

TOWARDS THE SEMANTICS OF SENTENCE ADVERBIALS

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9. května 1976

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ABSTRACT

In the present paper we argue that the so-called sentence adverbials (typically, adverbs like probably, admittedly,...) should be generated, in the framework of Functional Generative Description, by means of a special deep case - Complementation of Attitude (CA) on grounds of their special behaviour in the topic-focus articulation (TFA) of a sentence. From the viewpoint of the translation of CA expressions (and also of the multiple occurrence thereof inside a sentence) into a calculus of intensional logic, it should be noted that the TFA properties of CA expressions are directly correlated to the scope properties thereof. Our approach, which is stated in terms of a linguistic theory, serves as a basis for an algorithm of analysis of CA for purposes of a system of man-machine communication without a pre-arranged data base.

I INTRODUCTION

In the present paper we argue that the so-called sentence adverbials (typically, adverbs like probably, admittedly,...) as well as certain minority group adverbs (such as especially, also, not, even,...) should be generated, in the framework of Functional Generative Description (henceforth, FGD), by means of a new complementation (functor, deep case), namely Complementation of Attitude (henceforth, CA).

We argue that in the underlying structure of a sentence, CA can occupy several positions in the topic-focus articulation (henceforth, TFA) of a sentence, which coincide with the

positions of the occurrence of negation. As negation only slightly differs in its distribution on the surface, there is raised a proposal according to which negation (and other minority group adverbs with similar properties) should be generated as a case of CA.

CA (including negation and other minority group adverbs) is defined in FGD by its position in the underlying basic ordering of complementations; presumably, it occupies the leftmost, i.e. the communicatively least dynamic position.

The TFA properties of CA (also on its multiple occurrence inside a sentence) should be taken into account also in the translation of CA expressions into a calculus of intensional logic because they are directly correlated to the scope properties thereof.

The TFA distinctions which are reflected on the surface serve as clues for an algorithm of analysis of CA expressions in written technical texts for purposes of a question answering system without a pre-arranged data base.

II THEORETICAL BACKGROUND

A. General Issues

FGD is a multilevel system; it consists of a sequence of five levels which are connected by the asymmetrical relation of form and function, which accounts for the phenomena of homonymy and synonymy in natural language. The description of a sentence is equivalent to a sequence of its representations on all levels. The difference between the level of (strict, literal, linguistic) meaning (i.e. the underlying,

or tectogrammatical level - a level of disambiguated linguistic expressions) and the level of surface syntax, being parallel to the difference which is made in transformational grammar between the levels of deep and surface structure, constitutes the strong generative power of the FGD system; see (Sgall et al., 1969), (Hajičová and Sgall, 1980), and (Sgall et al., forthcoming).

The grammar of FGD consists of the generative component in the form of a dependency grammar, which generates underlying (tectogrammatical) representations (henceforth, TRs) of sentences in the form of linear formulas (which can be rendered also in the shape of rooted and projective dependency trees), and of the transductive component, by means of which TRs are translated, step by step, onto the lower levels of FGD.

Most important for the considerations in linguistic theory is the level of meaning - a link between the lower levels of the linguistic system and the (extralinguistic) domain of cognitive (ontological) content. It should be emphasized in this place that the distinctions of the level of meaning are correlated to those of the domain of cognitive content only in the translation of (disambiguated, meaningful) linguistic expressions into a calculus of intensional logic, see (Materna and Sgall, 1980), (Kosík and Sgall, 1981) and (Materna and Sgall, 1983). Thus, there should be distinguished, on the one hand, the linguistic semantics, which deals only with the distinctions which are structured by the linguistic form, see (Sgall et al., 1977) and also de Saussure's and Hjelmslev's conception of meaning as "form of content", and on the other hand, the logical (cognitive) semantics, which is committed to (conceptions of) the ontological structure of reality and which is used in the interpretation of linguistic expressions with respect to the extralinguistic content in their translation into a logical calculus, e.g. for purposes of natural language understanding.

