# COMPOSITIONALITY IN FOCUS*

ANNA SZABOLCSI

## 1. INTRODUCTION

1.1. It is held by many grammarians that the relation of syntax and semantics is characterized by the Fregean principle of compositionality. The principle can be stated in various ways; let us now adopt the following formulation:

(1) The literal meaning of an expression is uniquely determined by the literal meanings of its subexpressions and their mode of composition.

I believe that the validity of (1) is beyond doubt and thus any grammar, whether organized to reflect (1) directly or not, may ultimately be required to satisfy it. One of the systems that are precisely designed to reflect (1) is Montague Grammar, where, technical details aside, it is realized as follows:

(2) a. Sentences are composed by putting their constituents together step by step, with no subsequent rearrangement;
b. Not only each lexical item but also each rule of composition is assigned an explicit interpretation;
c. Interpretation is given in terms of model theory: the denotation conditions of expressions are defined relative to a mathematical construct which, loosely speaking, models the relevant aspects of the world talked about.[1]

One advantage of the strategy (2a, b) is that it helps exclude syntactic "tricks" — i.e. the postulation of all sorts of abstract structures which may seem syntactically convenient but whether or how they contribute to the meaning of the resulting sentence is a matter of mystery. (2c) is crucial in giving substance to "semantic representations".

*0165–4004/81/0015–141 $ 2,–*

Suppose that (2) or, rather, its mathematically explicit version in MONTAGUE (1974a), guarantees the system-internal fulfilment of principle (1). It may be interesting to ask, however, whether (2) is also sufficient to guarantee that the working of (1) in Montague Grammar is just as uncontroversial in an intuitive sense. The reason for asking this is as follows: The claim that (1) is valid for natural language seems to function as a working hypothesis with intuitive grounds, and thus for maintaining it one might like to have a similar kind of control over how the grammar actually implements it. Needless to say, care must be taken not to try to discredit (1) by bringing in points of view for checking it which are extrinsic to establishing it. The precise circumscription of the appropriate sort of intuition would go beyond the scope of the present paper; I will just assume without proof that the problems to be discussed do belong to the intended paradigm.

I will try to draw attention to two different problems that seem to exemplify that the system-internal fulfilment of (1) in view of (2) does not necessarily amount to its intuitive fulfilment as well. The one problem is related to the treatment of non-truth-conditional aspects, and thus the homogeneity, of meaning, and the other to the question of how to distribute bits of meaning among the lexical items and the rules that make up the sentence.

1.2. I will take my examples from the field of topic-focus articulation in Hungarian. Given that a wide range of phenomena that indicate the influence of both linguistic and extralinguistic context are usually described under this rubric, it might appear that this articulation is a property of utterances, rather than abstract sentences, wherefore it does not belong to the scope of grammar as delineated above. It seems, however, that at least in so-called non-configurational languages like Hungarian, some of the independently motivated syntactic rules yield a structure which comes quite close to what one would call the topic-focus structure (assuming that the latter is determined with a certain degree of coherence). This suggests, on the one hand, that some of the ingredients of meaning that are sometimes termed 'communicative' are in fact strictly grammatical and, on the other, that it is both justified and necessary to examine how these rules contribute to the literal meaning of the sentence, without any preconceived expectation that their contribution will in principle be different from that of

other rules. It is in this narrow sense that I will be concerned with topic-focus articulation.

Using the framework of Extended Standard Theory, K. Kiss (1981a) proposed that Hungarian sentences have the following structure (with minor variations, which are not pertinent to the present discussion, the same structure is assumed in Kiss (1981b)):

(3)

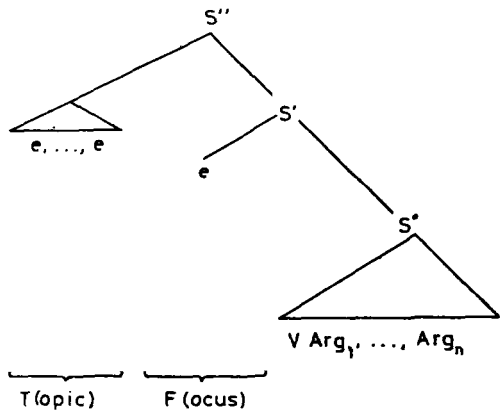


Fig. 1

The arguments of the finite verb V may follow it in an unordered sequence. They may also be moved to the two peripheral positions T or F; within the former, which is available for any number of arguments, the order is also free. F is distinguished, among other things, by being the intonation centre of the sentence and by the fact that certain arguments — e.g. the *wh*-word or the word preceded by the negative particle — may only occur here.

In Montague Grammar the desired argument orders may be obtained if we do not require that all the rules of composition place their input expressions next to each other in a uniform surface order (see the discussion of (21) below). Since grammatical function in Hungarian is not expressed by order, such variations will leave that aspect of the interpretation of rules unaffected. There remains the question of how to account for those ingredients of meaning that result from placing an argument into T or F position, as in (4):[2]

(4) [$_T$ *A padlón*] [$_F$ *Péter*] *aludt*
the floor-on Peter slept
'As for the floor, *PETER* slept there'

The problems to be raised are not specific for T—F articulation but are at least characteristic of it, precisely because the rules in question contribute to the meaning of the sentence in terms other than grammatical functions.

