

Bracketing paradoxes do not exist

with Harry van der Hulst and Frans van der Putten

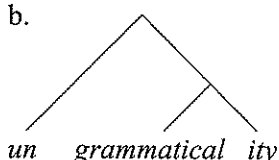
1. Introduction

A morphological issue that has been very popular in the last couple of years is the topic of bracketing paradoxes. Alongside the term 'bracketing paradoxes', one also finds labels such as 'relatedness paradoxes' and 'inheritance phenomena'. Though the phenomena discussed under this rubric do not form a homogeneous set, one thing that can be said with reference to all these cases is that some condition, principle or rule demands a left-branching structure as in (1a) while some other condition, principle or rule demands a rightbranching structure as in (1b).¹

(1) a.



b.



In the case of *ungrammaticality*, structure (1a) is dictated by a category restriction on *un*-prefixation which says that *un*- can only attach to adjectives, while structure (1b) would be the one assigned to *ungrammaticality* by the level ordering hypothesis. The level ordering hypothesis was developed in the '70s (Siegel 1974, Allen 1978) and claims that word formation factors out into several sequentially ordered blocks of processes. Thus, a distinction is made between level I and level II affixes on the basis of differences between affixes with respect to phonological properties, such as stress and the relative proximity or peripherality of the affixes vis-à-vis each other. In terms of the level ordering theory, *-ity* is a level I affix and *un*- a level II affix. Now, the level ordering theory claims that level I affixation occurs first, followed by level II affixation. It is commonly assumed that the level ordering hypothesis in addition requires that compounding takes place after level II affixation; occasionally inflection is included in the ordering as well (with views diverging on the question of whether inflection should be added inside or outside the lexicon). The classic level ordering hypothesis

confines itself to the ordering within one component of the grammar (the lexicon, in particular), but of course the hypothesis can be extended to include the rules of phrase structure, in tandem with the ordering of the various components of the grammar. This extended level ordering theory is illustrated in (2):

- (2) Class I affixation
 Class II affixation
 Compounding

 Inflection

 Phrase structure

Whenever, in what follows, we refer to the level ordering hypothesis, we mean the extended version in (2).

We will start out by discussing the various types of bracketing paradoxes. We will show first of all that we are dealing with a heterogeneous set of cases, and secondly, that the paradoxes do not just manifest themselves at the level of the word but at the phrasal level as well. We subsequently take a closer look at a number of analyses proposed in the extant literature. Finally, we make some proposals of our own. Our starting point will be that the arguments on the basis of which the phenomena at hand are identified as paradoxes are flawed. Though we cannot discuss all cases in detail, and though we do not wish to deny that some cases are indeed problematic, we would like to claim that all phenomena known as bracketing paradoxes can be analyzed in some alternative fashion such that we are not, in fact, dealing with paradoxes at all.

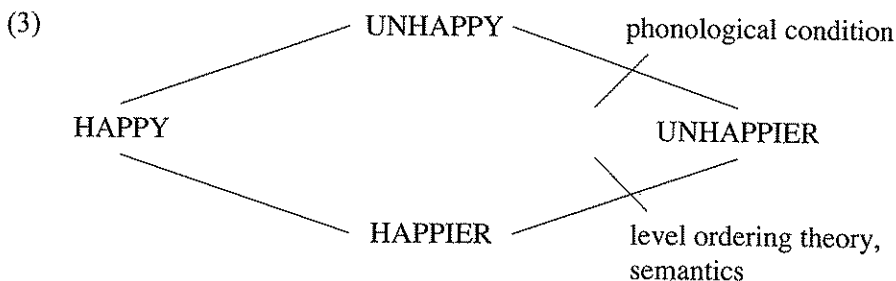
2. Typology

2.1. The lexical level

The typology we are introducing here merely serves the purpose of streamlining the discussion of bracketing paradoxes. It should not be taken to have any deeper theoretical status. We distinguish between three types of bracketing paradoxes:

Type I: *unhappier*

There are, in principle, two routes along which the word *unhappier* can be derived from the root *happy*, as illustrated in (3).



In (3) and in the representations to follow below the upper path systematically leads to a left-branching structure as in (1a) and the lower route to a right-branching one as in (1b). The smaller captions ('phonological condition', 'level ordering theory', etc.) indicate why the step in the derivation in question is excluded. In general, bracketing paradoxes are characterized by the fact that both derivational routes are blocked by some mechanism.

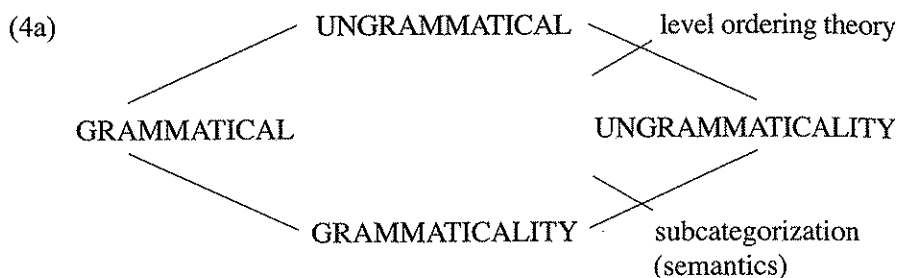
In the case of *unhappier*, the upper route is blocked by a phonological condition that says that the English comparative is expressed in trisyllabic words with the aid of *more* and not with *-er*; so one would expect *more unhappy* instead of *unhappier* on those grounds. The suffix *-er* can attach itself to *happy*, a disyllabic word with a light closing syllable, as in the downstairs derivation. However, the lower route is excluded by the level ordering theory: on the assumption that comparative formation is inflectional, it should be performed after *un-*prefixation. Moreover, the semantic interpretation of *unhappier*, [*more [not happy]*] and not [*not [more happy]*], corresponds to the upper route (Pesetsky 1985). On phonological grounds, therefore, one is led to favour the lower path and exclude the upper one, while level ordering theory and semantics lead one to exclusively select the upper path.