There are two relations defined on the dependency tree of the TR of a sentence: the relation of dependency and the relation of the deep word-order, which means that a TR captures the twofold structuring of (the meaning of) a sentence: its (syntactically based) dependency structure and its (semantico-pragmatically based) communicative

structure, i.e. its TFA.

In the dependency structure of a sentence the root of the tree represents the main verb, and the nodes of the main subtree represent its obligatory, optional and free complementations. The dependency principle is recursive. Each node has labels of three types: lexemic, morphological (such as -plural, -future,...) and syntactic (such as Actor, Locative,...); the syntactic labels may be alternatively viewed as labels on the edges of the tree. Every verb, noun, adjective and adverb has its case frame, i.e. a specification of its obligatory and optional complementations, see (Panevová, 1977).

B. Topic-Focus Articulation Background

In the communicative structure of a sentence there is captured the deep word-order of the (occurrences of) complementations, corresponding to a hierarchy of degrees of communicative dynamism thereof, as well as the boundary (boundness juncture) between the topic and the focus of a sentence, i.e. between the contextually bound and non-bound elements of the main subtree of a sentence. In fact, the above mentioned communicative distinctions cut across the dependency structure of a sentence; thus, every embedded clause as well as every (complex) phrase has its secondary TFA, including a secondary boundness juncture. The notion of contextual boundness is broadly conceived: not only a previous mentioning in a text but also a situational activation may cause the contextual boundness of an element.¹

The degrees of communicative dynamism of the complementations

I On the surface we observe different means of how the TFA of a sentence is expressed: cf. the free surface word-order in inflectional languages vs. the various syntactic means in languages with a fixed (grammatical) surface word-order (such as cleft sentences or the existential construction there is in English), or the particles ga and wa in Japanese. A surface representation of a sentence is often ambiguous between several possible underlying sources concerning the different placings of the boundness juncture; these possibilities may be disclosed by means of the negation test or the question test, see (Sgall and Hajičová, 1977-78).

occurring in the focus of a sentence (i.e. also in a topicless sentence) obey the scale of the underlying basic ordering of complementations, or systemic ordering (i.e. ordering of all types of complementations on their occurrence in a topicless sentence).

In FGD, universe of discourse is conceived as the activated part of the stock of knowledge shared by the speaker and the hearer during the discourse. The stock of shared knowledge is supposed to be dynamic, i.e. changing (being modified) in time during a discourse. The most activated elements of the stock of shared knowledge appear as the communicatively least dynamic occurrences of complementations inside a sentence. The speaker, essentially, is free in the choice of the topics of sentences.

C. Exemplification

By way of illustration of TRs of sentences in FGD, let us observe the surface sentence 1 and one of its TRs (namely the one where the Actor is contextually bound) captured by a (simplified) linear notation and indicated as TR 1, where act stands for Actor, att for Attitude, loc for Location, b is a superscript indicating contextual boundness, the slash denotes the boundness juncture of a sentence, and the brackets correspond in a certain way to the edges of the dependency tree.

1 Terry will probably run to Brooklyn.

TR 1 ((Terry^b)_{act} / (probably)_{att}
run-fut (Brooklyn)_{loc})

III COMPLEMENTATION OF ATTITUDE IN THE TOPIC-FOCUS ARTICULATION OF A SENTENCE

A. Complementation of Attitude and Negation

The starting point of our argument is the claim that CA obeys essentially the same pattern of occurrence in the underlying TFA structure of a sentence as the one which was proposed by (Hajičová, 1973) for negation.

In her conception, negation is an abstract, operator-like functor of FGT without a label on its edge and without pertinence to the TFA of a sentence; the symbol NEG, generated as a label on the node of the functor of negation, must be changed by surface rules into such forms as not, do not, etc.

In spite of the alleged non-pertinence of negation to the TFA of a sentence, there are delineated by Hajičová exactly three TFA positions (with respect to the position of the verb) in which negation can be generated; out of them, two belong to the primary case (negation occurring in the focus of a sentence) and one belongs to the secondary case (negation occurring in the topic of a sentence).