## 2. T(OPIC), OR NON-TRUTH-CONDITIONAL ASPECTS OF MEANING

2.1. Both T and F are positions for overt or covert contrast, nevertheless, while I will argue in the next section that the placement of certain arguments into F always affects the asserted meaning (i.e. the truth- or denotation-conditions) of the sentence, it appears that placement into T merely provides a possibility for another kind of interpretational surplus to arise. Namely, the 'as for ' surplus is dependent on whether T also receives a rising intonation, followed by a marked pause. I will label this latter case *Tc*, so (4) may be made more precise as follows:

(4) a. [$_{Tc}$ *A padlón*] [$_{F}$ *Péter*] *aludt*
'As for the floor, *PETER* slept there'

b. [$_{T}$ *A padlón*] [$_{F}$ *Péter*] *aludt*

c. [$_{T}$ e] [$_{F}$ *Péter*] *aludt a padlón*
'*PETER* slept on the floor'

The choice between (4b, c) becomes relevant only at the point of text organization, whereas the difference between (4a) and (4b, c) is unmistakable even in isolation. The two questions to be put about 'as for ' relate to its precise content and its conceivable nature; of these, I will mainly be concerned with the latter here.

The use of Tc may be said to express a kind of 'modal reservation' on the part of the speaker. The simplest version of it, which also comes to mind if the sentence occurs alone, i.e. in mere covert contrast, may be spelled out as follows: Besides asserting what (4b, c) asserts, (4a) also suggests that (i) in the universe of discourse there is something other than that named in Tc such that the same question (here: "Did *PETER* .?") might sensibly be raised about it, and (ii) it is possible that the answer to that latter question would have the opposite truth value. The first objection to this scheme comes from tautologous examples: in view of (ii) (5) ought

to suggest that a contradiction ("neither *PETER* . ., nor not *PETER* .") may hold for another Tc:

(5) *A padlón — vagy Péter aludt, vagy nem*
'As for the floor, either *PETER* slept there or not'

This objection may perhaps be evaded by considering that in normal conversation (5) is never meant to make a tautologous claim but rather to express uncertainty and thus, by interpreting (ii) possibly as a "suggestion about a suggestion", (5) may legitimately be contrasted with

(6) *.de a hintaszékben — (biztosan) ő / nem ő (aludt)*
'but as for the rocker, (certainly) *HE* / not *HE* (slept there)'

More serious is the problem posed by the other kind of contrast:[3]

(7) *A padlón — Péter aludt, de a helyzet — nem volt kellemetlen*
'As for the floor, *PETER* slept there, but as for the situation, it was not embarrassing'

The difficulties showing up here (namely, that it is not the same question that we put about the situation for the sake of contrast) might in fact be taken to indicate that it is not necessary for grammar in the strict sense to take care of the shade of meaning Tc creates. There exists a type of example, however, which makes the consideration of the Tc-surplus inescapable. Namely, although the finite verb or the nominal predicate with no overt copula is immobile — see (3) — it is possible to copy them into Tc, where the former assumes the infinitival and the latter the dative suffix:

(8) a. [$_{TC}$ *Dicsérni*] [$_{F}$ e] *(nem) dicsértem a könyvet*
'As for praising, I did (not) praise the book'

(9) a. [$_{TC}$ *Ügyesnek*] *(nem)* [$_{F}$ *Péter*] *ügyes*
'As for being clever, it is (not) Peter who is'

These sentences are utterly ungrammatical if the copied element is in F position or after the verb:[4]

(8) b.* [$_{T}$ e] [$_{F}$ *Dicsérni*] *dicsértem a könyvet*
c.* [$_{T}$ e] [$_{F}$ e] *Dicsértem dicsérni a könyvet*

(9) b.* [$_{T}$ e] [$_{F}$ *Ügyesnek*] *ügyes Péter*
c.* [$_{T}$ e] [$_{F}$ *Péter*] *ügyes ügyesnek*

Given that in (8a) and (9a) we observe quite respectable grammatical processes serving no other end than to create the Tc-surplus, a grammar where only syntactic rules with well-behaved interpretations are allowed must take it seriously. Now, instead of trying to delineate the precise content of it, let us merely assume that the Tc-surplus constitutes a non-truth-conditional aspect of meaning and is in this respect similar to the much less controversial contribution of *even*, *therefore*, *too* etc., and examine how the phenomenon can be accomodated in Montague Grammar in general.

2.2. Following GRICE (1975), KARTTUNEN & PETERS (1979) suggested that sentences like (10a, b) have the same truth conditions, though with (10b) the speaker also commits himself to (11):

(10) a. *Bill likes Mary*
b. *Even Bill likes Mary*

(11) Other people besides Bill like Mary, and of the people under consideration, Bill is the least likely to like Mary

(11) is called a conventional implicature of (10b) in view of the following defining properties: (i) it is due to the mere presence of *even* and not to contextual factors, (ii) it is not cancellable, (iii) if it turns out to be false, the *even*-sentence may remain true and is only judged as inadequate.

Let us note that in view of (i) and (ii), (11) can justly be regarded as part of the literal meaning of (10b). Further, it appears that we would run into difficulties with the otherwise well-taken strategy (2a, b) if the scope of literal meaning were limited to the actual truth conditions. Remember that all items and rules are supposed to have an explicit interpretation. Formally speaking, this requirement may be circumvented by the possibility of assigning a vacuous interpretation — but, mathematically, still an interpretation — to something within the framework of MONTAGUE (1974a), wherefore the contribution of *even* and its brothers might in fact be ignored, though at the cost of impoverishing the meaning of the sentence. Nevertheless, the option of assigning vacuous interpretations is usually disregarded, since this device would also allow for a mass of arbitrarily postulated abstract items and rules to pour into the grammar. Thus it seems preferable to require that all legitimate items and rules make some non-vacuous contribution

to the meaning of the sentence, thus distinguishing them from illegitimate ones. Therefore we have ample motivation for taking conventional implicata into account.