Type II: modifier scope

Modifier scope *de facto* plays a role in the *unhappier* case as well, but the motivation for assuming a bracketing paradox is different here than in the cases we will discuss immediately below.

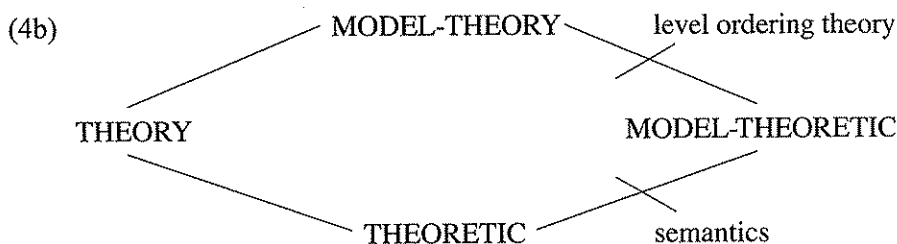
For type II, we can distinguish three different instantiations, in the light of the nature of the motivation for blocking one of the two routes. As a first example, consider the oft-discussed case of *ungrammaticality*. Once again,

there are two derivational routes, taking *grammatical* as the base, as illustrated in (4a).



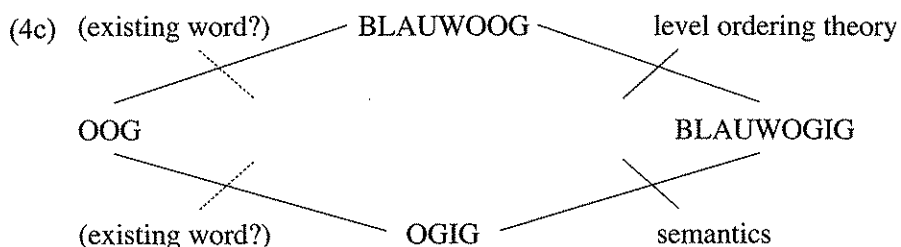
Here, the level ordering theory determines that the lower path is the right one and that the upper one is excluded, on the basis of the fact that *-ity* is a level I-affix and *un-* a level II-affix. In addition, however, there is a subcategorization restriction that says that *un-* can attach to adjectives, as is the case on the upstairs derivation, and not to nouns, as on the lower route. To this one might add that *un-* should have scope over *grammatical* and not over *grammaticality*.

This motivation is the only motivation to exclude the lower route in the second case instantiating type II: *model-theoretic* in (4b). This case is similar to Dutch *dienstplichtig* 'military.service-obligation-y', where *-ig* semantically must take scope over *dienstplicht* '(military) draft', a compound. The upstairs derivation is once again blocked, however, by the level ordering theory, which demands that affixation precede compounding.



In the case of *model-theoretic*, excluding the upper route (or the level ordering theory) is motivated in addition by the allomorphy brought about by affixation. For this allomorphy is identical to the allomorphy we see in the derivation of *theory*. With this allomorphy tied to a locality restriction of the sisterhood type, the allomorphy observed in *model-theoretic* pleads in favour of the upper route.

A third subtype of type II is *blauwogig* 'blue-eye-y, i.e., blue-eyed'. The literature generally refers to such cases as 'synthetic compounds', assigning them a ternary-branching structure, the motivation for which is taken to lie in the observation that neither the construct *ogig* 'eye-y' nor the construct *blauwoog* are existing words. However, in a theory using *possible* rather than *actual* words as a basis for subsequent word formation, this argument is null and void. In principle, therefore, there are once again two derivational routes, because there definitely are A-N compounds in Dutch, such as *sneltrein* 'fast-train, i.e., express train', *zuurkool* 'sour-cabbage, i.e., sauerkraut' and the bahuvrihi-compounds, so that *blauwoog* is certainly a possible morphological construct; and *ogig* is a possible morphological construct as well, given the many examples of the type 'N-ig' (cf. *harig* 'hair-y', *buikig* 'belly-y', etc.).²

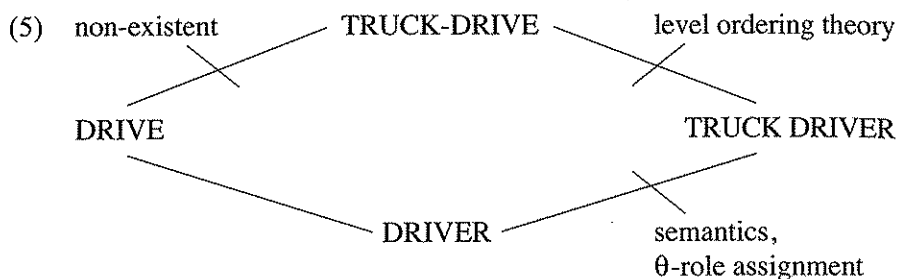


For the second part of the derivational process (the step from *blauwoog/ogig* to *blauwogig*), just as for the *model-theoretic* case, the upper route is blocked by the level ordering theory, while the lower route leads to a structure in which the scope of *blauw* 'blue' is not reflected appropriately. The argument to that effect is that *blauwogig* does not mean 'eyed in a blue sort of way', but 'with blue eyes', which suggests that *-ig* takes scope over the construct *blauwoog*.

