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Scandinavian Conference
of Linguistics**

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Preface

The present volume is a collection of papers that were read of the Twelfth Scandinavian Conference of Linguistics, Reykjavík, June 14-16, 1990. A few papers were presented at the conference but not received for publication.

The conference was organized by the Linguistic Institute of the University of Iceland. In addition to the editor of this volume, Eiríkur Rögnvaldsson, Jörundur Hilmarsson, Kristján Arnason, Margrét Jónsdóttir, Sigurður Konráðsson and Þorsteinn G. Indriðason were members of the organizing committee. Þorsteinn G. Indriðason was also the executive manager of the conference, assisted by Elís Másson, Jón Gíslason, Margrét Guðmundsdóttir, María Garðarsdóttir, Sigríður Þorvaldsdóttir and Svandís Svarasdóttir. On behalf of the Linguistic Institute I thank all these people for their unselfish contribution.

Halldór Arnann Sigurðsson

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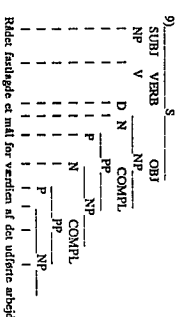
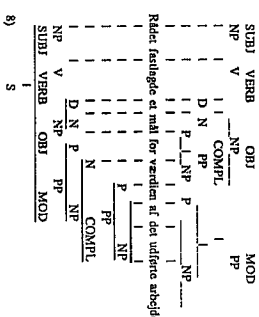
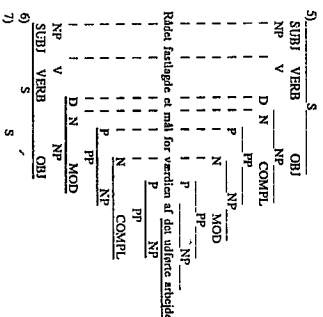
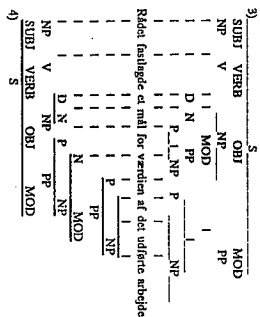
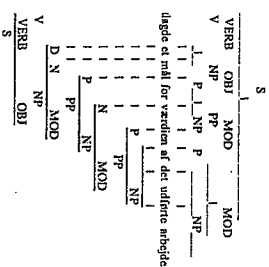
Ambiguity

paper I will suggest that four types of ambiguity are much more common than normally assumed: instances of syntactic ambiguity, lexical ambiguity, information structure ambiguity and speech act ambiguity are found in almost every utterance. I will show how examples are disambiguated, and what the frequent occurrence of ambiguity means for linguistic theory.

Lexical ambiguity

Lexical ambiguity is normally assumed to be ubiquitous. Firstly it is possible to find examples of four different types of ambiguity (i.e. ambiguity caused by different linguistic rules), viz. syntactic ambiguity, lexical ambiguity, information structure ambiguity and speech act ambiguity. Secondly every utterance found to contain thousands of ambiguities, created primarily by the rules of syntax and lexicon.

A typical example of syntactic ambiguity is ambiguity with respect to prepositional phrase attachment. It is best described by an example *Rådet fastlagde et mål for verdien af det udførte arbejde* (The council fixed a measure for the value of the done) is ninefold syntactically ambiguous:



The correct analysis is 9): the prepositional phrase: for verdien af det udførte arbejde

complement in relation to the verbal noun *mål*, and the prepositional phrase: *af udførte arbejdet* is a complement of the verbal noun *værden*. They are arguments related to the hidden predicate in the verbal nouns, and their argumenthood is marked by the preposition: argument 2 of *mål* is marked by the preposition *for*, and argument 1 of *værdi* is marked by the preposition *af*. The ambiguities arise from the central syntactic rules which can be described as follows:

