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THEORETICAL LINGUISTICS PROGRAMME, BUDAPEST UNIVERSITY (ELTE)

STRATEGIES FOR SCOPE TAKING

ANNA SZABOLCSI

RESEARCH INSTITUTE FOR LINGUISTICS, HUNGARIAN ACADEMY OF SCIENCES

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ANNA SZABOLCSI

THEORETICAL LINGUISTICS PROGRAMME, BUDAPEST UNIVERSITY (ELTE)
RESEARCH INSTITUTE FOR LINGUISTICS, HAS, ROOM 119

DEPARTMENT OF LINGUISTICS, UCLA
405 HILGARD AVE., LOS ANGELES, CA 90024-1543
E-MAIL: ibaesza@mvs.oac.ucla.edu

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THEORETICAL LINGUISTICS PROGRAMME, BUDAPEST UNIVERSITY (ELTE)
RESEARCH INSTITUTE FOR LINGUISTICS, HUNGARIAN ACADEMY OF SCIENCES

BUDAPEST I., P.O. BOX 19. H-1250 HUNGARY
TELEPHONE: (36-1) 175 8285; FAX: (36-1) 212 2050



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A Nyelvtudományi Intézet

Könyvtára

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1. Overview¹

Standard theories of scope are semantically blind. They employ a single logico-syntactic rule of scope assignment (quantifying in, Quantifier Raising, storage, or type change, etc.) which roughly speaking "prefixes" an expression α to a domain D and thereby assigns scope to it over D , irrespective of what α means, and irrespective of what operator β may occur in D :

- (1) The semantically blind rule of scope assignment:
 $\alpha [{}_D \dots \beta \dots] \Rightarrow \alpha \text{ scopes over } \beta$

There are two basic ways in which (1) turns out to be incorrect: the resulting interpretation may be incoherent, or the resulting interpretation may be coherent but not available for the string it is assigned to.

Szabolcsi & Zwarts (1993) focus on the first case. Take a version of (1) that is assumed to operate in surface syntax: WH-fronting. In a sizable class of cases, called "weak island violations," this rule yields unacceptable results. For instance:

- (2) a. Who do you think that I mentioned this rumor to?
 b. Who do you regret that I mentioned this rumor to?
 c. Who didn't you mention this rumor to?
- (3) a. How do you think I solved this problem?
 b.* How do you regret that I solved this problem?
 c.* How didn't you solve this problem?
- (4) a. Who do you think that I got the ring I am wearing from?
 b.* Who do you regret that I got the ring I am wearing from?
 c.* Who didn't you get the ring that you are wearing from?

¹ This paper develops ideas in Szabolcsi (1993; 1994a, Section 4; 1994b) and has been presented at talks and in class in Budapest, at MIT, and at UCLA. I am grateful to Michael Brody, Carmen Dobrovie-Sorin, Donka Farkas, Irene Heim, László Kálmán and, most of all, Dorit Ben-Shalom for discussion. This research was partially supported by NSF grant # SBR 9222501.

Sz&Z submit that the violation is semantic in nature. How in (3b,c) and who in (4b,c) ought to scope over domains D that they are unable to. The reason is that manners and collectives are elements of proper join semi-lattices. Sz&Z argue that the computation of the denotation of a factive context requires taking meets, and that of the negative context, complements. Since these operations are not defined in join semi-lattices, manners and collectives cannot scope over such contexts. For the moment, let it suffice that the $\alpha > \beta$ scope relation, pace (1), is not semantically unconstrained.

To illustrate the second case, which the present paper is concerned with, consider the fact that quantifiers in English often scope over operators that are higher in the surface syntactic hierarchy. These cases are attributed to the covert operation of (1). This account predicts, however, that all quantifiers α interact uniformly with all operators β . But they do not. E.g., some but not all direct objects can scope over the subject (5), and some but not all can scope over negation (6):

- (5) a. Three referees read every abstract.
'every $N >$ three N '
b. Three referees read few abstracts.
* 'few $N >$ two N '
- (6) a. John didn't read many abstracts.
'many $N >$ not'
b. John didn't read few abstracts.
* 'few $N >$ not'

It turns out that these contrasts have to do with semantics, too; however, they pertain to the syntax/semantics interface, rather than pure semantics. That is, the starred examples are not incoherent; simply, the given form cannot carry the intended meaning. Proof is that the same α 's are able to scope over the same β 's in English when they are originally higher in syntactic structure (7) or when they acquire such a higher position via overt fronting (8):

- (7) a. Few referees read three abstracts.
'few $N >$ three N '
b. Few women didn't like John.
'few $N >$ not'
- (8) Few men did no one / every woman / two women like.
'few $N >$ no N / every N / two N '

Examples comparable to (8) are standard in Hungarian, a language that disambiguates scope in surface structure (see below).