Type III: argument inheritance (verbal compounds)³

An example of type III is *truck driver*. For the upper route in (5), the first step is ruled out right away. In Dutch, verbal compounds like *stofzuig* 'dust-suck, i.e., vacuum-clean' are exceptional to begin with. In English, forms such as *truck-drive* do not seem to be able to occur at all. Even if they *were* possible, however, the second step on the upper route would still be impossible since the level ordering theory excludes suffixation of *-er* subsequent to compounding. The semantics blocks the lower route. In the verbal structure *drive a truck*, a *truck* receives its theta role from the verb

drive. It seems plausible to have the same happen in the case of *truck-driver*. This then requires a derivation along the lower path.

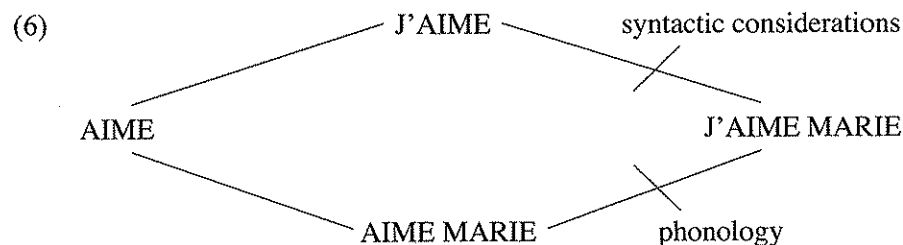


A solution which is often proposed in these kinds of cases is to resort to a so-called inheritance mechanism. This is tantamount to adopting a derivation along the lower path and allowing *truck* to receive its theta role by having the properties of the verb *drive* percolate up to the noun *driver*.

2.2. The phrasal level

The three types of bracketing paradoxes discussed in the foregoing manifest themselves not just at the lexical level but at the phrasal level as well. The problem is not strictly morphological, therefore.

I. An example of a phrasal counterpart to *unhappier* is the French sentence *j'aime Marie*, discussed in Sadock (1985):

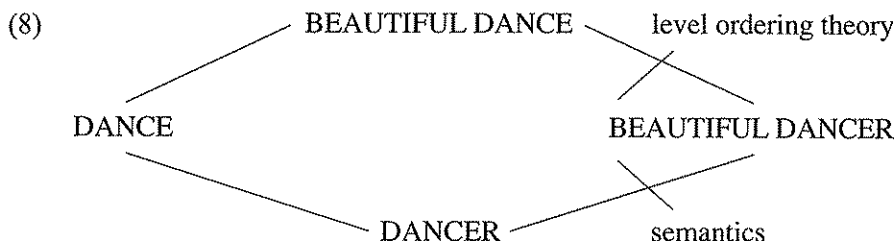


Syntactic considerations would exclude a structure in which *j'aime* is a constituent. Phonologically, however, such a structure seems precisely the most obvious one.⁴

II. Modifier scope. As in the case of bracketing paradoxes at the lexical level involving the scope of a modifier, several types of problems involving modifier scope can be differentiated at the phrasal level:

- (7) a. *beautiful dancer, snelle beslisser* 'quick decider'
 b. Greenlandic Eskimo: *Hansi ataatsinik qamuteqarpoq*
 Hansi-Ø ataaseq-nik qamut-qar-poq
 Hans-ABS a-INST/PL sled-haveIND/3SG
 c. *ernstig gewonde* 'seriously injured (person)',
 verplicht verzekerde 'obligatorily insured (person)'
 d. *transformational grammarian, zwartebander* 'black belt-er'
 e. *nuclear stress rule, rode-bessentaart* 'red berry-cake'

In the first case, affixation of *-er* has to happen first, given the level ordering theory. Just as in the case of *blauwogig* 'blue-eye-y, i.e., blue-eyed', the semantics favours the upper path, however: *beautiful* modifies *dance* and not *dancer*, on the most salient reading of *beautiful dancer*.



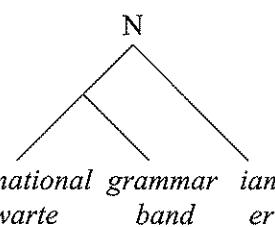
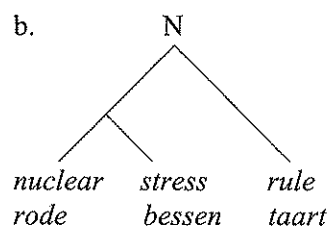
We will be brief about the other cases in (7). In (7b) we are dealing with a phenomenon known as *incorporation*. This phenomenon manifests itself in a variety of languages, including Greenlandic Eskimo. Here we find verbs having affixal status, such as *-qar* in (7b). They must combine with a stem to form a word. The modifier 'a' applies semantically to 'sled' and not to 'have sled', however. Without discussing this in any further detail in this article, we will assume an analysis for such cases that in principle corresponds to the analysis of *beautiful dancer* discussed below.