How are conventional implicata to be handled, however? KARTTUNEN & PETERS (1979) suggest that the grammar should associate with every expression, not only its denotation conditions ("extension expression" $\alpha^e$) but also its implicature conditions ("implicature expression" $\alpha^i$), plus a specification of how these are inherited in the course of subsequent operations, cf. the projection problem:

(12) Interpretation of the expression $a$: $\langle \alpha^e; \alpha^i \rangle$

Now, while formally eligible, this proposal also raises problems, as noted by KARTTUNEN & PETERS (1979):

> . . . we are content to accept the notion of conventional implicature as primitive and do not attempt to define it in terms of felicity or appropriateness, notions which themselves need clarification. At present we have no answer to questions like 'Why is it that there are conventional implicatures?' and 'Why are there words like *even* [and rules like copying into Tc, at least, we may add — ASZ] which mean something but which have no effect on truth conditions?' (p. 15)

Note that for lack of a principled answer to these questions, the identification of literal meaning with the two-component construct in (12) is by no means a trivial move. I.e. in the absence of a new coherent theory of meaning plus predictions which specify where such items or rules will turn up in the grammar, it seems but a makeshift: we hardly know now what kind of a notion of meaning we are operating with. Further, the formal cast of (12) somewhat masks a problem arising from the fact that we have separated literal meaning into two rather different components. Namely, a scrutinization of the statement of the compositionality principle would be required in order to articulate how rules of interpretation may distribute bits of meaning into the one component or the other, and what kinds of interaction between the two components are to be theoretically tolerated. E.g. it seems justified to let the $\alpha^i$ component make reference to the contents of $\alpha^e$; on the other hand, it seems rather dubious in general (and in a case I will discuss it in § 3.1 in particular) whether the reverse may be the case, that is, whether the asserted meaning of the sentence

may be dependent on its implicatures. It appears therefore that the satisfactory account of non-truth-conditional aspects of meaning is still more or less an open question.

## 3. F(OCUS), OR WHAT SHOULD HAVE A FIXED INTERPRETATION

In this section I will first present a few claims concerning the interpretation of the F position (§ 3.1) and then turn to the examination of how these considerations enter into the understanding of the working of principle (1) in the grammar (§ 3.2).

3.1. The two, often alternative, proposals made by authors who use a notion of *focus* comparable to F as defined in (3) are:

(13) a. Focusing expresses exhaustive listing;

b. the truth of "the rest of the sentence" is presupposed (in one of the many senses of this term)

with certain variations, see e.g. KUNO (1972), SGALL et al. (1973), KARTTUNEN & PETERS (1975). Lack of space prevents me from discussing the literature in detail; let me just try to show for the case of F in Hungarian that at least with the placement of non-*wh* noun phrases into this position, it is reasonable to assign (13a) a truth-conditional status and part with (13b).

Consider first the following examples:[5]

(14) a. [$_F$ *Péter*] *aludt a padlón*
'*PETER* slept on the floor'

b. [$_F$ e] *Aludt Péter a padlón*
'Peter slept on the floor'

c. [$_F$ *Péter és Pál*] *aludt a padlón*
'*PETER AND PAUL* slept on the floor'

It seems intuitively clear that it is not merely inadequate but pronouncedly false to infer (14a), as opposed to (14b), from (14c) i.e. that exhaustive listing is part of the truth conditions of (14a, c). Since however even the strongest intuition concerning such distinctions may turn out to be deceptive, let us look for some support:

(15) a. *Nem* [$_F$ *Péter*] *aludt a padlón*
'Not *PETER* slept on the floor'

b. [$_F$ e] *Nem aludt Péter a padlón*
'Peter did not sleep on the floor'

(16) a. [$_F$ *Péter*] *nem aludt a padlón*
'*PETER* did not sleep on the floor'

b. *Nem* [$_F$ *Péter*] *nem aludt a padlón*
'Not *PETER* did not sleep on the floor'

Here (15a, b) are the natural linguistic negations of (14a, b) respectively, while (16b) is the natural linguistic negation of (16a). Now suppose that above we were wrong and the truth conditions of (14a, b) are in fact identical, only their implicata being different. Then we would have to expect that the truth of (15a) is compatible only with the truth of (15b) and not with the truth of (14c), the latter two being logically contradictory under any analysis. This prediction is not borne out, however, since both cases obtain:

(17) a. *Nem* [$_F$ *Péter*] *aludt a padlón, hanem* [$_F$ *Pál*]
'Not *PETER* slept on the floor but *PAUL* did'

b. *Nem* [$_F$ *Péter*] *aludt a padlón, hanem* [$_F$ *Péter és Pál*] or:
*.hanem* [$_F$ *az egész társaság*]
'Not *PETER* slept on the floor but *PETER AND PAUL* did *or:* .but *THE WHOLE COMPANY* did'

where *hanem* (as opposed to *de* in the previous section) is the F-contrast version of 'but'. On the other hand, these facts are easily explained if, as suggested at first, (14a) is taken to assert:

(18) For every x, x slept on the floor if and only if x is Peter[6]

and (15a) is not only recognized as the natural linguistic negation of (14a) but is also taken to negate exactly the proposition (18).