I do not find it desirable to develop a theory that maintains the omnivorous rule (1) and supplements it with a variety of filters on its overt or covert application. Such a strategy would

simply not be explanatory. Instead, I argue for an approach that is as constructive as possible. (This constructive methodology is in the same spirit as the combinatory categorial approach to syntax in Szabolcsi (1992) and references cited therein, although the results to be discussed in this chapter are entirely independent of categorial grammar.)

The assumption is that "quantification" involves a variety of distinct, semantically conditioned processes. Each kind of expression participates in those processes that suit its particular semantic properties. Thus the heuristic principle is this:

- (9) What range of quantifiers actually participates in a given process is suggestive of exactly what that process consists in.

Based on data in Liu (1990, 1992), proposals how to devise semantically conditioned specialized scopal mechanisms were first made in Ben-Shalom (1993) and Beghelli (1993). A both empirically and theoretically more fully developed version of the latter is Stowell & Beghelli (1994, in progress).

In this paper I first summarize those features of Ben-Shalom's proposal that will be important in the core discussion. Then I proceed to reviewing certain aspects of S&B's theory (various other aspects are taken up in Beghelli (1995)) and suggest that data from Hungarian, a language that "wears its LF on its sleeve," provide specific empirical support for them. Then I propose that S&B's LF, especially in the light of some of the Hungarian data, can be quite directly mapped onto (somewhat modified) Kamp & Reyle (1993) style Discourse Representations.²

The aspects of DRT that seem to correlate quite interestingly with these findings are (i) the assumption that noun phrases either introduce a discourse referent or operate in the manner of generalized quantifiers, and (ii) the assumption that a discourse referent can be dissociated from the distributive operator (when there is one) that it is the key argument of. On the other hand, the observations in S&B help eliminate a certain indeterminacy in DRS construction rules, especially with respect to the order in which noun phrases are to be processed (the issue of inverse scope) and with respect to the possible locations of distributive operators.

The main modification of DRT that S&B's theory of English as well as my own data from Hungarian call for pertains to the treatment of quantifiers like every man and some others. I will argue that these also introduce a discourse referent, albeit a somewhat different kind than the type two men. In this light, I propose two modes of operation for noun phrases: (a) introduce

² Potentially, other dynamic theories could be used, too. K&R's is special in that it happens to include significant work on plurals, as opposed to Heim's (1982) File Change semantics. The intuition my analysis is based on relies on the representational character of DRT; it remains to be seen whether DPL-style reincarnations of DRT would be equally suited to this purpose.

a discourse referent (corresponding to a witness set of the generalized quantifier) as a logical subject of distributive or collective predication, or (b) operate on a predicate denotation in the manner of a counting quantifier. I call these "modes of operation" because the distinction seems to pertain essentially to canonical verification procedures, although it does have a representational correlate. Hungarian shows that the denotational semantics of the noun phrase delimits, but does not fully determine, its procedural options.

I remark that these two modes of operation are reminiscent of the "look-up" versus "compute" distinction made in Szabolcsi & Zwarts (1993). Developing a broader procedural theory that properly subsumes both goes beyond the scope of this paper, however.

2. Constructive approaches to differential scope taking

2.1 Ben-Shalom (1993)

Ben-Shalom restricts her attention to a representative subset of the data in Liu (1990) that do not involve partitives. Some features of her proposal that are directly relevant to the present paper are as follows. Consider (10) and (11):

- (10) Three referees read every abstract.
 (11) Three referees read fewer than five abstracts.

The standard way to calculate the object wide scope ($O > S$) reading of (10) is to form the set of things read by three referees and check whether every abstract is in that set. But if the formation of this set, which is not the denotation of a surface syntactic constituent of the sentence, is a freely available option, then it can be used in calculating an $O > S$ reading for (11), too. This is the standard assumption in the literature. However, (11) does not readily admit an $O > S$ reading. This suggests that the $O > S$ reading of (10) is not calculated in the above mentioned way, either. Rather, it must be calculated in some alternative way that is available when the intended wide scope quantifier is, say, every man but not when it is, say, fewer than five abstracts.

Ben-Shalom proposes that inverse scope is effected by a specific binary quantifier [$O > S$].

- (12) If S and O are generalized quantifiers and R is the relation denoted by a transitive verb, the binary quantifier [$O > S$] is defined to operate as follows:
 For every $a \in A$, $S(R(a))$,
 where A is some set determined by O .