For cases like *ernstig gewonde* 'seriously injured (person)', *verplicht verzekerde* 'obligatorily insured (person)', the modifiers *ernstig* and *verplicht* should specify the adjectives *gewond* and *verzekerde*, not the words *gewonde* and *verzekerde* – with these words looked upon as nouns, derived

via *-e* suffixation from the adjectives *gewond* 'injured' and *verzekerd* 'insured', respectively. We assume, however, that no syntactic approach should be adopted: we are dealing with an NP, just as in *een ernstig gewond persoon* 'a seriously injured person'; the head noun is an empty category in the examples in (7c):

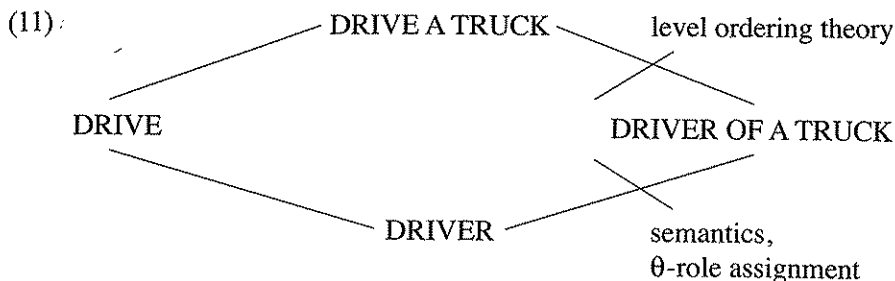
- (9) [_{NP} *een* [AP *ernstig gewonde*] [_N *ec*]]

Finally, there are cases in which we apparently are dealing with a phrasal input for affixation or compounding. Examples of these types are *transformational grammarian* (or Dutch *zwartebander* 'black belt-er') featuring affixation, and *nuclear stress rule* (Dutch *rode-bessentaart* 'red berry-cake') involving compounding. These forms differ clearly from cases such as (7a). In an example such as *snelle beslisser* 'quick decider', the inflection of the adjective is determined by the head of the derived form. Such is not the case in forms such as *rode-bessentaart*, as is evident from the fact that its diminutive is *rode-bessentaartje* 'red berry-cake-DIM' (and not **rood-bessentaartje*), which has neuter gender unlike its common-gender non-diminutive and would be expected not to feature the inflectional schwa on the adjective *rode* if inflection were determined by *taart* 'cake'. We therefore assume a structure as in (10), in which the adjective forms a constituent with the noun that it modifies.⁵

- (10) a. 
b. 

In what follows, we will only address subtype (7a) (*beautiful dancer*, *snelle beslisser*).

III. Argument inheritance. The phrasal counterpart to *truck driver* is *driver of a truck*:



The level ordering theory rules out a scenario here where *-er* is connected to the phrase *drive a truck*. On the other hand, one would like to be able to say that a *truck* receives its theta role from the verb *drive* and not from the noun *driver*.

In this section, we have inventoried a large variety of different types of bracketing paradoxes, without claiming exhaustivity. This survey highlights two things. It is wrong, first of all, to view bracketing paradoxes strictly as problems in the morphological domain, because each type of morphological bracketing paradox has a counterpart at the phrasal level. And secondly, we have seen that there are rather diverging motives for taking a particular construct to be a bracketing paradox. In the next section, we address a number of proposals from the extant literature to handle bracketing paradoxes.

3. Other proposals

Taking the level ordering theory in (2) seriously leads one to predict that the constructs discussed above are ungrammatical. The literature features several proposals aimed at solving such bracketing paradoxes. Some seek to solve all paradoxes, others confine themselves to a subpart of the types discussed above. Here we present an overview of the most prominent proposals.

- (12) a. level ordering theory as the starting point:
- Pesetsky (1985)
 - Williams (1981b)
 - inheritance theories, e.g. Randall (1984)
- b. rejection of (parts of) the level ordering theory:
- Botha (1981)
 - Strauss (1982)

c. two autonomous structures:

- Sproat (1985)
- Sadock (1985)

In this section, we will briefly discuss the theories listed under (12a) and (12b). Sproat's and Sadock's proposals (12c) are addressed in section 4.⁶

a) First of all, there are approaches that take the structure forced by the level ordering theory as their starting point, and relate the alternative structure to that. Pesetsky (1985) adopts a familiar stand from the point of view of generative grammar's approach to these kinds of cases. We actually find bracketing paradoxes throughout the grammar, especially in all those constructions in which movement transformations apply. The standard assumption with respect to such constructions is that the paradox can be solved by postulating two or more levels of representation, with some demands (e.g. local subcategorization) satisfied at one level and others (e.g. quantifier scope) at another. A (e.g. transformational) mapping mediates between the various levels. Pesetsky proposes using this strategy in the case of morphological bracketing paradoxes as well. The mapping operation he invokes is a variant of the quantifier raising operation called 'affix raising'. This approach allows him to start out, for a case such as *blauwogig* 'blue-eye-y, i.e., blue-eyed', from a rightbranching structure, in agreement with the level ordering theory. The S-structure thus generated is subsequently converted into a leftbranching LF-structure.

Though this approach is correct in principle, the question arises as to what restrictions this strategy is supposed to be subject to. Without further restrictions on affix raising, it should be possible to relate morpheme salads to interpretable LFs. It should be possible, for instance, to form something like *resistanceing* with the interpretation 'the action of being resisting'. To avoid this, Pesetsky proposes a constraint banning string-vacuous affix raising. This manoeuvre, however, is too restrictive since it makes the application of affix raising dependent on accidental word order facts – thus, it makes affix raising possible in *beautiful dancer* but not in French *danseur très élégant*, and it enables affix raising in *truck driver* but not in *driver of a truck*.

Another approach along the lines of (12a) is Williams (1981b). He gives a definition of relatedness which manages to relate, in a non-structural fashion, words having a structure dictated by the level ordering theory to other words. Thus, *blue-eyed* can be defined as related to *blue eye* by stripping away the head *-ed*. An objection to this proposal, noted by Williams

(1981b: 263) himself, is that it does not seem to work in cases such as *re-aircondition*, which can be related to *aircondition* neither via stripping of the head nor via stripping of the non-head. Botha (1983) rightly points out that Williams's use of the notion 'marked leak' is effectively tantamount to the admission that the theory does not work.

