell, Oxford & Cambridge.

Bródy M. (1995), Towards Perfect Syntax. *Working Papers in the Theory of Grammar,* **Vol. 2.**, No. 4. Theoretical Linguistics Programme, Budapest University (ELTE) and Research Institute for Linguistics, Hungarian Academy of Sciences.

Chomsky, N. (1957), *Syntactic Structures.* The Hague, Mouton

Chomsky, N. (1995, ed.), *The Minimalist Program.* MIT Press, Cambridge, Mass.

Dowty, D. R. (1996), Toward a minimalist theory of syntactic structure. In H. Bunt and A. van Horck (eds.), *Discontinuous Constituency.* Mouton de Gruyter, Berlin & New York.

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[57] We proposed elsewhere (Alberti 1995) a semantic treatment of possessive constructions similar to Pustejovsky's theory (independently of him).

Dowty, D. R., R. E. Wall, S. Peters 1981: *Introduction to Montague Semantics.* Dorderchr, Reidel.
É. Kiss K. (1992), Az egyszerű mondat szerkezete [The Structure of the Simple Sentence]. In Kiefer F. (ed.): *Strukturális magyar nyelvtan, I. Mondattan.* Budapest, Akadémiai. 79-177.
É. Kiss K. (1998) Verbal Prefixes or Postpositions? Postpositional Aspectualizers in Hungarian. C. de Groot and I. Kenesei (eds.), *Approaches to Hungarian* **VI.** Szeged, JATEPress, 123-148.
Geach, P. T. (1962), *Reference and Generality: An Examination of Some Medieval and Modern Theories.* Cornell University Press, Ithaca (third revised edition: 1980).
Groenendijk, J., and M. Stokhof (1989), *Dynamic Predicate Logic. Towards a compositional, non-representational semantics of discourse.* ITLI, Amsterdam.
Groenendijk, J., and M. Stokhof (1990), Dynamic Montague Grammar. In L. Kálmán and L. Pólos (eds.): *Papers from the 2nd Symposium on Logic and Language.* Akadémiai, Budapest. 3-48.
Groenendijk, J., M. Stokhof (1991), Dynamic Predicate Logic. *Linguistics and Philosophy* **14**. 39-100.
Grondelaers, S., and M. Brysbaert (1998), The interaction of storage and computation in the creation of discourse entities. In Utrecht Congress on Storage and Computation in Linguistics, Abstracts of Selected Papers. Universiteit Utrecht. p28.
Heim, I. (1982), *The semantics of definite and indefinite noun phrases.* Diss. U. Mass., Amherst.
Heim, I. (1983), File change semantics and the familiarity theory of definiteness. In Bäuerle, R., Schwarze, Ch. and Stechow, A. von (eds.), *Meaning, use and interpretation of language.* Berlin, De Gruyter.
Hudson, R. (1984), *Word Grammar.* Blackwell, Oxford.
Kálmán L. (1990), Deferred information: the semantics of commitment. In L. Kálmán and L. Pólos (eds.): *Papers from the 2nd Symposium on Logic and Language.* Akadémiai, Budapest. 125-157.
Kálmán L. and Nádasdy Á. (1994), A hangsúly [Stress]. In: Kiefer, F. (ed.) Strukturális magyar nyelvtan. 2. Fonológia [A structural Hungarian grammar. 2. Phonology]. 393-467. Akadémiai, Budapest.
Kálmán L. and Rádai G. (1996), Discontinuous Constituents in Hungarian from a Constructionist Perspective. In C. de Groot and I. Kenesei (eds.), *Approaches to Hungarian* **6**. (ed. .
Kamp, H. (1981), A theory of truth and semantic representation. In Groenendijk, J., Janssen, T., and Stokhof, M. (eds.). *Formal methods in the study of language.* Amsterdam: Mathematical Centre.
Kamp, H., and U. Reyle (1993), *From Discourse to Logic.* Kluwer Academic Publ.
Karttunen, L. (1976), Discourse Referents. In J. D. McCawley (ed.), *Syntax and Semantics* **7.** New York, Academic Press. 363-385.
Karttunen L. (1986), *Radical Lexicalism.* Report No. CSLI 86-68. Stanford.
Landman, F. (1986), *Towards a Theory of Information.* Foris, Dordrecht.
Lehmann, Ch. (1988), On the Function of Agreement. In H. Barlow, Ch. A. Ferguson (eds.), *Agreement in Natural Languages. Approaches, Theories, Descriptions.* CSLI Stanford.
Marantz, A. (1995), The Minimalist Program. In G. Webelhuth (ed.), *Government and Binding Theory and the Minimalist Program.* Blackwell, Oxford & Cambridge. 349-382.
Pustejovsky, J. (1995), *The Generative Lexicon.* MIT Press, Cambridge, Mass. & London.
Partee, B. H., Meulen, G. B. ter, and Wall, R. P. (1990), *Mathematical Methods in Linguistics.* Kluwer Academic Publ.
Shieber, S. M. (1985), Evidence against the context-freeness of natural languages. *Linguistics & Philosophy* **8,** 333-343.
Steedman, M. (1988), Combinators and Grammars. In Oehrle, R. T., E. Bach, D. Wheeler (eds.): *Categorial Grammars and Natural Language Structures.* Reidel, Dordrecht.417-442.
Szabolcsi A. (1997), Strategies for Scope Taking. In Szabolcsi A. (ed.) *Ways of Scope Taking.* SLAP 65. Kluwer, Dordrecht. 109-154.
van Eijck, J., and H. Kamp (1997), Representing discourse in context. In J. van Benthem, A. ter Meulen (eds.): *Handbook of Logic and Language.* Elsevier, Amsterdam, The MIT Press, Cambridge, Mass.
Zeevat, H. (1987a), A Treatment of Belief Sentences in Discourse Representation Theory. In D. de Jongh, J. Groenendijk, M. Stokhof (eds.): *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers.* Foris, Dordrecht. 189-215.
Zeevat, H. (1987b), Combining Categorial Grammar and Unification. In U. Reyle, C. Rohrer (eds.): *Natural Language Parsing and Linguistic Theories.* Dordrecht.
Zeevat, H. (1988), Realism and Definiteness. In G. Chierchia, B. Partee, R. Turner (eds.): *Properties, Types and Meaning.* Vol. II. Kluwer, Dordrecht.
Zeevat, H. (1991a), A Compositional Version of Discourse Representation Theory. In *Linguistics and Philosophy* **12.** 95-131.
Zeevat, H. (1991b), *Aspects of Discourse Semantics and Unification Grammar.* Diss., Univ. of Amsterdam.

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