$\lambda x[S(R(x))]$ is the property denoted by the subject+verb segment of the sentence; in the examples at hand, it is the property of being read by three referees, cf. $\lambda x[\lambda P\exists y[\text{referee}(y) \ \& \ P(y)](\text{read}(x))]$. Informally, (12) says, "Grab a set A determined by the quantifier denoted by the object and check, for every element a of this set, whether it has the property that three referees read it." (The fact that Ben-Shalom formulates her proposal using a binary quantifier is immaterial for the present paper, so it will not be dwelt on.)

Let us underline the procedural difference between the standard calculation of scope and the one encoded by $[O > S]$. The difference is twofold. On the standard account we construct the set denoted by $\lambda x[S(R(x))]$ and let O operate on it. Using $[O > S]$, this set does not need to be constructed and O is not a predicate operator. Instead, O contributes a domain of entities, each of which is checked for the property $\lambda x[S(R(x))]$.³

The binary quantifier $[O > S]$ works most straightforwardly when O is a principal filter, because principal filters are precisely those quantifiers that determine a unique set, called their generator. The unique set $\llbracket \text{every man} \rrbracket$ determines is the set of men; the unique set $\llbracket \text{John and Bill} \rrbracket$ determines is the set $\{\text{john, bill}\}$, etc. When O is just monotone increasing, it determines several suitable sets (in a big enough model), called its witnesses, so the operation of $[O > S]$ is less simple but still perfectly viable. But when O is monotone decreasing or non-monotonic, it does not determine any suitable set on its own. As is explained in detail in Chapter 1, the truth conditions of Fewer than six men walk or Exactly six men walk cannot be specified as "There is a set A consisting of fewer than/exactly six men such that each $a \in A$ walk." Hence $[O > S]$ is inapplicable to non-increasing quantifiers.

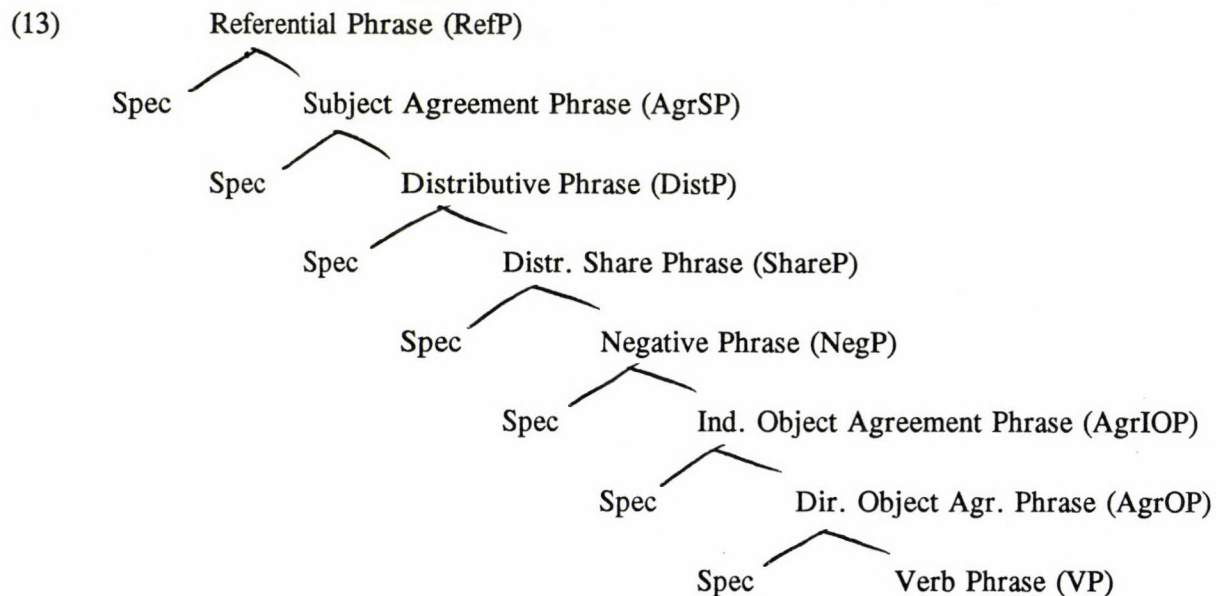
According to Ben-Shalom, $[O > S]$ captures the empirical facts correctly because the best inverse scope takers in English are indeed principal filters. In the discussion below I will consider a wider range of quantifiers in a wider range of contexts, and propose a somewhat similar account of them, exploiting the fact that the strategy "Grab a witness set and check its elements for property P" generalizes exactly to the increasing quantifiers.