The cases considered so far only involved situations in which, Peter or not, someone slept on the floor, in line with (13b). This is not necessary, however: the following type of contrast is just as natural, and the above interpretation does indeed permit that:

(19) *Nem* [$_F$ *Péter*] *aludt a padlón, hanem* [$_F$ *a házigazda*] *költözött szállodába*
'Not *PETER* slept on the floor but *THE MASTER OF THE HOUSE* moved to a hotel'

It appears that (13b) is usually understood in view of the principles of cooperative conversation if a sentence like (15a) occurs alone and it can easily be cancelled with additions like in (19). Neglecting the presuppositional clause is also motivated by the correspondence of the structures of F-sentences and *wh*-questions, to be hinted at below, because given the possibility of negative answers, *wh*-questions may not be said to induce a similar presupposition either.

As a matter of fact, the implicature analysis might still be maintained with some sophistry. Suppose again that (14a) asserts that 'Peter slept . . ' and implicates that 'no one else slept . . .' (as opposed to the 'someone slept . . .' implicature suggested for clefts in KARTTUNEN & PETERS 1975), and, further, that pre-F negation, in distinction to preverbal negation, is defined as contradiction negation:

(20) a. Ordinary negation of $\varphi$: $\langle \neg\varphi^e; \varphi^i \rangle$
b. Contradiction negation of $\varphi$: $\langle \neg[\varphi^e \wedge \varphi^i]; [\varphi^i \vee \neg\varphi^i] \rangle$

(definitions cited from KARTTUNEN & PETERS 1979: 47). In this case the falsity of (14a) — although not expressible in natural language — would be rather different from the truth of (15a), which latter would now permit all the conjunctions in (17a, b) and (19). Notice, however, the trick: what we have thus achieved amounts to claiming that a certain kind of implicature necessarily behaves as if it were part of the asserted meaning, which seems but an abuse of the very distinction. The fact that such possibilities may arise is actually one point which makes it rather dubious to let the first component of meaning make reference to the second, as it does in (20b).

Let us now see one way to accomodate these claims in the Montague framework (a slightly different version is discussed in more detail in SZABOLCSI 1981a). Essentially, the sentence is composed with the arguments of the verb behind the verb. One or more of the arguments may be a special pronoun $pro_i$ and there is a rule which preposes it to F (deleting the placeholder ! from the verb) and assigns it sentential stress. The subsequent binding of $PRO_i$ with the term to be focussed is a sentence-forming operation, the interpretation of which says that the list so given is exhaustive.[7] Here I give a simplified derivation of (14a), to be read from bottom

to top, together with the translations of the two crucial rules into the language of intensional logic, with the intervention of which natural language sentences are interpreted in Montague Grammar:

(21)

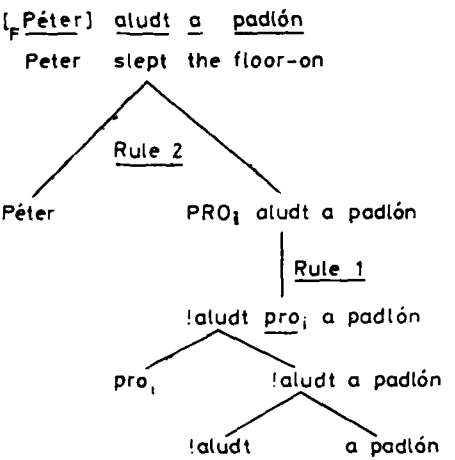


Fig. 2

(22) a. If $a$ is a sentence containing $pro_i$, and $a$ translates as $a'$ (here: $\check{\mathcal{S}}_i(\hat{}\textit{on-the-floor}\ (\hat{}\textit{slept}))$), then the translation of the result of the application of Rule 1 to $a$ is $\lambda\mathcal{S}_i[a']$.

b. If $b$ is a noun phrase (but not an indexed pronoun) and $c$ is an expression obtained by Rule 1, and $b, c$ translate as $b'$ (here: $\lambda P\check{}P(\hat{}\textit{peter})$) and $c'$ (here: $\lambda\mathcal{S}_i[\check{\mathcal{S}}_i(\hat{}\textit{on-the-floor}\ (\hat{}\textit{slept}))]$) respectively, then the translation of the result of the application of Rule 2 to $b$ and $c$ is the equivalence $c' = \lambda\mathcal{S}\forall R[b'(\hat{}\lambda x[c'(\hat{}\lambda P\check{}P(x)) \wedge \check{}R(x)]) \rightarrow \check{}\mathcal{S}(R)]$ (here, after lambda conversion, $\lambda\mathcal{S}_i[\check{\mathcal{S}}_i(\hat{}\textit{on-the-floor}\ (\hat{}\textit{slept}))] = \lambda\mathcal{S}\forall R\ [(\textit{on-the-floor}\ (\hat{}\textit{slept})\ (\hat{}\textit{peter}) \wedge \check{}R(\hat{}\textit{peter})) \rightarrow \check{}\mathcal{S}(R)]$).

The complicated formulation of the result of Rule 2 serves the uniform treatment of bare proper names, conjunctions, and quantifiers in F. In the present case it can be shown to amount to the same as (18):

(18) For every x, x slept on the floor if and only if x is Peter.