In the scheme which follows we shall see that these three underlying positions are a perfect match to the possibilities of occurrence, in the TFA of a sentence, of CA.² In the examples, the scopes of the expressions in question are indicated by arrows. It should be noted that in the primary case (i.e. in (i) and (ii)), the scopes of the expressions in question extend over the focus of a sentence.

(i) The verb of a sentence is non-bound (i.e. it occurs in the focus of a sentence). There is negated ("attituded") the relation between the topic and the focus of a sentence.

² In fact, there is even a fourth possible position of negation and CA in the TFA of a sentence, which can be subcategorized as a subcase of (i): namely, a position where negation and CA are not only less communicatively dynamic than the (non-bound) verb, but where they play the role of the least communicatively dynamic element of a sentence (cf. TRs 2' and 3', also underlying the ambiguous 2 and 3, respectively), this leftmost position coinciding with the position of negation and CA in the underlying basic ordering of complementations.

TR 2' (/ NEG (Terry)_{act} run-fut
(Brooklyn)_{loc})

TR 3' (/ (probably)_{att} (Terry)_{act}
run-fut (Brooklyn)_{loc})

2 Terry will not run to Brooklyn.

TR 2 ((Terry^b)_{act} / NEG run^b-fut / (Brooklyn)_{loc})

3 (= 1) Terry will probably run to Brooklyn.

TR 3 ((Terry^b)_{act} / (probably)_{att} run^b-fut (Brooklyn)_{loc})

(ii) The verb of a sentence is bound (i.e. it occurs in the topic of a sentence). There is negated ("attituded") the relation between the topic and the (nonverbal) focus of a sentence. In this case, negation (or the CA expression) can stand, on the surface, either in the preverbal position, which gives rise to ambiguity with case (i) above (cf. the ambiguous surface sentences 2 and 3), or in the postverbal position, which is unambiguous (cf. the surface sentences 4 and 5).

4 Terry will run not to Brooklyn.

TR 4 ((Terry^b)_{act} run^b-fut / NEG (Brooklyn)_{loc})

5 Terry will run probably to Brooklyn.

TR 5 ((Terry^b)_{act} run^b-fut / (probably)_{att} (Brooklyn)_{loc})

(iii) The secondary case. The verb is bound and it alone is negated ("attituded"). In this case, negation (or the CA expression) stands, on the surface, in the preverbal position, which gives rise to ambiguity with cases (i) and (ii) above.

6 (= 2) Terry will not run to Brooklyn.

TR 6 ((Terry^b)_{act} NEG run^b-fut / (Brooklyn)_{loc})

7 (= 3) Terry will probably run to Brooklyn.

TR 7 ((Terry^b)_{act} (probably^b)_{att} run^b-fut / (Brooklyn)_{loc})

B. Including Negation into Complementation of Attitude

On the basis of the observed coincidence in the behaviour of negation and CA in the underlying TFA structure of a sentence, we propose that negation and CA should be collapsed, i.e. that negation should be generated as a case of CA (by means of CA). On this proposal, there would be removed from FGD the only abstract label (NEG) and substituted by the adverb not, which should be viewed as a regular tectogrammatical lexical unit occurring in TRs of sentences. Thus, TRs 2, 4 and 6 should be readjusted to a shape where instead of NEG, not is generated as bound or non-bound and as accompanied by the label of CA (att).

TR 2' ((Terry^b)_{act} / (not)_{att} run^b-fut (Brooklyn)_{loc})

TR 4' ((Terry^b)_{act} run^b-fut / (not)_{att} (Brooklyn)_{loc})

TR 6' ((Terry^b)_{act} (not^b)_{att} run^b-fut / (Brooklyn)_{loc})

The features in which negation differs from the rest of CA expressions, such as (i) its non-occurrence in the sentence-initial position on the surface (+Not, Terry is singing), (ii) its non-occurrence in the function of a loose complementation in the sentence-final position (+Terry is singing, not) and (iii) its regular occurrence in questions and commands, should be treated as exceptions which do not have the force to overthrow the generalization stated in III C., concerning the behaviour of CA (including negation) in the underlying structure of a declarative sentence. Moreover, as we shall see in III D., not is not an isolated item among the other CA expressions because there are also other minority group adverbs obeying the same paradigm of occurrence in the TFA of a sentence which exhibit the essential idiosyncratic properties of not.