The discussion of Stowell & Beghelli's proposal will make clear that, however insightful Ben-Shalom's proposal is, the overall picture of scope interaction is more complex than Liu's pioneering work suggested. Two important factors are (i) the need to factor out the contribution of distributivity and (ii) the fact that the possibility of inverse scope depends, not only on the choice of the wide scope taker but, sometimes, also on the choice of the narrow scope taker. Thus the account requires a more complex set of assumptions.

³ It might be objected that checking whether an entity has property $\lambda x[S(R(x))]$ involves checking whether it is in the corresponding set, but this is not really so. To use a mathematical example, we may not be able to construct the set of prime numbers, but we may well be able to determine whether a given number is a prime, by examining what its divisors are. This example also reveals that the checking procedure may be intensional and/or invoke inferential processes. I thank Ed Keenan for discussion on this issue.

2.2 Stowell & Beghelli (1994, in progress)

Like Ben-Shalom, Stowell & Beghelli dispense with Quantifier Raising, an omnivorous movement rule without a specific landing site, and propose that Logical Form in English includes, among others, the following hierarchy of functional projections. (I am not presenting the full justification of this structure below.)



Each type of quantifier acquires its scope by moving into the specifier of that functional category which suits its semantic and/or morphological properties. Some important options are as follows.

Definites (the two men) move to RefP and distributive universals (every man) to DistP. The head of DistP selects for a ShareP complement, which can be either an indefinite (two (of the) men) or an existential quantifier over events. Indefinites may alternatively move to RefP.

Modified numerals (more than six men, fewer than six men, exactly six men, and indefinites whose noun is destressed) do not move to either RefP, DistP, or ShareP. They just move to the appropriate agreement position to receive Case. The fact that modified numeral subjects are capable of taking widest scope follows from the fact that AgrSP in English happens to be higher than DistP and ShareP (plus a fact about distributivity to be mentioned below). On the other hand, indirect and direct object modified numerals happen to have their agreement positions quite low in the structure, and they scope accordingly.⁴

The possibility of inverse scope is due to reconstruction. The simplest assumption is that

⁴ Definites, universals, and bare indefinites also pass through or land in their own agreement positions for Case reasons and this may affect their distributivity.

(i) reconstruction can only undo semantically insignificant movement, i.e. modified numerals can be lowered from their Case position but expressions in RefP, DistP, or ShareP cannot be lowered; and (ii) a phrase can be reconstructed into the position(s) of its trace, typically, into its VP-internal position. For instance,

- (14) a. More than three men read every book
 b. $[\text{AgrSP more than three men}_1 [\text{DistP every book ... [VP ... } t_1 \text{ ...}]]]$
 -----↑

The converse is not possible: Every man read more than three books does not receive an inverse scope interpretation since every man cannot undo its presence in DistP and reconstruct into a VP-internal position below AgrOP:

- (15) a. Every man read more than three books
 b. $[\text{AgrSP every man}_1 [\text{DistP } t_1 [\text{ShareP } \exists [\text{AgrOP more than three books [VP ... } t_1 \text{ ...}]]]]]$
 -----/-----↑

There is a slight difference between (15) and More than three men read more than six books. Here inverse scope is also very difficult but can be forced by context. Since more than three man as a subject can in general reconstruct into its VP-internal position, this is in fact predicted. (Then the marginality of reconstruction when the object is also a modified numeral calls for an independent account.)

Definites and bare indefinites do not move to DistP even when they are interpreted distributively; instead, their distributive interpretation is due to a silent operator comparable to adverbial (not "binominal") each. S&B call this "pseudo-distributivity." Silent each can apparently occur below AgrSP, ShareP, AgrIOP, and AgrOP, but not below RefP. This captures the fact that even when direct object three books moves to RefP and is therefore referentially independent of subject two of the men, it cannot make the latter referentially dependent, since there is no distributive operator between the two positions.

- (16) a. Two of the men read three books
 b. $[\text{RefP three books } [\text{AgrSP two of the men}_1 [\text{ShareP } t_1 [\text{... }]]]]$

On the other hand, in the structure below the property of having read three of the books can be distributed over two men, because the latter has a trace in AgrSP associated with silent each:

- (17) a. Two men read three of the books
 b. $[\text{RefP two men}_1 [\text{AgrSP } t_1 \text{ EACH } [\text{ShareP three of the books [... }]]]]$

We have seen that the distributivity of universals is due to a separate distributive operator (Dist) and, similarly, the distributivity of definites and bare indefinites is due to a separate distributive operator (silent each). This is important because once the distributive key and the distributive operator are separated, they can move separately. This possibility is made crucial use of. Every man and (the) two men are allowed to move upward unboundedly to a higher RefP, but the corresponding distributive operators, being heads or adverbs, stay put. Thus it is predicted that (18) has a de re reading where every woman or two particular women have the property of there being more than six men who think that the women will fall in love with them; but the men cannot vary with the women, as this property does not distribute:

(18) More than six men imagine that every woman / two women will fall in love with them.