The fact that $pro_i$ is not immediately generated in front of V permits us to compose sentences attributed by K. Kiss to F-to-F movement:

(23) a. [$_F$ e] *Szeretném, ha* [$_F$ *Pétert*] *választanád*
would-like-I if Peter-acc chose-you
'I would like if for every x, you chose x if and only if x is Peter'

b. [$_F$ *Pétert*] *szeretném, ha* [$_F$ e] *választanád*
'For every x, I would like if you chose x if and only if x is Peter'

since in the derivation of (23b) we will have *!szeretném, ha választanád* $pro_i$*-t*, to which Rules 1 and 2 can apply. More than one $pro_i$ is permitted in a single clause, however, because it appears that the phenomenon is not really F-to-F movement; the lower F need not remain empty, as it ought to in that case:

(24) [$_F$ *Pétert*] *szeretném, ha* [$_F$ *te*] *választanád* (*te* 'you')

'For every x, I would like if for every y, y chose x if and only if y is you, if and only if x is Peter'

As seen both from the form and the meaning of (24), the subject of 'chose' is focussed in its own clause and the object in the matrix.[8]

The focussing operation might in fact be formulated as a single rule; it is separated into Rules 1 and 2 for the sake of parallelism with the derivation of *wh*-interrogatives. Recall that the *wh*-question test is often used to determine the focus of the sentence, and insofar as that gives grammatically conditioned results in Hungarian, they can easily be accounted for given the fact that the *wh*-word is bound to occupy the F position. That is, we want to capture the phenomenon that the interpretation of (25) is the same as that of (14a), as derived in (21):

(25) a. [$_F$ *Ki*] *aludt a padlón?* (*ki* 'who')
'Who slept on the floor?'
b. [$_F$ *Péter*].

Following Hausser (1980a), interrogatives like (25a) are interpreted as functions from the denotations of their grammatically suitable minimal answers — like (25b) — to the denotations of

the corresponding redundant answers — as (14a) might be. The derivation of (25a) will be exactly parallel to that of the $PRO_1$ *aludt a padlón* subexpression in (21), the only difference being that $ki_1$, a variable of the same logical type, is used in the place of $pro_1$. The translation of (25a), in view of Rule 1 is:

(26) $\lambda\mathcal{S}_1$ [$\check{}\mathcal{S}_1$ slept on the floor]

i.e. (the characteristic function of) the set of those who slept on the floor. The only deviation from R. HAUSSER's proposal, which ignored "focus problems", consists in that if the term of the minimal answer can occupy the F position at all, then the translation of the minimal answer will not merely state that the denotation of that term is contained in the set denoted by the interrogative with respect to which it is to be evaluated but also that it exhausts that set. In other words, the translation of (25b) is analogous to that of Rule 2, the actual F-filling rule.[9]

Let us now come back to the treatment of negation. The original version of the grammar as devised in MONTAGUE (1974b) only contained preverbal negation. The negative particle is introduced syncategorematically, the sentence forming rule having both an affirmative and a negative version. As witnessed in examples (15) and (16), Hungarian does have preverbal negation, even though this only decides whether the sentence will be negative if the F position is left empty, as in (15b). If F is filled, it is the presence or absence of a negative particle in front of F which matters: compare (15a) and (16b), two negative sentences, with (16a), an affirmative one ('Peter is the only one who did not sleep on the floor'). In conjunction with the analyses of (15a) within (17a, b) and (19) and with the fact that the negative particle may not precede an argument in T position or after the verb, this seems to suggest that it is expedient to have a negative version of Rule 2, i.e. F-filling as well. The translation of Rule $2_{neg}$ is the same as that of Rule 2, only the whole formula is within the scope of negation. In other words, this means that in (15a) and (16b) it is not a "negated argument" that we place in F (as suggested in KISS 1981a); but rather, both of the "main sentence-forming rules" — the composition of NP and VP into S and F-filling — can either be affirmative or negative. This way of looking at things naturally does away with the need to introduce some extra filter to rule out ungrammatical strings like (27a, b): they do not arise.

(27) a.* [$_T$ *Nem Péter*] [$_F$ *a padlón*] *aludt*
b.* [$_T$ e] [$_F$ e] *Aludt a padlón nem Péter*

Finally, it may be added that the above decisions as to the "affirmative" or "negative" character of the sentence are not merely based on intuition; the two-level proposal for negation just outlined seems to provide a safe basis for the description of quantifier scope phenomena.

Exhaustive listing in F also has consequences for the interpretation of noun phrases containing numerals. If we are to compute the meaning of the sentence from the meanings of its constituents, it is to be decided whether *három* 'three' for instance, is to be lexically defined as '(there are) exactly three x's such that ' or as '(there are) at least three x's such that ...' or, perhaps, as both. Now, although sentences like (28), (29) are freely used even if it is the case that exactly three boys are sleeping,

(28) [$_T$ *Három fiú*] [$_F$ e] *alszik*
three boy sleep

(29) [$_T$ e] [$_F$ e] *Alszik három fiú*

this is not their grammatically determined interpretation, as is seen from their negation or questioning:

(28) a. [$_T$ *Három fiú*] [$_F$ e] *nem alszik*
three boy not sleep
b. [$_T$ *Három fiú*] [$_F$ e] *alszik?*

(29) a. [$_T$ e] [$_F$ e] *Nem alszik három fiú*
b. [$_T$ e] [$_F$ e] *Alszik három fiú?*

