

PETER EISENBERG

On the Linguistically Proper Treatment of Quantification in Ordinary English

The purpose of this paper is to demonstrate some characteristics of a surface syntax which has been developed within the framework now called Integrational Linguistics¹. It is a surface syntax in the sense that all units which are dealt with in the syntax of some natural language must in fact be syntactic units of that language. So a syntax of English will assign syntactic structures exclusively to the syntactic units of English, i. e. to those units which are actually used in the English language.

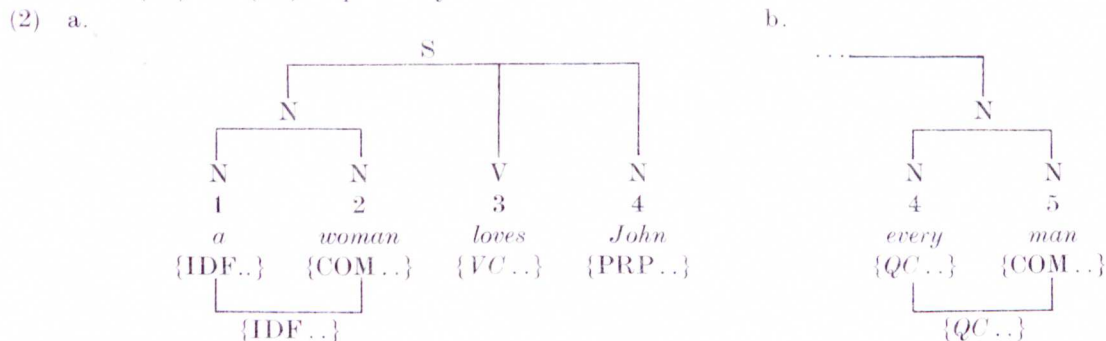
¹ The basic notions of this syntax have been explicated in Lieb 1975, 1976 and applied to German in Eisenberg 1976. For the aims of Integrational Linguistics cf. Lieb 1977 and the references given in the bibliography there. Of course it is not assumed that all people who work within the framework of Integrational Linguistics would necessarily agree with everything I'm saying here.

In what follows I will be concerned with only one of the famous quantification problems, namely the ambiguity of sentences like (1b) as opposed to (1a).

- (1) a. A woman loves John
- b. A woman loves every man

The discussion will concentrate on the question of how many syntactic descriptions should be assigned to these sentences. I will take the syntax of Montague 1974b (PTQ) as a point of reference, since (1) it takes — for reasons which will be criticised — a view quite different from the one outlined here and (2) it is a surface syntax and is therefore related much more closely to our syntax than for instance transformational grammars.

In our syntax (1a) and (1b) could be described by the (only partially specified) syntactic structures (2a) and (2b) respectively.



A syntactic structure in our sense is an ordered triple consisting of a constituent structure (upper part of diagrams), a syntactic marking structure (lower part of diagrams), and an intonation structure (not represented here), cf. Lieb 1976, 15ff. In the marking structure constituents are marked by two types of categories. Unit categories classify syntactic units with respect to their form *within* a paradigm, e. g. singular and plural for nominals and present, past, etc. for verbs. These categories are omitted in (2). Paradigms themselves are classified by paradigm categories such as COM (common) and PRP (proper) for substantivic paradigms and DEF (definite) and IDF for determiners. Verbal paradigms are classified with respect to place and the kind of subject and object they take. For reasons of space the categories of the verb are not given in (2) but simply indicated by *VC*. Similarly, the paradigm categories for *every* are indicated by *QC*, because for the moment it is only important that *every* can indeed be distinguished syntactically from *a* and *the*.

In contrast to most transformational and practically all logical grammars, including the grammar of PTQ, it is proposed, then, to assign one single syntactic structure to (1b). This proposal follows from some basic assumptions concerning what is understood here as the aim of syntax and the relation between syntax and semantics. If the aim of syntax is nothing but the characterization of “the various syntactical categories, especially the set of declarative sentences” then it follows “that the aim of syntax could be realized in many different ways, only some of which would provide a suitable basis for semantics” (Montague 1974a, 223.) For Montague this means that semantics must be taken as the basis for syntax at least in so far as semantic arguments decide between possible alternatives in syntax. This is exactly what surface syntax in our sense will avoid as far as possible. Instead, a central working premise says that syntactic descriptions should be given in their own right as well as semantic ones. Both are considered to be formally completely independent of each other. Among other things, this has the consequence that the syntactic description of a language can fit equally well different semantic descriptions of that language. Thus an appropriate specification of the aim of syntax in our sense would have to exclude the common practice to infer from semantic structures what

syntactic structures should look like. However this does not mean that we are losing a criterion for building syntactic arguments without gaining one. Taking up Montague's formulation we would specify the aim of syntax as "to characterize the various syntactical categories by specifying their form".

Though it has often been stated in linguistics that the syntax of a language (together with its phonology and morphology) is to specify its form, in my opinion this has rarely ever been taken literally since the time of structuralists. There has not even been much of a discussion on how the notion of form should be defined with respect to syntax. But though nobody has a satisfactory notion of form, enough can be said about it to defend the analysis proposed for (1).

In general the form of an entity has to be described in terms of perceptual properties of that entity. That is to say that two entities are equal with respect to their form if their perceptual properties are identical. The form of a syntactic unit is determined, as far as the level of syntax is concerned, by what we call the syntactic means. The syntactic means can be taken as the source of structuredness of natural language expressions. They maximally comprise word order, intonation, and morphological marking. Now, if the syntactic structures of a syntactic unit have to reflect what use has been made of the syntactic means to form that unit, then one has to accept the consequence that syntactic units differ in form iff it can be shown that they are different with respect to word order, morphological marking, or intonation. On the other hand, a syntactic unit has several forms iff there are several different assignments of intonation and/or morphological marking to that unit (word order being an inherent property of a unit). It follows that exactly one syntactic structure has to be assigned to (1 b) as long as one does not argue that there may be several intonation patterns.