The fact that the distributive operators do not move up to the next clause is what explains the traditional observation that "QR is clause bounded."

3. Claims to be made

Below I will examine Hungarian data in the light of S&B and make the following main claims:

- (19) Hungarian distinguishes scope positions in its surface syntax that are highly reminiscent of those postulated by Stowell & Beghelli for Logical Form in English.
- (20) Some noun phrases can occur in only one of the above scope positions, but others can occur in more than one, and their interpretations vary accordingly.
- (21) It is known that the presuppositional versus existential interpretation of noun phrases may be a function of their position. Hungarian is shown to exhibit similar positional distinctions in a new dimension, distributivity.
- (22) Scope taking mechanisms fall into two broad categories. In the one case, the noun phrase introduces a logical subject of predication; in the other, it performs a counting operation on an independently defined predicate denotation.
- (23) The above distinction is not a purely denotational one, instead, it is representational/procedural. The original basic insight of DRT seems convenient for capturing the distinction (technically or at least metaphorically). Introducing a logical subject of predication can be assimilated to introducing a discourse referent. Anaphora facts will motivate the distinction of two kinds of discourse referents: individuals (atomic or plural) and sets.
- (24) In general, the logical forms S&B derive for English sentences can be seen as direct instructions for constructing DRSs.

4.1 Hungarian surface structure disambiguates scope

Hungarian has come to be known as a language that "wears its LF on its sleeve." A substantial body of work by Hunyadi, Kenesei, É.Kiss, Szabolcsi, and others since the early Eighties has established that surface order and intonation disambiguate scope. For instance, the following sentences are unambiguous; the scopal order of quantifiers matches their left-to-right order.⁵

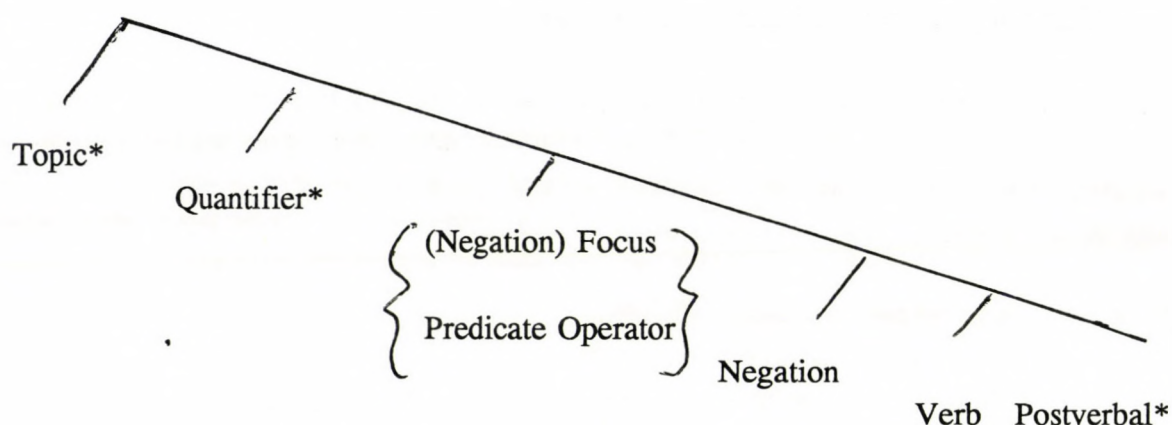
- (25) a. Sok ember mindenkit felhívott.
 many man everyone-acc up-called
 'Many men phoned everyone' = many men > everyone
- b. Mindenkit sok ember felhívott.
 everyone-acc many man up-called
 'Many men phoned everyone' = everyone > many men
- (26) a. Hatnál több ember hívott fel mindenkit.
 six-than more man called up everyone-acc
 'More than six men phoned everyone' = more than 6 men > everyone
- b. Mindenkit hatnál több ember hívott fel
 everyone-acc six-than more man called up
 'More than six men phoned everyone' = everyone > more than 6 men

Theoretically speaking, it is the occurrence in specific syntactic positions that defines the quantifiers' scope. Simple syntactic tests distinguish the positions in (27), which I label with the pretheoretical names that have by now become more or less traditional; I coined the speaking name Predicate Operator for one subtype of what is traditionally called Focus. As usual, the * indicates that the given position may be filled multiply:⁶

⁵ For simplicity's sake, in this paper I will only consider cases in which the postverbal universal is unstressed. It is agreed, following É. Kiss (1987), that the alternative, heavy stressed option involves stylistic postposing in Phonetic Form.