Although the (a) sentences are open to the wide or narrow scope interpretation of the existential quantifier over negation, none of the four is open to the 'exactly' interpretation. For instance, the (a) sentences may mean either (30a) or (30b) but by no means (30c):

(30) a. There are at least three (possibly more) boys not sleeping
b. There are at most two (possibly no) boys sleeping
c. Either more or less but not three boys are sleeping

Such an interpretation is reserved for F, where it is unavoidable:

(31) a. [$_T$ e] [$_F$ *Három fiú*] *alszik*
'(Exactly) *THREE BOYS* are sleeping'

b. [$_T$ e] *Nem* [$_F$ *három fiú*] *alszik*
'Not (exactly) *THREE BOYS* are sleeping'

c. [$_T$ e] [$_F$ *Három fiú*] *nem alszik*
'(Exactly) *THREE BOYS* are not sleeping'

And, needless to say, it is impossible to infer (32) from (31a), similarly to the case with conjunctions in F, discussed above:

(32) [$_T$ e] [$_F$ *Két fiú*] *alszik*
'(Exactly) *TWO BOYS* are sleeping'

This distribution suggests that it is reasonable to assign only the 'at least' interpretation to numerals in the lexicon since (i) that is necessary for their occurrence in T or after the verb anyway, and (ii) the 'exactly' interpretation in F follows naturally from this lexical meaning plus structurally determined exhaustive listing. It is true that the sentences in (31) are in fact ambiguous between the readings 'exactly three boys, and no one else' and 'of the boys, exactly three' — of which only the former is obtainable by Rule 2 as above, given that it is designed for placing the whole noun phrase in F. Nevertheless, it is possible to devise another derivation for these sentences with another designated pronoun standing for the numeral (see also the correspondence with ***hány*** 'how many' interrogatives) and a similar pair of operations for binding it with the numeral 'at least three', to the desired effect.

3.2. The argumentation so far served two purposes. First, I wished to show that F is not only a syntactically distinguished but also a truth-conditionally relevant position of Hungarian sentences. Second, I argued that a number of semantic phenomena are straightforwardly accountable for if we leave the interpretations of lexical items fixed and merely add a type of rule for focussing whose interpretation ensures exhaustive listing. Leaving the first point unquestioned, let us now examine the second from a different point of view.

The step-by-step composition of sentences in Montague Grammar — cf. (2a) — goes together with the fact that both the "formal abilities" and the interpretations of rules are largely encoded in the system of categories. That is, syntactic categories are not taken to be primitive but are defined recursively. E.g. the category

transitive verb is defined as NP → IV, i.e. a syntactic function whose argument is an expression (basic or complex) of category NP and whose value is an expression equivalent to an intransitive verb IV; and one category of adverbs is defined as IV → IV i.e. a function from expressions (basic or complex) of category IV to expressions of the same category. In that way the actual rules that compose, say, *find* and *a pen* into *find a pen* and then this latter and *quickly* into *quickly find a pen* merely "carry out the instructions" of the categories of the expressions on which they operate. This is reasonable given that syntactic categorization makes sense in that it expresses the combinatorial properties of expressions. Further, syntactic functions are systematically mapped into semantic functions — e.g. a transitive verb is interpreted as a function whose argument is the meaning (intension) of the NP it combines with and whose value is the denotation of the IV phrase thus obtained, which is indeed the same kind of thing as the denotation of basic intransitive verbs, that is, ultimately, a set of individuals (those who *find a pen* and those who *sleep*, respectively). Now, in these cases it seems very obvious that the interpretation of a complex expression is indeed a function of the interpretations of its constituents via their mode of combination.

The original fragment of English in MONTAGUE (1974b) contained, however, besides the majority of rules as described, further rules capable of more than just realizing the syntactico-semantic function-argument structure of expressions. Such is the rule of preverbal negation mentioned above, or the rules of quantification, which play a crucial role in the derivation of sentences differing in scope interpretation. Moreover, in the course of extending the fragment scholars have proposed various further "tricky" rules. It is to be noted that although the homomorphic character of meaning assignment as established in MONTAGUE (1974a) does set a limit to the range of possible tricks, nevertheless, even the permitted tricks may give rise to structures in which the intuitive controlability of what is really a constituent of a complex expression is obscured. Therefore serious efforts have been devoted to imposing restrictions on the form of rules and keeping them as far as possible within the type of functional application. The main principles are discussed in PARTEE (1979) and HAUSSER (1978), and are exemplified, with certain variations, in BACH (1979), HAUSSER (1980b), PARTEE & BACH (1981), for instance.