C. Generalizing about Complementation of Attitude

On grounds of the evidence supplied in III A., there can be made a generalization according to which CA (including negation) occupies, in the underlying basic ordering of complementations, the position of the leftmost, i.e. the least communicatively dynamic element, which means that it occurs inside a sentence (in the primary case, i.e. in (i) and (ii) of III A.) as the least communicatively dynamic element of the focus, thus playing on the surface (with the exception of the preverbal positions) the role of the topic-focus boundary indicator (cf. examples 4 and 5).

Thus, CA is defined, as a complementation of FGD, by its position in the underlying basic ordering of complementations. In fact, every adverbial expression which obeys the paradigm of occurrence in the TFA of a sentence as specified in III A. (the position in the underlying basic ordering being only one instance thereof - cf. Footnote 2) should be classified as a case of CA, however idiosyncratic it may seem as concerns its lexical semantics, its distributional properties, or its possibilities of paraphrasing.

D. Including other minority adverb groups into Complementation of Attitude

We argue that there should be included into CA also other minority adverb groups consisting of adverbial expressions (adverbs) which obey the paradigm of occurrence in the TFA of a sentence as specified in III A. and which share the essential idiosyncratic properties of not, such as especially, mainly, also, again, even, and only. All of them exhibit the properties (ii) and (iii) (as specified in III B.), and only exhibits also (i).

We propose, then, that CA should be viewed as a means of generating adverbial expressions which exhibit a special kind of behaviour in the TFA of a sentence (specified in III A.) and which can be divided into several groups; the expressions belonging to the single groups are supposed to be differentiated primarily by their mutual ordering, which dictates their scope properties and whose violation yields ungrammaticality (cf. IV). The adverbial expressions belonging

to the single minority adverb groups (and even adverbial expressions belonging to one group) differ in their lexical semantics, distributional properties, and possibilities of paraphrasing.

The groups of CA expressions can be tentatively subcategorized as follows: (i) "style disjuncts" (briefly, honestly, simply,...); (ii) adverbials of viewpoint (in my view, according to the newspapers,...); (iii) "attitudinal disjuncts" (admittedly, surprisingly, unfortunately,...); (iv) adverbials of subjective certainty (probably, possibly, certainly,...); (v) "particularizers" (mainly, especially,...); (vi) "additives" (also, again,...); (vii) negation (not), and (viii) "exclusives" (only, even,...).

We suppose that groups (i), (ii) and (iii) are open-ended (i.e. productive), whereas the members of groups (iv), (v), (vi), (vii), and (viii) can be listed; these groups can be then labelled as minority adverb groups. Out of them, groups (v) - (viii) exhibit the idiosyncratic properties mentioned above in III B. and III D.

IV MULTIPLE OCCURRENCE OF COMPLEMENTATION OF ATTITUDE INSIDE A SENTENCE

In the underlying representations of sentences in FGD, CA can be generated essentially on two principles of multiple occurrence of a complementation inside a sentence.

(i) Firstly, there can be generated in the focus (and in the secondary case, also in the topic) of a sentence clusters of two or more occurrences of CA, which differ in the degrees of their communicative dynamism; there hold specific scope relations between them; the CA expression with the highest degree of communicative dynamism in the cluster has in its scope the rest of the focus of a sentence (in the primary case), or the rest of the topic (in the secondary case); the other CA expressions in the cluster have in their scopes the rest of the cluster.

If the adverbial expressions inside the cluster belong to different groups of CA, they obey a certain kind of ordering (as suggested by the listing in III D.), whose violation yields ungrammaticality (cf. 8 vs. 9).³ If, however, the adverbial expressions occurring inside the cluster belong to the same group, they cooccur without any restrictions on their order.