S -> ARG1 PRED ARG2 (MOD)
 ARG2 -> NP
 ARG2 -> P NP
 NP -> Det ADJ N (COMPL) (MOD)
 MOD -> P NP
 COMPL -> P NP

ambiguities are created because a clause-final PP has four possible sources: it can be generated as a mediate ARG2 of the predicate (e.g. *result in something*), as a modifier of the predicate (*in four minutes*), as a complement of a preceding noun (*the report of mind*) or as a modifier of a preceding noun (*the man on the street*) and because complements of nouns are not obligatory it is from a purely syntactic point of view both possible that the prepositional phrases are complements of the 1 and modifiers (adjuncts) of the noun - with the same preposition, as in 5), 6) and 2).

and the real attachment problem is that it is not possible from a syntactic point of view to decide whether a prepositional phrase is attached as a modifier to the central verbal noun or to the verb of the clause. And if there are more prepositional phrases in the clause than one, many possibilities of combination will arise: 1), 3), 7) and 8).

perhaps it is not obvious that there are any differences in meaning between any of the nine possible analyses of the sentence, but it depends on the abstractness of meaning of the sentence; the complement-modifier difference is crucial in an example like: *He longed for three months for her*: did he long for three months, or her? The difference in attachment pattern is important in an example like: *The woman attacked the black man with the knife*: who had the knife?

lexical ambiguity
 lexical ambiguity is a well-known type of ambiguity; it is created by the fact that a lexical word can have multiple meanings. The Danish word *høj* has at least 5 different meanings:

- C/ 1) en høj bygning - a high building
 2) en høj mand - a tall man
 3) en høj lyd - a loud sound
 4) et højt mål - a noble aim
 5) en høj tone - a high tone

It is obvious that the Danish word *høj* has different meanings when it is translated differently into English, but my claim is that reading 5) and 1) have different meanings too. I can test the ambiguity monolingually by the so-called Zeugma-test. It goes like this:

D/ If the coordination of two contexts of a single word always results in a Zeugma, i.e. absurdity, the word is monolingually ambiguous.

I try to coordinate the two contexts of *høj* and *high* in 1) and 5):

E/ *?*Hvad er højest, tårnet eller det høje C?
 *?*What is the highest, the tower or the high C?

That suggests that reading E/ 1) and 5) have different meanings in both Danish and English.

If we in this test the 8 words of the syntactically ambiguous sentence, we will see that all the words except one are ambiguous:

F/ Rådet (4 meanings) fastlagde (1 meaning) et mål (4 meanings) for (8 meanings) værden (2 meanings) af (8 meanings) det udførte (3 meanings) arbejdet (2 meanings).

That means that this little sentence is $9 \times 4 \times 4 \times 8 \times 2 \times 8 \times 3 \times 2 = 110.592$ times ambiguous if you take into account both syntactic and lexical ambiguities.

That means that the rules of syntax and the lexicon are not adequate (at least not sufficient) as a description of the speaker-hearer's intrinsic competence. According to Chomsky (1965:4) the aim of a grammatical description is the following:

G/ A fully adequate grammar must assign to each of an infinite range of sentences a structural description indicating how this sentence is understood by the ideal speaker-hearer

But it is certainly not adequate that the grammatical description, as sketched in B/, generate for one tiny sentence 110.592 indications of how it should be understood. It is simply not an adequate grammar.

And the reason for this inadequacy is not that the grammar sketched in B/ is not the best grammatical description known; it is the best syntactic description that it is possible to make. The problem is the presuppositions made about the delimitation of grammars. Grammar, in this conception, only deals with the formal rules of manipulation of linguistic entities, and that is simply not enough for indication of how a sentence is understood.

Normally the compositionality principle is taken for granted, too. It says (ParTEE 1984):

H/ The compositionality principle, in its most general form, can be expressed as follows:

The meaning of an expression is a function of the meanings of its parts and of the way they are syntactically combined.

The overwhelming number of ambiguities shows that the compositionality principle cannot be the whole story. There must be more to the meaning of an uttered sentence than the meaning of its parts and the meaning of their combination.