Notice now that in the light of these considerations the focussing rule as described in § 3.1 appears to be a misfit since its interpretation goes far beyond functional application. (The fact that the rule operates by binding a syntactic variable $pro_i$ is also problematic but is not specific for this case, as the same holds for quantification, and it may thus be assumed to be resolved along the same lines, whatever they should be.) Suppose however that we wish to maintain both the claims about exhaustive listing in F and the functional application restriction on the form of the rules. As far as I can see, we have one option in that case:[10] namely to build exhaustive listing into the meanings of the lexical items that may fill F. E.g., we might have, in addition to the translation of *Mary* in MONTAGUE (1974b) as in (33a), another lexical item as in (33b):

(33) a. $Mary_1$: $\lambda P[\check{}P(\hat{}m)]$
'the set of properties Mary has'

b. $Mary_2$: $\lambda P \forall x[\check{}P(x) \leftrightarrow x = \hat{}m]$
'the set of properties Mary and only Mary has'

or, for the numeral *egy* 'one':

(34) a. $egy_1$: $\lambda Q \lambda P \exists x[\check{}Q(x) \wedge \check{}P(x)]$
'at least one x with property Q (say, man)'

b. $egy_2$: $\lambda Q \lambda P \exists x[\forall y[[\check{}Q(y) \wedge \check{}P(y)] \leftrightarrow x = y]]$
'just one x with property Q'

c. $egy_3$: $\lambda Q \lambda P \exists x[\check{}Q(x) \wedge \forall y[\check{}P(y) \leftrightarrow x = y]]$
'just *one* x *with property* Q *and no one else*'

Without developing the whole alternative system of rules, let me just point out that (i) $Mary_2$ with this translation, if combined with the IV *alszik* 'sleep' will yield, via functional application, 'Mary and only Mary sleeps', and similarly for $egy_2$, $egy_3$ and (ii) these translations, in conjunction with a single negation rule, will give precisely the desired interpretations. It goes without saying that this alternative presupposes a rather intricate lexical mechanism and thus the whole of the grammar would not become any simpler than it was; but this aspect does not crucially concern us here.

Let us now consider the Fregean principle again. It is clear that the meaning of the sentence is composed from the meanings the

system assigns to the lexical items plus the interpretations of the strictly grammatical operations in terms of mere functional application, so the principle is formally satisfied. On the other hand, it may be striking to assume that *Mary*, for instance, is an ambiguous lexical item — i.e. means something different in one position of the sentence than in another. Can we say that the grammar reflects the compositionality principle in an intuitively revealing fashion now? The immediate answer may be 'No' and if so, it can be used as an argument against the functional application restriction. Nevertheless, this 'No' may be premature, as it may turn out to be difficult to provide airtight arguments for the claim that what we have an unquestionable pretheoretical intuition about is the interpretation of isolated lexical items, as opposed to that of grammatical operations/constituency — or, in fact, neither. If however we have no reliable intuition concerning the meanings of subexpressions then the question whether a grammar conforms to the compositionality principle in an "intuitive" sense appears as quite nonsensical.

This conclusion may sound too discouraging though, and I do indeed suggest that we might gain some support for making the choice between unambiguous lexical items versus uniform rules by introducing another, although also theory bound, point of view.

Recall that I used a marker ! in (21) to ensure proper placement for $pro_i$ (and to prevent recursive application within a clause). Some similar technique would also be necessary within the second proposal, in connection with exhaustively interpreted lexical items. Such a technique is evidently ad hoc in the sense that even if both grammars produce observationally adequate syntactic and semantic results, they have very little explanatory force. That is, as long as we employ only a technique, it will be quite a surprising fact that a language should have a position in front of the finite verb such that exhaustive listing and negation are associated with that position in the above described fashion (not to mention other phenomena discussed in the references cited). Of course, the point is not that Hungarian has such a position in front of the finite verb; the point is that languages have peripheral positions for operators (in the sense of CHOMSKY 1981), and a wide range of both syntactic and semantic phenomena are associated with them universally. In other words, although the Chomskyan theory does not make it logically necessary for there to be such a thing

as F(ocus) in Hungarian, it does make at least many of its properties coherently predictable. I believe that the above discussed dilemma, if not resolvable on independent grounds, should be resolvable relative to the needs of a version of Montague Grammar which is equipped with a similar predictive mechanism. Given the radically different attitudes towards the questions of interpretation, such a mechanism cannot be simply taken over, of course. It appears, however, that a principled comparison of the working of the two theories might be of great help and thus it may be a fruitful line for research.

Address of the Author: *Anna Szabolcsi*
*MTA Nyelvtudományi Intézete*
*Szentháromság u. 2.*
*H–1014 Budapest 1*

## NOTES

* I am indebted to my colleagues in Budapest and to R. Hausser for their comments, and to L. Karttunen and S. Peters for earlier discussions.

[1] Some details of how I understand (2c) are spelled out in Gergely & Szabolcsi (1979), Szabolcsi (1981b).
[2] On the relation of quantifier scope phenomena and T—F structure, which will not be discussed here, see Szabolcsi (1981a).
[3] Of the ample literature, see e.g. Lakoff (1971).
[4] In more detail about topics, see Szabolcsi (1980).
[5] I will insist on translating Hungarian F with contrastive stress in English although I am aware that this choice does not give a full correspondence (— and neither would clefting). Note that my arguments are based on the Hungarian original and not on the translation.
[6] Naturally, exhaustive listing is understood with respect to a "relevant universe of discourse". This pragmatic property is not a peculiarity of focus, however; note e. g. that *Mary is kind to everybody* is never meant to say that Mary is kind to every coexisting human being, including those whom she has never even heard of.
[7] A more sophisticated formulation might avoid the disastrous property of "subsequent rearrangement" involved here. Although not designed for the needs of EST, I believe the present treatment is also in keeping with the idea that F(ocus) is an operator in a non-argument position, whereby the links with K. Kiss's proposal are, if indirectly, maintained.
[8] This analysis eludes several serious syntactic problems, compare Kiss (1981a), pp. 304—211 and Horváth (1980).
[9] For some discussion of terms that cannot be focussed and arguments that do not necessarily express exhaustive listing in F, see Szabolcsi (1981a) and Kiss (1981b).
[10] I may not claim that this is necessarily the only conceivable option, of course; nevertheless, let me exclude an apparent alternative. Suppose we had in the lexicon an item called *sentential stress*, a function with two arguments, say, *aludt pro*$_i$ *a padlón* and *Péter* (cf. (21)), such that exhaustive listing were