Then there are a number of theories that make use of an inheritance mechanism. Examples of such theories are Selkirk (1981) and Randall (1984). For a case like *truck driver*, Randall starts out from the structure dictated by the level ordering theory. This countenances the intuitive idea that *truck* is the theme of the verb *drive* by proposing a mechanism that allows the subcategorization properties of the verb *drive* to percolate up to *driver*. Such inheritance theories are of course only intended to address cases of type III. Thus, they would only help us out in a subset of cases. An additional drawback of such theories is that they lead both to overgeneralization and to undergeneralization, as is argued in Hoekstra and Van der Putten (1988).

b) A second type of approach is to reject one or more ingredients of the level ordering hypothesis. Botha's (1981) approach is a very drastic example. In his theory, a phrase such as *blauw oog* 'blue eye' may serve without any trouble as the input to the rule of *-ig* suffixation. Unfortunately, we now rule in all sorts of unwanted derivations as well. We will not address Botha's theory in any detail here. There are innumerable problems with this approach, as outlined, for instance, in Hoeksema (1984).⁷

Strauss (1982) rejects the level ordering theory insofar as the ordering of class I, class II and compounding is concerned. He observes that there exist violations of level ordering theory in which a prefix and a suffix are attached in the wrong order (e.g. *ungrammaticality*) but there are no such violations resulting from an illegitimate combination of two prefixes or two suffixes. He therefore argues that level ordering theory should be dropped and replaced with restrictions concerning string-adjacent morphemes. Kiparsky (1982) points out that the situation is more complex than Strauss has suggested: thus, Strauss wrongly predicts that things like **insuccessful*, featuring prefixation and suffixation in the wrong order, should be grammatical. It should be noted, in any event, that abandoning level ordering internal to the lexicon does not solve the full gamut of paradoxes, unless one is willing to abandon the ordering of the phrasal level and the lexicon, which is intrinsically guaranteed by the grammar as a whole, as well.

For all proposals from the literature discussed in the foregoing, we may therefore conclude that they are incomplete or inadequate, or both.

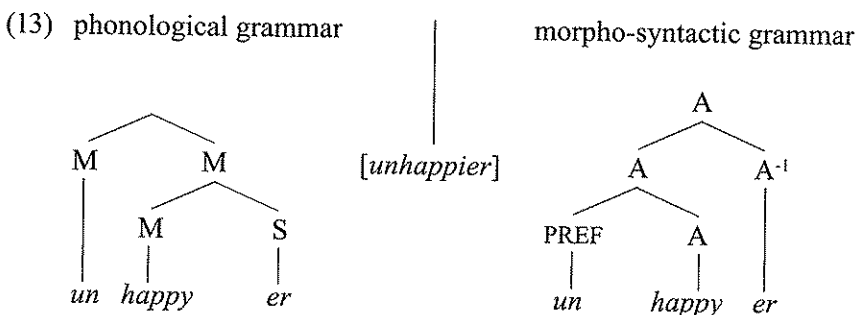
4. Our proposal

4.1. Type I (*unhappier*, *j'aime Marie*)

In section 2 we showed that bracketing paradoxes have the following things in common. They are forms for which one could in principle choose two derivational routes, and there are both arguments in favour the first route and ruling out the second, and ones in favour of the second and against the first. There are important differences as well, however. Looking at the reasons why the two routes are blocked, one finds that in cases of type I (*unhappier*, *j'aime Marie*) the level ordering theory and the semantics block one path and some phonological rule the other, while in cases of types II and III the first path is blocked by the level ordering theory and the second because of semantic scope or subcategorization properties.

It would be wrong to talk about a bracketing paradox in the case of type I. Recent research has shown that a grammar effectively consists of two grammars, a (morpho)syntactic grammar and a phonological grammar, which, though related, are autonomous. Whenever the phonological hierarchy fails to parallel the morpho-syntactic one, we are dealing with a lack of parallelism between two autonomous structures. It would be wrong to call this a paradox. We would be dealing with a paradox if within one particular grammar, e.g. the morpho-syntactic one, two conflicting structures would be assigned.

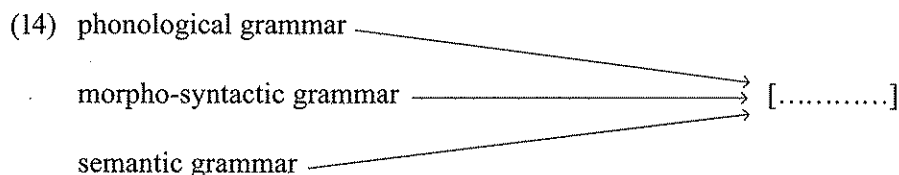
The situation in the case of *unhappier* can be represented as in (13).