⁶ Topics are flatly intoned and not contrastive; contrastive topics (paraphrasable by 'as for ...') have a scooped intonation, must be followed by some operator, and are analyzed by Kiss (1987) as instances of Left Dislocation. In this paper I am not concerned with Left Dislocation, so even the position is omitted from the diagram.

(27)



The fact that left-to-right order determines scopal order follows from (28). For recent discussions, see É.Kiss (1991, 1994).

(28) In Hungarian, operators c-command their scope at S-structure (where c-command is defined in terms of first branching node).

Typically, a Hungarian sentence with n scope-bearing DPs will have n or $n-1$ in the preverbal field, so that their scopes are indeed disambiguated by surface order. The postverbal field is assumed to have a flat structure. It is rare but possible to have more than one scope-bearing DP postverbally; what their relative interpretation is is an interesting question which I will return to in the Appendix but which need not concern us in the bulk of the paper.

Some of the diagnostics of which position a DP occupies in the preverbal field are as follows:

- (29) a. Topics, but not Quantifiers, can be followed by sentential adverbial like *tegnap* 'yesterday.'
- b. When a Quantifier precedes a non-negated finite verb that has a prefix, the prefix is in its proclitic position.
- c. When a Focus or Predicate Operator precedes a non-negated finite verb that has a prefix, the prefix occurs postverbally.⁷
- d. A sequence of Quantifiers cannot be broken by a non-Quantifier.
- e. A DP in Focus receives an exclusion-by-identification interpretation; a DP in Predicate Operator does not. (See Szabolcsi 1994b for some discussion.)

⁷ That is to say, the finite V moves into the head of the functional projection whose specifier position Focus or Predicate Operator occupies.



4.2 A parallelism with S&B's LF

I argue that the extent to which Hungarian surface structure reveals the syntax of scope is even greater than has been thought. Namely, the traditionally distinguished positions correspond quite closely to the specifier positions of the functional categories in (13). For the time being, I ignore the postverbal field.

(30)	Hungarian	Topic	≈	Spec, RefP
		Quantifier	≈	Spec, DistP
		Focus (with indefs.)	≈	Spec, ShareP
		Predicate Operator	≈	Spec, AgrP/VP

This parallelism is supported by data that pertain to (i) exactly what noun phrases occur in each position, and (ii) what kind of interpretation they receive there.

Some restrictions on the occurrence of DPs in these positions are well-known. E.g. a Topic must be specific, and universals do not occur in Topic or Focus (this latter fact was first observed in Szabolcsi 1980:66). However, no systematic investigation of these matters has been carried out to date. In what follows I examine a representative sample. Note that many DPs occur in more than one position; as we shall see, their interpretations vary accordingly.

Let us see how the mere distribution of DPs supports the parallelism in (30).

Proper names, definites, and those indefinites that take widest scope in their own clause are placed into [Spec, RefP] in S&B. The Hungarian counterparts occur in Topic.

Distributive universals are placed into [Spec, DistP] in S&B. The Hungarian counterparts occur in Quantifier position.

Bare indefinites that scope under distributive universals are placed into [Spec, ShareP] in S&B. The Hungarian counterparts can occur in Focus with a comparable scope interpretation.

Modified numerals, which do not readily take inverse scope in English are placed into [Spec, AgrP] or [Spec, VP] in S&B. The same holds for indefinites whose N is destressed and whose numeral is interpreted as 'exactly n.' The (relevant) Hungarian counterparts cannot occur higher than the Predicate Operator position.⁸

In view of the above data as well as in anticipation of the discussion below, it seems justified to refer at least to Hungarian Topic as (spec of) HRefP and Hungarian Quantifier as (spec of) HDistP. On the other hand, I will retain the labels Focus and PredOp since here, it seems, the pertinent similarities are functional and the residual differences are significant. (ShareP, unlike Focus, does not host definites; PredOp, unlike AgrP, is not Case-related, etc.)

⁸ That is, unless a constituent of DP is set into contrast, in which case the whole DP is pied piped to Focus. This option is irrelevant to us and is not indicated in the table.