located in the translation of this item — not a linguistically unlikely idea. This treatment would in fact be reminiscent of HAUSSER's (1981b) for mood markers but would also be as problematic as that. Namely, the translation of *sentential stress* ought to be of the form $\lambda r[\ldots \lambda\mathcal{S}_i[r]\ldots]$, where $r$ is a variable ranging over sentences open in $\check{}\mathcal{S}_i$ (cf. the translation of *aludt pro*$_i$ *a padlón*), the intention being that this $\check{}\mathcal{S}_i$ will get bound after lambda conversion. Precisely because of this binding, however, this would not be a legitimate application of lambda conversion: it is easy to construct models in which $\lambda r[\ldots \lambda\mathcal{S}_i[r]\ldots](\ldots\check{}\mathcal{S}_i\ldots)$ and $[\ldots\ \lambda\mathcal{S}_i[\ldots\check{}\mathcal{S}_i\ldots]\ldots]$ are not equivalent, see also GALLIN (1975), p. 19. Therefore this alternative is out. In any case, I believe that the lexical multiplication option discussed in the main text is worth attention, even if further research reveals a better alternative to this particular problem.

## REFERENCES


BACH, E. 1979.
"Control in Montague Grammar", *Linguistic Inquiry* 10, 515—531.

CHOMSKY, N. 1981.
*Lectures on Government and Binding* (Foris, Dordrecht).

GALLIN, D. 1975.
*Intensional and Higher Order Modal Logic* (Elsevier).

GERGELY, T. and A. SZABOLCSI 1979.
"How to Do Things with Model Theoretic Semantics", *Computational Linguistics and Computer Languages* 13, 43—56.

GRICE, P. 1975.
"Logic and Conversation", DAVIDSON & HARMAN (eds) *The Logic of Grammar* (Dickenson, Encino) 64—75.

GROENENDIJK, J., TH. JANSSEN and M. STOKHOF, (eds) 1981.
*Formal Methods in the Study of Language* (Mathematical Centre Tract 136, Amsterdam).

HAUSSER, R. 1978.
*Surface Compositional Semantics*, Chapter I. (unpublished manuscript).

HAUSSER, R. 1980a.
"Surface Compositionality and the Semantics of Mood", in SEARLE, KIEFER & BIERWISCH (eds) *Speech Act Theory and Pragmatics* (Reidel, Dordrecht).

HAUSSER, R. 1980b.
"The Syntax and Semantics of English Mood" (to appear).

HORVÁTH, J. 1980.
"Core Grammar and a Stylistic Rule in Hungarian", in NELS 9, 237—255.

KARTTUNEN, L. and S. PETERS 1975.
"Conventional Implicature in Montague Grammar", in BLS 1, 266—278.

KARTTUNEN, L. and S. PETERS, 1979.
"Conventional Implicature", in OH & DINNEEN (eds) *Syntax and Semantics* 11 (Academic Press, N. Y.) 1—57.

É. KISS, K. 1981a.
"Structural Relations in Hungarian, a 'Free' Word Order Language", *Linguistic Inquiry* 12, 185—214.

É. KISS, K. 1981b.
"Topic and Focus: The Operators of the Hungarian Sentence" (to appear in *Folia Linguistica* XV/3—4).

KUNO, S. 1972.
"Functional Sentence Perspective", *Linguistic Inquiry* 3, 269—320.

LAKOFF, R. 1971.
"If's, And's and But's about Conjunction", in: FILLMORE & LANGENDOEN (eds) *Studies in Linguistic Semantics* (Holt, N. Y.) 115—149.

MONTAGUE, R. 1974a.
"Universal Grammar", in THOMASON (ed.) 222—247.

MONTAGUE, R. 1974b.
"The Proper Treatment of Quantification in Ordinary English", in THOMASON (ed.) 247—271.
PARTEE, B. 1979.
"Montague Grammar and the Well-Formedness Constraint", in HENY & SCHNELLE (eds) *Syntax and Semantics* 10 (Academic Press, N.Y.) 275—315.
PARTEE, B. and E. BACH 1981.
"Quantifiers, Pronouns and VP Anaphora", in GROENENDIJK et al. (eds) 445—483.
SGALL, P. E. ,HAJIČOVÁ and E. BENEŠOVÁ 1973.
*Topic, Focus and Generative Semantics* (Kronberg, Taunus).
SZABOLCSI, A. 1980.
"Az aktuális mondattagolás szemantikájához [On the Semantics of Functional Sentence Perspective]", *Nyelvtudományi Közlemények* 82, 59—83.
SZABOLCSI, A. 1981a.
"The Semantics of Topic-Focus Articulation", in GROENENDIJK et al. (eds) 513—541.
SZABOLCSI, A 1981b.
"Model Theoretic Semantics of Performatives", in KIEFER, F. (ed.) *Hungarian Contributions to General Linguistics* (John Benjamins, Amsterdam).
THOMASON, R. (ed.) 1974.
*Formal Philosophy. Selected Papers of Richard Montague.* (Yale University Press, New Haven).