That also means that it is not likely that grammar is autonomous (cf. Podor 1983). Even if it is possible to design shortcuts which will get rid of most of the over-generation, it will not solve the problem, because shortcuts of the type: 'choose the minimal attachment pattern', will only get the correct results in 2/3 of the instances, and because shortcuts are not syntactic rules; they are not part of the speaker-hearer's intrinsic linguistic competence, but ways of optimizing the computing or processing of syntactic rules. Grammar must be an integrated part of a bigger, more exhaustive system of rules.

A really adequate grammar must contain a system of rules which to each sentence uttered successfully in real communication will generate (in most cases) only one structural description indicating how the sentence is understood. And that can only be done if the grammar deals with other aspects of the communication process than the formal properties of the linguistic form. That is what the rest of this paper will explain.

Information structure ambiguity

What I call information structure ambiguity can be illustrated by the following example:

I/ Hun sov ikke fordi hun var syg.
She didn't sleep because she was ill.

In both the Danish and the English sentence the different meanings will become clear in different contexts:

- J/
- 1) She slept, but she didn't sleep because she was ill
 - 2) She was tired, but she didn't sleep because she was ill

The difference is that in case J/1) 'because' is negated, while in case J/2) 'sleep' is negated.

As a rule the information focused on is negated, i.e. what falls in the scope of the negation. In case J/1) 'sleep' can not be the focused piece of information because it is mentioned in the previous clause, and old information is not focused (except in identity predication or cleft sentences). Consequently 'because' is focused on and negated in J/1). In the second case 'sleep' is expected (by inferences from the fact that she was tired), and normally the speaker only negates information which she assumes is expected by the reader. And in J/2) it is also presupposed that 'she was ill'. Consequently 'sleep' is the negated element in reading J/2).

In this way the meaning of the sentence is invariably connected to the information structure of the clause, i.e. the information that is focused in the specific context and the actual speech situation. And since the meaning of the sentence is not only what is implied by it, but also what is implicated by it, almost every sentence will be ambiguous with respect to information structure (in the following I indicate the focused piece of information by bold type face, and the presupposed piece of information by square brackets):

K/ (She slept,) but [she] didn't [sleep] because she was ill
implicates: 'her sleep was caused by something else'
(She was tired,) but [she] didn't sleep [because she was ill]
implicates: 'she unexpectedly stayed awake'

[Hun] havde 3 børn - [She] had 3 children
implicates: 'she had only three children'

[Hun] havde 3 children - [She] had 3 children

implicate: 'she does not have all 3 any more'

Hvis du slår grasset, får [du] 40 kr.

If you mow the lawn, [you]'ll get 40 kroner.
implicate: 'and if you don't, you don't'.

Hvis du slår grasset i forhaven, får du 40 kr.

If you mow the lawn in the front garden, you'll get 40 kroner.
implicate: 'and if you do it in the back garden, you will have 50 kroner'.

The implicated meaning of a sentence can be computed by the following two rules derived from the Gricean maxim of relevance (cf. Grice 1975, Sperber and Wilson 86):

When the speaker refers to something, it is done by the weakest information sufficient for unambiguous reference.

When the speaker focuses on relevant information it is done as efficiently as possible, i.e. by predicating the strongest information which is true. (The speaker predicates the focus and only the focus).

Speech act ambiguity

A famous example of speech act ambiguity (cf. Searle 1979: Ch. 2) is the following:

Can you pass the salt.

It can both be a question and a polite request. The easiest way to explain how a pragmatic question can count as a request is by appealing to the abductive reasoning possible in real communication. Abductive reasoning (or retrodiction) is reasoning consequent to antecedent (cf. Peirce 1958: 368).