(31)	Topic	Quantifier	Focus	PredOp	Post-V
<i>a legtöbb fiú</i> 'most (of the) boys'	+				+
<i>valamely fiú/bizonyos fiúk</i> 'some boy(s)'	+				+
<i>Péter, Péter és Mária</i> 'Peter,' 'P and M'	+		+		+
<i>a fiú(k)</i> 'the boy(s)'	+		+		+
<i>hat fiú</i> 'six boys'	+		+	+@	+
<i>sok fiú</i> 'many boys'	+	+		+@	+
<i>minden fiú</i> 'every boy'		+			+
<i>valamennyi fiú</i> 'each boy'		+			+
<i>még Péter is</i> 'even Peter'		+			+
<i>hat fiú is</i> 'even/as many as six boys'		+			+
<i>Péter is</i> 'Peter, too'		+			+
<i>semelyik fiú (neg.concord)</i> 'none of the boys'		+			+
<i>legalább hat fiú</i> 'at least six boys.'		+			+
<i>több, mint hat fiú</i> 'more than six boys(1)'		+		+	+
<i>hatnál több fiú</i> 'more than six boys(2)'				+	+#
<i>pontosan hat fiú</i> 'exactly six boys'				+	+#
<i>kevés fiú</i> 'few boys'				+	+#
<i>kevesebb, mint hat fiú</i> <i>hatnál kevesebb fiú</i> 'less than six boys(1,2)'				+	+#
<i>legfeljebb hat fiú</i> 'at most six boys'				+	+#
<i>fiú(k)</i> 'boy(s), existential'				+	+#

@

With noun destressed

#

Only if PredOp/Focus is filled or V is negated

Apart from the fact that scopal movement is visible, the crucial point where Hungarian differs from English is that Hungarian has no agreement (Case) positions mixed with the scope positions in the preverbal field, whence scope relations are independent of the argument hierarchy. In the Appendix to this paper I sketch out a theoretical syntactic analysis of Hungarian sentence structure that captures the observations above.

5. Distributivity

The reason why the Quantifier position deserves the label HDistP is that all DPs occurring there are strictly distributive. (Although we get distributive readings elsewhere, too, as will be discussed below.)

Some DPs occur only in HDistP and not in the other three distinguished positions. Universals, minden fiú 'every boy' and valamennyi fiú 'each boy' are the paradigmatic cases. But all is 'also, even' phrases are like universals in that they are barred from HRefP, Focus and PredOp. For their distributivity, consider:

- (32) Kati is fel-emelte az asztalt.
 Kati also up-lifted the table-acc
 'Kati lifted up the table, too'

This sentence cannot mean that along with others, Kati was a member of a collective that lifted up the table. It can only mean that Kati lifted the table on her own, and someone else did too.

- (33) Hat fiú is fel-emelte az asztalt.
 six boy even up-lifted the table-acc
 'As many as six boys lifted up the table'

Here the contribution of is 'even' is essentially scalar: hat ... is means that six is considered many. Nevertheless, while the same sentence without is may well have a collective reading, the sentence may only mean that there were as many as six individual table liftings.

But the most interesting new facts involve the observation that the same noun phrase may sometimes occur in more than one position, and its interpretation varies accordingly. The most tangible differences arise in contexts that distinguish distributive and collective interpretations.

Consider first telic predicates that can be either distributive or collective. Names, definites and bare indefinites (=DPs that can occur both in HRefP and in Focus) support either reading, in HRefP as well as in Focus. DPs in HDistP do not support a collective reading at all. Finally, DPs in PredOp support an unmarked distributive reading of the sentence as well as a

marked collective one, which has the flavor "It took as many/few as n boys to VP."

In the examples below the first DP is one that occurs only in the given position and the second is one that occurs in different positions with varying interpretations.

- (34) a. Kati és Mari HRefP
 Két fiú fel-emelte az asztalt.
 'Kati and Mari
 Two boys lifted up the table'
 OK lifting: collective
- b. Minden fiú HDistP
 Több, mint hat fiú fel-emelte az asztalt.
 'Every boy
 More than six boys lifted up the table'
 * lifting: collective
- c. Kevesebb, mint hat fiú PredOp
 Több, mint hat fiú emelte fel az asztalt.
 'Less than six boys
 More than six boys lifted up the table'
 OK lifting: "it took n"-collective

Similar results are obtained with purely non-distributive telic predicates: "once only" predicates. Notice that here the distributive interpretation is out, no matter what the subject is: the same sand castle cannot be destroyed more than once (I mark this with #). See Szabolcsi & Zwarts (1993: Section 5) for a discussion.