Now, it is important to point out that these restrictions on syntax in no way diminish the possibilities of relating syntax and semantics in an explicit and systematic way. I therefore will now indicate, even though it is almost a trivial task, how translation rules could be formulated for converting surface forms to logical forms.

- (3) a. If $\tau_1 = f_3(\gamma, \delta, \zeta)$ and $\tau_1 \in S$
 and $\gamma = \text{subj}(\tau_1)$ where $\gamma = f_2(\alpha, \beta)$ and $\alpha \in \text{IDF}$, $\beta \in \text{COM}$ and β translates to e_1
 and $\delta = \text{pred}(\tau_1)$ where $\delta \in \text{VC}$ and δ translates to e_2
 and $\zeta = \text{diobj}(\tau_1)$ where $\zeta \in \text{PRP}$ and ζ translates to e_3
 then τ_1 translates to $\lceil \forall u[e_1(u) \Delta e_2(u, e_3)] \rceil$
 b. If ...
 and $\zeta = \text{diobj}(\tau_1)$ where $\zeta = f_2(\vartheta, \alpha)$ and $\vartheta \in \text{QC}$, $\alpha \in \text{COM}$ and α translates to e_3
 then τ_1 translates to $\left\{ \begin{array}{l} \lceil \forall u[e_1(u) \Delta \forall v[e_3(v) \supset e_2(u, v)]] \rceil \\ \lceil \forall v[e_3(v) \supset \forall u[e_1(u) \Delta e_2(u, v)]] \rceil \end{array} \right\}$

Let me reiterate what seems to me the most important point when the present approach is compared to Montague's. The fact that several logical forms can be assigned to one syntactic structure does not affect the rigour or strictness of the relation between syntax and semantics. A rule like (3b) is neither vague nor indefinite or the like. It rather tells us that every syntactic unit which meets the specified syntactic conditions will be ambiguous in the way (1 b) is. (A more detailed discussion of the consequences for the notion of syntactic ambiguity can be found in Eisenberg 1977.)

Up to now I have argued against conceptions which would assign two syntactic structures to (1 b). Yet it must at least be mentioned that the syntax of PTQ does not yield just two syntactic analyses for sentences of this type but seven (as Barbara Partee has worked out [1975, 282]). One of the reasons for this is that in the syntax of PTQ term phrases may be inserted into formulas either directly or indirectly, i.e. by replacing a free variable. This device has been invented in order to give a term phrase different scope in different syntactic descriptions of a syntactic unit and thereby resolve ambiguities like the one in (1 b). In Montague grammar syntactic operations

of this kind are never restricted to the cases where they are needed for semantic reasons, but they are freely applicable whenever the syntactic conditions are fulfilled. This has the consequence that sentences like (1 a) also have seven syntactic analyses in PTQ, though they are not even ambiguous. To take a very extreme example: *John finds a unicorn* and *John seeks a unicorn* both have seven syntactic analyses which are completely identical despite the fact that the first of these sentences is ambiguous and the second is not. But while in this case one could argue that Montague was not aware of or interested in the syntactic difference between *find* and *seek* because it did not show up directly in the fragment he wanted to deal with, this is not the case with respect to (1 a) and (1 b). It would be no problem to formulate purely syntactic conditions within the grammar of PTQ to prevent that more than one syntactic analysis is assigned to (1 a) and more than two to (1 b). But this of course would complicate the grammar and take off much of what is called its elegance or simplicity or the like.

It seems to me that this rather unrestricted assignment of syntactic structures as well as the more controlled assignment for the purpose of syntactic disambiguation both illustrate an attitude toward natural language syntax which linguists should seriously argue against. It is the view that any set of rules which assign structures to natural language expressions can be taken as a natural language syntax, no matter what these structures look like. Admittedly, if one has this attitude, then important theoretical differences between natural and artificial languages would vanish. Yet with respect to syntax linguists should never give up the view that there is one important difference which is also a theoretical one: artificial languages have the structure we give to them whereas natural languages have the structure they have.

*Peter Eisenberg, Lehrstuhl für deutsche Sprache, Technische Universität Hannover,
D-3000 Hannover 1*

Bibliography

- Eisenberg, P. 1976: *Oberflächenstruktur und logische Struktur*. Tübingen.
 Eisenberg, P. 1977: 'Zum Begriff der syntaktischen Mehrdeutigkeit'. *Linguistische Berichte* 48, 28—46.
 Lieb, H. 1975: 'Oberflächensyntax'. In: Lieb, H. (ed.): *Linguistische Arbeiten und Berichte* 4. Fachbereich 16 der FU Berlin, 1—51.
 Lieb, H. 1976: 'Grammars as Theories. The Case for Axiomatic Grammar'. Part II. *Theoretical Linguistics* 3, 1—98.
 Lieb, H. 1977: *Outline of Integrational Linguistics*. *Linguistische Arbeiten und Berichte* 9. Fachbereich 16 der FU Berlin.
 Montague, R. 1974a: 'Universal Grammar'. In: Thomason, R. (ed.): *Formal Philosophy*. New Haven.
 Montague, R. 1974b: 'The Proper Treatment of Quantification in Ordinary English'. In: Thomason, R. (ed.): *Formal Philosophy*. New Haven.
 Partee, B. 1975: 'Montague Grammar and Transformational Grammar'. *Linguistic Inquiry* VI, 203—300.