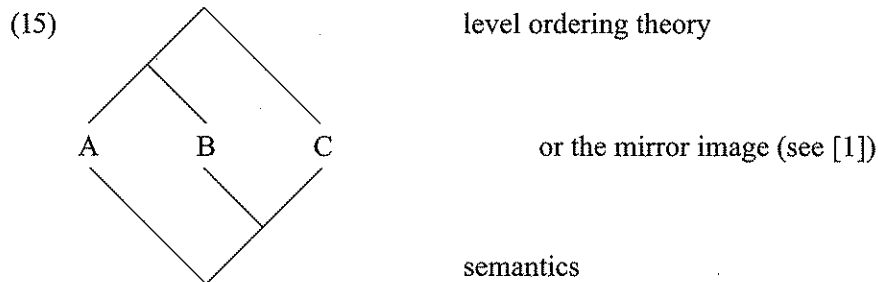
In the phonological grammar, a right-branching structure is used, in agreement with the phonological properties of *un-*, a phonologically independent element, and *-er*, a phonologically dependent element ('M' and 'S' stand for the phonological categories 'phonological word' and 'syllable'). In the morpho-syntactic grammar, by contrast, a left-branching structure is employed,

in line with the semantics of the construct. It is an interesting question as to how the phonological structure is related to the morpho-syntactic one. In generative grammar, Sproat and also Sadock have made proposals in this domain, as far as bracketing paradoxes are concerned. Sproat bases himself on a syntax-generated structure that is related via a mapping relationship to a set of alternative bracketings of the same string. From this set, the bracketing that meets the phonological constraints is selected. Sadock presents an analysis using conventions from autosegmental phonology to indicate the mapping between morpho-syntactic and phonological structure.

The other types of bracketing paradoxes we distinguished in the above arise as a result of a collision between the structure dictated by level ordering theory and a structure that is considered semantically adequate. A possible approach to these would be to assume, alongside autonomous prosodic and morphosyntactic structures, an autonomous semantic structure dictated by a semantic grammar. This would result in something like (14).



But we will not take this tack. We will continue to assume the standard generative perspective that structure aspects of meaning are handled by the same system that also takes care of other structural properties, such as word order. Following this line of thought, we are presented with a conflict of the type in (15):



If we do not wish to exploit mechanisms such as Pesetsky's 'affix raising', we will be forced to assume that one of the two structures is not well-motivated. Two options then remain: we may either argue that level ordering

theory is false or we may show that the arguments for the semantic structure are inadequate. In what follows we will follow both routes: some cases will be analyzed as forms to which the wrong structure has been assigned as a consequence of incorrect assumptions within level ordering theory, and for which the semantically motivated structure is the correct one. For other cases, we will show that the arguments that have led to a semantic structure deviating from the one guaranteed by level ordering theory are untenable.

- (16) – level ordering theory: *ungrammaticality* (type II)
model-theoretic, dienstplichtig
'service-obligation-y' (type II)
- semantics: *blauwogig* 'blue-eye-y', *roodgevelekt*
'red-spotted' (type II)
beautiful dancer (type II)
truck driver (type III)
driver of a truck (type III)

4.2. Level ordering theory

In the foregoing, we discussed Strauss's proposal to replace level ordering theory with restrictions on combinations of adjacent morphemes. This would be a potentially fruitful move for those cases in which the relevant restrictions apply only to the combination of prefixes or the combination of suffixes. Then affixation would be able to occur subsequent to compounding, and the paradox in the case of *model-theoretic* (also Dutch *dienstplichtig* 'service-obligation-y, i.e. subject to (military) draft') would then evaporate. This proposal turned out to be overly simplistic since it would wrongly rule in things such as **insuccessful*. As an alternative to level ordering theory, Booij (1982) i.a. has proposed to explain the restrictions in terms of stratal features. Given a distinction between [+native] and [–native] morphemes, ill-formed combinations can be ruled out by saying that [–native] morphemes must not be peripheral to [+native] morphemes. The question that then arises is whether the feature harmony applies to string-adjacent morphemes or to morphemes adjacent in terms of hierarchical structure. The string-adjacency option fails to rule out **insuccessful*, while the standard hierarchical approach would rule out *ungrammaticality*. Hoekstra, Van der Hulst and Moortgat (1980) propose that, if stratal features are properties of 'heads', the well-formedness of *ungrammaticality* will follow from the

assumption that in *ungrammatical* it is not the prefix *un-* that is the head but the stem *grammatical*.⁸ A stratal explanation of restrictions on morpheme combinations thus presents itself as an alternative to level ordering theory. And with such an explanation in place, cases such as *model-theoretic* and *ungrammaticality* are crossed off the list of bracketing paradoxes.

It should be clear that this approach does not get rid of all bracketing paradoxes, not even the word-level types. The *blauwogig* 'blue-eye-y, i.e., blue-eyed' type remains outstanding. Even if we were to allow *-ig* to attach to the compound *blauwoog*, there continue to be other reasons for blocking this derivation. That we are dealing here with suffixation to the second morpheme *oog* has been argued by various people (cf. Van Santen 1986, Meys 1981, Hoeksema 1983 and Moortgat 1986), among other things on the basis of parallel cases such as *zwartgerokt* 'black-GE-skirt-ed', for which the presence of the prefixal part of the participial circumfix *ge-* in between *zwart* 'black' and *rok* 'skirt' leaves no doubt that affixation takes place on the basis of *rok* and not on the basis of *zwartrok*.

4.3. Semantic arguments

The arguments leading to a particular semantic structure are often inadequate, as we will show.