8 Terry will run / probably not only to Brooklyn.

9 +Terry will run / only not probably to Brooklyn.

If two occurrences of CA are detached by the boundness juncture of a sentence, they may cooccur without any restrictions on their order because their scopes do not overlap; cf. 10, containing two negations.

10 Terry did not sing / not because of Mary.

(ii) Secondly, we suppose that on the coordinative-appositive principle of multiple occurrence of a complementation inside a sentence, the occurrences of a complementation do not differ in their degrees of communicative dynamism, and hence, that their order does not correspond directly to the principles of the TFA of a sentence: a coordinative or appositive unit presumably occupies, in the underlying representation of a sentence, the position of one "word" in the deep word-order. In TRs of sentences in FGD, coordination and apposition are not represented by means of the dependency tree, but require a special device. Thus, coordinative and appositive occurrences of CA have identical scopes: in 11, probably and certainly have in their scopes Terry will run to Brooklyn,

³ On the multiple occurrence of CA within the loose occurrence thereof or within the coordinative-appositive multiple occurrence thereof, CA expressions do not obey the ordering suggested in III D; cf. a.

a. Tragically but not surprisingly, Terry loves Mary.

and in 12, Terry loves Mary. In the linear representation, it is not possible to indicate the scopes by arrows.

11 Probably or certainly, Terry will run to Brooklyn.

12 Probably, i.e. far from certainly, Terry loves Mary.

V ANALYSIS OF COMPLEMENTATION OF ATTITUDE

In the analysis of simple CA occurrences in sentences in written technical texts within the framework of the question answering system TIBAC (cf. (Sgall, 1983)), cases to be resolved by an algorithm concern, in fact, only those adverbs which may function both as CA and as Complementation of Manner (such as amusingly, curiously, delightfully, foolishly, naturally, really, reasonably, strangely, surprisingly, unexpectedly, wisely,... of group (iii), or honestly, briefly, simply,... of group (i)). The adverbs which can function only as CA (such as probably, admittedly, unfortunately,... - there are at least one hundred of them) should be listed in the lexicon.

Presumably, there occurs only one kind of genuine ambiguity with the adverbs which may function in the mentioned two ways (cf. line 8 of the algorithm below);⁴ other cases of surface ambiguity can be resolved by an algorithm, due to the underlying TFA distinctions which are reflected on the surface (cf. line 9 of the algorithm below) as well as due to some

⁴ In cases of genuine ambiguity (such as the one in 8 of the algorithm), the adverbial expression in question (naturally) cannot be resolved automatically because of the lack of surface clues for the disambiguation of the boundness juncture of the sentence: in this case, the adverbial expression in question functions as CA if it is located in the focus of a sentence, and as non-CA if it is located in the topic of a sentence.

idiosyncratic surface clues with the loose occurrence of CA in the sentence-final position (cf. line 6 of the algorithm below).

	YES	NO
1. Is the adverb listed in the lexicon as a CA expression?	5	2
2. Does the adverb occur in the sentence-final position?	3	4
3. Is the adverb detached by a comma from the rest of the sentence?	6	7
4. Does the adverb occur in an immediately postverbal position?	8	9
5. CA: <u>Terry is probably singing. Terry is singing probably in the garden. Etc.</u>		
6. CA: <u>Terry is singing, naturally.</u>		
7. non-CA: <u>Terry is singing naturally.</u>		
8. genuine ambiguity: <u>Terry is singing naturally in the garden.</u>		
9. CA: <u>Naturally, Terry is singing in the garden. Terry is naturally singing in the garden. Terry is singing in the garden naturally with his friends.</u>		

It can be concluded that from the viewpoint of computational applications, the definition of CA in terms of the TFA of a sentence has enabled us to construe a simple algorithm of analysis of CA expressions, which is hopefully extendable also over the cases of multiple occurrence of CA inside a sentence. Moreover, CA expressions occurring inside a sentence can themselves provide a clue for the disambiguation of the topic-focus boundary of a sentence.

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