The task of the audience is not to infer what is implied by the speaker's utterance, it is straight-forward; but to hypothesize what is possibly the speaker's reason for making the utterance. The audience perceives the result of the communicative act, and have to figure out which causal intention has produced this result. The abductive inferences, which is supposed to be done by the audience of this utterance, can be described as follows ('S' means 'speaker', 'A' means 'audience')::

N/

If S means 'salt castor', she says *salt*

she says *salt*

ergo: S means 'salt castor'

A only passes the salt if he can

which is equivalent to:

If A passes the salt he can pass the salt

he can pass the salt

ergo: A passes the salt

As a rule it can be formulated in this way (cf. Togeby 1984):

O/ If a proposition X is the presupposition of another proposition Y, the utterance of X will implicate Y.

'I pass the salt' presupposes 'I can pass the salt', the utterance of *I can pass the salt* implicates: 'I pass the salt'. But even if it is explained in this way how a question is understood as a request, it is still a problem in which cases a question is understood as a question and in which cases it is not.

Disambiguation

I have given examples of four types of ambiguity, i.e. ambiguities which are explained as created by different types of linguistic rules, viz. syntactic rules, lexical rules, implication and implicature rules, and abductive interpretation rules.

I will now demonstrate how all four types of ambiguity can be disambiguated by the same procedure, or the same device, viz. a mental model (cf. P.N.Johnson-Laird 1983) of what is assumed to be known by the audience.

The syntactically ambiguous sentence:

P/ Politibefengten angreb den sorte mand med kniven - The policeman attacked the black man with the knife

is disambiguated in real communication by the fact that the audience knows from the context whether the policeman or the black man had the knife; if the audience didn't know, *the knife* could not be definite form. And notice: If *knife* is not definite form, the sentence is not ambiguous: *The policeman attacked the black man with a knife*

can only mean that 'the policeman had the knife'.

As an example of lexical ambiguity I will take the word *salt*, which can mean either 'salt castor' or 'salt in nature', 'salt desert'. Now if I were standing in Estfahan in Iran, and were asked if I would like to cross the big salt desert between Estfahan and Afghanistan in an old jeep, I would ask the jeep owner: *But, can you pass the salt?* and I would not be misunderstood. Why? Because both I, as the speaker, and the audience know what is mutually manifest to us, viz. the big desert of the eastern horizon. In other words I know what I am looking at, I know what you are looking at, and I know that you know what I am looking at, so I can confidently suppose that you will infer, that if I say *the salt* I mean 'the salt desert'.

In any situation in which you could hear the informationally ambiguous sentence:

Q/ She didn't sleep because she was ill,

you know either that 'she slept' or that 'she was ill', and in both cases you will not even see the ambiguity.

Finally, if the words *salt* and *pass* could not be misunderstood in the situation in which the speech act

R/ Can you pass the salt

is uttered, the problem is how to explain why it is understood as a request and not as a question. Both speaker and audience know that A is able to pass the salt, and that A knows that S knows that A knows that, and that it is a presupposition of 'you pass the salt' that 'you can pass the salt', and both S and A knows that A is not passing the salt in the normal course of events. Then it is not possible to misunderstand the utterance either as a question about A's ability, or as a question about the normal course of events. You do not ask questions about what you already know.

In all four cases the disambiguation is done because both speaker and audience have a mutual awareness of what is mutual manifest to them both in the perceptual field, in their background knowledge, and among their wishes, intentions and dispositions.

The mutual awareness model

The model of linguistic meaning in human communication then looks like this: If the speaker by a communication act successfully conveys to the audience the meaning of a sentence, the following must hold:

- S/ 1) the meaning of the definite information, is mutual manifest (i.e. S is aware of it, A is aware of it, S knows that A is aware of it, A knows that S is aware of it ... and so on as long as necessary),
 2) S is aware of the new information she focuses on,
 3) S is aware of the fact that A is not aware of the new information,
 4) S believes that A will prefer to know about the new information compared to not knowing about it.