Type II

a) The assignment of a particular semantic structure is often based on naïve paraphrases. Thus, in the case of (3c) it is often pointed out that the semantic structure of *blauwogig* is *blauwoog+ig* and not *blauw+ogig* because the paraphrase 'with blue eyes' makes sense while the paraphrase 'eyed in a blue sort of way' does not. What is presupposed in this line of thought is that compounds of the type A+A should be paraphrasable as 'Y in an X sort of way'. That this is incorrect, however, is clear from such compounds as *witheet* 'white-hot, i.e., extremely hot/angry'. The paraphrase 'hot in a white way' is just as ridiculous here as the paraphrase 'eyed in a blue way' for *blauwogig*. Such paraphrases are unsuitable, therefore, as a motivation for a particular semantic structure. A perhaps even clearer example is *rood-gevlekt* 'red-GEspotted', for which the paraphrase 'with red spots' seems right and the paraphrase 'spotted in a red way' does not. Alongside *rood-gevlekt*, however, we find the synonym *roodbont* 'red-motley', for which

f. <i>een strenge leraar</i> a stern teacher	<i>een strenge vader/leermeester</i> a stern father/master
g. <i>een trouwe bezoeker</i> a faithful visitor	<i>een trouw fan/lid</i> a faithful fan/member
h. <i>een zware drinker</i> a heavy drinker	<i>een zware alcoholic</i> a heavy alcoholic
	<i>een zwaar geval van alcoholisme</i> a heavy case of alcoholism
i. <i>een handige prater</i> a clever talker	<i>een handig advocaat</i> a clever lawyer
j. <i>een verdienstelijk spreker</i> a meritorious speaker	<i>een verdienstelijke rede</i> a meritorious speech

In all these cases there is a so-called adverbial interpretation available, sometimes alongside an extensional interpretation. The availability of such an adverbial interpretation is not so much dependent on the presence, inside the noun, of a verbal part that refers to an action but instead on the question of whether the referent of the noun can be intrinsically associated with an action or property that is modifiable by the adjective. Things are even more complicated in cases such as *een luie stoel* 'a lazy chair', *een verdienstelijke zege* 'a meritorious victory' and *een wild plan* 'a wild plan', where the adjectives, semantically speaking, modify neither the referent of the noun nor an action associated with it, but rather something like the subject of that action. To resort to a special mechanism for the cases in the left-hand column in (19) would, when viewed from this perspective, imply the loss of a generalization.

Type III

For cases of the type *truck driver*, *driver of a truck*, featuring argument inheritance, the same argument applies. The fact that in a parallel verbal structure (*a*) *truck* receives its theta role from *drive* cannot be taken to be an argument for assuming a semantic structure like *truck drive* + *er* or *drive a truck* + *er* for the nominal cases — theme-like arguments are also found in combination with non-deverbal nouns:

- (20) a. Dutch *tasjesrover* *tasjesdief*
 bag-robber (i.e., pickpocket) bag-thief
 voetballiefhebber *voetbalfan*
 soccer-lover soccer-fan
- b. English *oil trade* *oil business*
 toolholder *toolbox*
- (21) a. Dutch *de schrijver van het boek* *de auteur van het boek*
 the writer of the book the author of the book
 de verzorger van het kind *de vader van het kind*
 the caretaker of the child the father of the child
- b. English *a causer of trouble* *a source of trouble*
 the leader of the company *the boss of the company*

Conversely, in cases like *truck driver*, *driver of a truck* we find, in the position of (a) *truck*, not only theme arguments but also all sorts of other arguments and elements that cannot be arguments at all:

- (22) a. Dutch *tasjesrover* *struik-, zee-, bankrover*
 bag-robber (i.e. pickpocket) bush-, sea-, bank-robber
 romanschrijver *viltschrijver,*
 novel-writer felt-writer,
 machineschrijver,
 machine-writer
 veelschrijver,
 much-writer,
 puikschrijver
 fine-writer
 bierdrinker *probleemdrinker*
 beer-drinker problem-drinker
- b. English *novel writer* *ghost writer, typewriter*
 bull fighter *bush fighter,*
 resistance fighter
 scene painter *word painter*

- (23) a. Dutch *de dichter van het sonnet* *de dichter van het*
 the rhyme-er (poet) of *Leidseplein*
 the sonnet the poet of Leiden Square
 de dichters van
 tegenwoordig
 the poets of today
 de dichters van het
 genoot schap
 the poets of the society
- b. English *the strangler of Mary* *the strangler of Cornwall*

For a more detailed discussion of these formations we refer to Hoekstra and Van der Putten (1988).

So we see that both for forms of type II (with the exception of *ungrammaticality* and *model-theoretic*) and for those of type III, the non-isomorphic semantic structure that is often assumed is based on naïve paraphrases and superficial observations with respect to thematic structure. The arguments for a semantic structure that deviates from the morpho-syntactic structure turn out to be flawed. As soon as a semantic structure is assumed that matches the morpho-syntactic structure, we are no longer confronted with a paradox.

5. Conclusion

We have argued that so-called bracketing paradoxes come in three types. For all three types, we find both cases in which the paradox manifests itself at the lexical level and ones in which there is a conflict at the phrasal level.

We have shown that in none of these cases we are genuinely dealing with a paradox. Cases of the first type (*unhappier, j'aime Marie*) should be kept separate from the other cases. The conflict we find here is one between a PF representation fed by prosodic information and a morpho-syntactic (and semantic) structure determined by level ordering, subcategorization, etc. We are not denying that these two structures may be non-isomorphic. The fact that they differ from each other is perfectly natural, however. So there is no conflict or paradox here.

Bracketing paradoxes of the second and third types are parallel to the extent that in both cases the conflict is caused by morpho-syntactic factors, in particular the level ordering theory on the one hand, and factors of a

more semantic nature, such as scope, on the other. To argue that these are not genuine cases of paradoxes either, we needed to show that either the assumptions regarding level ordering or the observations concerning the semantic structure of the constructs in question are inadequate.

Cases such as *model-theoretic*, *dienstplichtig* 'service-obligation-y' and *ungrammaticality* can be accommodated by rejecting the restrictions imposed by level ordering theory, and to replace them, if necessary, by other restrictions (in the case of *ungrammaticality*, for instance, by stratal constraints on morpheme combinations).

In other cases, the argumentation with respect to the semantics of the constructions is unconvincing. One often finds that a particular semantic structure is assumed on the basis of incorrect paraphrases or without taking the full range of relevant cases into consideration. We do not have the illusion of having solved all relevant cases. On the contrary, the foregoing discussion shows that there are plenty of interesting problems crying out for solutions. What we do hope to have made clear, however, is that the category of bracketing paradoxes falls apart into a number of heterogeneous categories for which separate approaches are required.

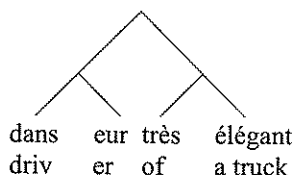
Editors' note

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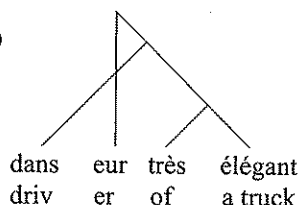
Notes

1. Of course it is equally possible for the mirror-image situation to present itself, with the level ordering theory prescribing a left-branching structure and sub-categorization a right-branching one. It is also possible that one of the two structures is not easily expressible in terms of a tree diagram. Such may be the case for *un danseur très élégant* 'a very elegant dancer' and *driver of a truck*, where the level ordering theory demands a left-branching structure (i) but where the semantics would lead one to connect *très élégant* 'very elegant' and *a truck* to the verbal forms *danse* 'dance' and *drive*, which would lead to a structure such as (ii).

(i)



(ii)



2. As an argument for the idea that word formation takes place on the basis of existing words one often finds the fact that idiosyncratic properties of an existing word are inherited under subsequent word formation. Thus, *handig* 'hand-y' does not mean 'with (many/big) hands' but 'agile/skilful (when it comes to the hands)'. This lexicalisation is inherited in *handigheid* 'hand-y-ness, i.e., agility, skilfulness'. The opposite is also found, however: the idiosyncratic interpretation linked to *harig* 'with lots of hair' we do not find in *langharig* 'long-hair-y, i.e., long-haired'. See also Aronoff (1976) and Meys (1981) for discussion.
3. The term '(argument) inheritance' is ambiguous. On a narrow interpretation, the term identifies a mechanism that registers that in a deverbal derived form such as *truck driver* the element *truck* bears the same relationship to *drive* as in the parallel verbal structure *drive a truck*. This mechanism is discussed in section 2.2. In the remainder of this article we use the term '(argument) inheritance' in another, broader sense, however. On this interpretation, '(argument) inheritance' is nothing more than a label for a particular group of deverbal derived forms – those that include a nominal element that corresponds to an identical element in a parallel verbal construction. So whenever we are talking about derivations with 'argument inheritance', we are referring to derivations for which an account in terms of an inheritance mechanism would in principle be possible, without implying, however, that we would actually like to choose such an account. On the contrary, we oppose such an analysis, and the arguments we will enumerate against a separate semantic structure for cases such as *truck driver* plead just as forcefully against an analysis in terms of an inheritance mechanism.
4. Sadock's is not the most felicitous example. First of all, on an IP-analysis of this sentence (with S fleshed out as a projection of INFL (I) whose specifier is

the subject NP) there is no major constituent boundary present between the finite verb and the subject. Secondly, it is not at all obvious for French subject-clitics that their cliticization is syntactically irrelevant (cf. Kayne 1984: ch. 10). Nonetheless, the general point that phonological phrasing does not parallel syntactic constituent structure is correct in and of itself. A simple example to show this is the phonological phrasing of an NP with a postnominal modifier. Phonologically, the postmodifier is realized as a sister to the head plus determiner, while syntactically the determiner is a sister to the combination of the head and the modifier.

5. These cases call for an analysis basing itself on a phrasal input. This implies that they threaten the level ordering theory in (2). We will not discuss this further here because our main objective is not to reject the level ordering theory. See also note 7.
6. A third theory exploiting two autonomous structures is Moortgat's (1986). His proposal will not be discussed in detail here, since he uses a theoretical framework differing from ours. Viewed from our perspective, his proposal is comparable to that of Sproat. His theory can generate the power-set of possible syntactic structures, but these all receive the same interpretation at LF. From the total set of syntactic structures, the theory selects the structure that corresponds to the demands of the phonological component.
7. The criticism of Botha's theory presented in Hoeksema (1984) i.a. assumes, like Botha himself, a much richer theory of phrase structure rules than is currently in vogue. Both Botha's line of argument and the objections to it should be re-evaluated in the light of recent developments in X-bar theory. This is particularly the case in the light of claims like those made in Fabb (1984) and Sproat (1985) to the effect that the standard dividing line between the lexicon and syntax (co-inciding with the traditional dichotomy between word formation and sentence formation) is in need of revision. Examples such as *rode-bessen-taart* 'red berry-cake' and *zwartebander* 'black belt-er', mentioned earlier, seem to require an interaction between phrases and affixation that is impossible on standard assumptions about the place and function of the lexicon. It would take us too far afield, however, to dwell on this further.
8. One wonders how idiosyncratic allomorphy should be dealt with. A variety of alternatives spring to mind – e.g., that allomorphy is subject only to a string-adjacency requirement, or that allomorphy is based on phonological structure, or that allomorphy applies to heads. We will not address the question of which of these approaches is to be preferred.