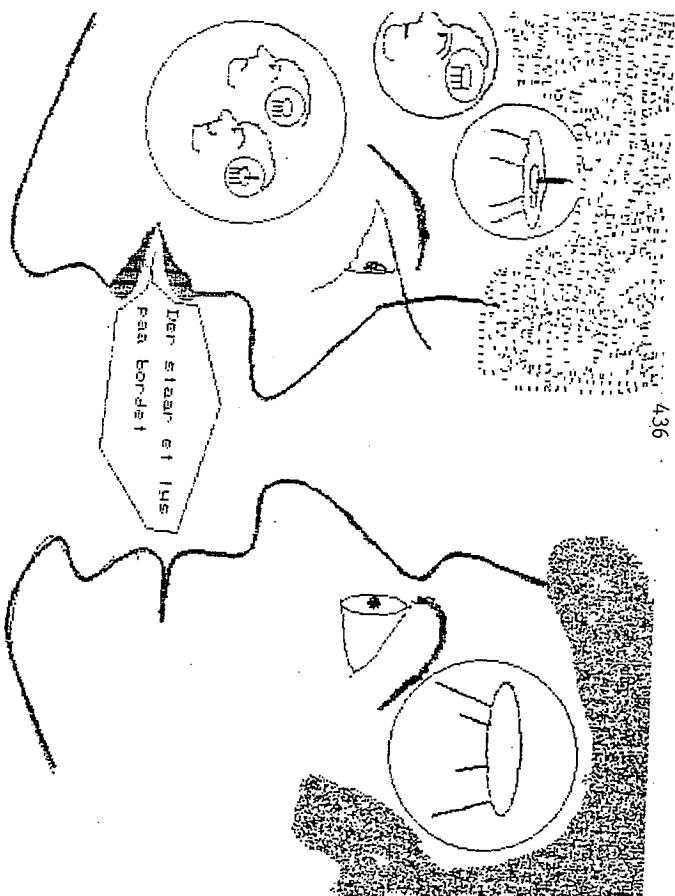
Let the successfully communicated meaning be the meaning of this sentence:

T/ Der st r et lys p  bordet - There is a candle on the table.

then the following must hold:

- U/ 1) the table, is mutual manifest (i.e. S is aware of it, A is aware of it, S knows that A is aware of it, A knows that S is aware of it ... and so on as long as necessary),
 2) S is aware of the candle on the table,
 3) S is aware of the fact that A is not aware of the candle on the table,
 4) S believes that A will prefer to know about the candle as opposed to not knowing about it.

If any of the 4 conditions are not satisfied, S will not and can not successfully convey the meaning by uttering the sentence. I will really insist on all four claims, and I will show it by a picture which demonstrate how complicated the four conditions are as parts of a mental model in the head of the speaker:



This means that the normal theory of syntax as an independent machinery which indicates meaning by generating or analyzing syntactic structures according to the compositionality principle, must be false.

Sentences, the end result of syntax, is a means used by the speaker to convey meanings to the audience, i.e. changes in their mental models, in a situation in which the speaker knows that the audience needs it. It is an instruction from the speaker to the audience to build or change a mental model of something which the audience already has identified, an instruction to build or change the model out of material which is already there.

The syntax will not work without the mental models, because all uttered sentences are manyfold ambiguous on many levels without the already existing mental models. On the other hand the existence of mental models makes syntactic disambiguation superfluous, because the speaker's instructions are normally unambiguous in relation to the objects, materials and relations already present in the mental model of the audience. The speaker normally does not specify anything more than necessary in the

situation in which the audience has already identified objects and relations and only has to add something or change something in their models. That is what is described by the principle of relevance L .

The function of syntax is to instruct the audience in how to change or extend their already existing mental models. And syntax only works if the audience already has identified objects or relations presupposed known in their mental models.

As a conclusion, autonomous compositional grammars by and large ignore the fact that the syntactic rules combined with a lexicon produce a huge amount of overgeneration. Valuable as they obviously are, Chomskyan grammars are deficient in that they leave unexpressed many of the basic regularities of the language with which they are concerned. It is only possible to explain how sentences are understood if the grammatical rules include or are connected to rules about how to instruct communication partners to build or change mental models of what the sentence meanings are about.

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