- (35) a. Kati és Mari le-rombolta a homokvárat. HRefP
 'Kati and Mari tore down the sand castle'
 OK destruction: collective
 # destruction: distributive
- b.# Minden fiú HDistP
 Több, mint hat fiú le-rombolta a homokvárat.
 'Every boy
 More than six boys tore down the sand castle'
 * destruction: collective
 # destruction: distributive

- c. Kevesebb, mint hat fiú PredOp
 Több, mint hat fiú rombolta le a homokvárat.
 'Less than six boys
 More than six boys tore down the sand castle'
 OK destruction: "it took n"-collective
 # destruction: distributive

On the other hand, there are other non-distributive predicates like surround where even the "it took n" flavor is absent, and modified numerals in PredOP support an impeccable collective interpretation of the sentence. I suspect that this difference, which otherwise plays no role in my analysis and will not be investigated further, is due to the stativity of the predicate. (Note that surround differs from gather, for instance, in that (i) if a plurality of entities surround something together, then no subset of them surrounds it, but (ii) a single entity may surround something by forming a full circle on its own.)

- (36) a. Az X birtok és az Y birtok körül-öleli a kastélyt. HRefP
 'Estate X and estate Y surround the castle'
 OK surrounding: collective
 OK surrounding: concentric circles
- b. Minden birtok HDistP
 Több, mint hat birtok
 Sok birtok körül-öleli a kastélyt.
 'Every estate
 More than six estates
 Many estates surround the castle'
 * surrounding: collective
 OK surrounding: concentric circles
- c. Kevesebb, mint hat birtok PredOp
 Több, mint hat birtok
 Sok birtok öleli körül a kastélyt.
 'Less than six estates
 More than six estates
 Many estates surround the castle'
 OK surrounding: collective
 OK surrounding: concentric circles

The behavior of DPs in Quantifier position fully supports the idea that this position is analogous to [Spec, DistP]. Not only do the Hungarian counterparts of every boy and each boy occur in this position, but a variety of further DPs do, too. And while the latter can support collective readings elsewhere, in this position they only support distributive readings.

However, the following question presents itself: Do the collective or distributive readings arise in the same manner in all three positions?

6. Outline of the analysis

In the foregoing discussion I was careful to use a wording according to which a DP "supports a collective/distributive reading of the sentence." The reason is that I wished to remain entirely neutral as to what role this DP specifically plays in the formation of such a reading. I will argue that in every one of the three positions that we are considering the DPs play a somewhat different role. The claims are as follows. I formulate them with respect to Hungarian and will argue for them using Hungarian data, but recall that I believe that, modulo the obvious cross-linguistic differences, these data are supportive of S&B's approach and, therefore, my claims are intended to hold of their logical forms, too. In fact, some of these claims are incorporated into Stowell & Beghelli (in progress).⁹

- (37) A DP that occurs both in HRefP and Focus, as well as valamilyen/bizonyos N 'some N(s)' that only occur in HRefP, contribute an individual to the interpretation of the sentence, i.e., an atomic or a plural individual (the atoms of) which correspond(s) to the element(s) of a witness set of the DP.¹⁰ This individual serves as a logical subject of predication. Predication may be distributive or collective, depending on the nature of the predicate.
- (38) A DP in HDistP contributes a set to the interpretation of the sentence, i.e., a witness set. This set serves as a logical subject of predication mediated by a distributive operator.
- (39) A DP in PredOp does not contribute an entity to the interpretation of the sentence and does not serve as a logical subject of predication. It is a counting operator on the

⁹ A legtöbb fiú 'most (of the) boys' and fiú(k) 'boy(s), existential' are not included in my three categories. Their analysis goes beyond the scope of this paper.

¹⁰ A witness set of a generalized quantifier GQ is a set that is (i) an element of GQ, and (ii) a subset of the smallest set GQ lives on. E.g. a witness set of [[two men]] is a set consisting of two men. See Chapter 1 for discussion.

property denoted by the rest of the sentence. If that predicate is distributive and thus denotes a set, the DP counts its elements. If that predicate is collective and thus denotes a plural individual, the DP counts its atoms. The result of counting may even be compared to the cardinality of the NP-set, i.e. the DP's determiner need not be intersective.

The basic distinction that I wish to make is between DP denotations that contribute an entity as a target of predication and DP denotations that operate on the denotation of the predicate in the manner of generalized quantifiers. Such a distinction seems straightforward between names, definites and bare indefinites on the one hand and modified numerals on the other.¹¹ Distributive quantifiers might seem to side naturally with the latter group, but I claim they indeed side with the former. The above reviewed facts concerning distributive versus collective interpretations follow from this two-fold distinction, I argue. But, as we shall see, anaphora facts require finer tuning, so distributive quantifiers end up as a separate subspecies in the predicational category. This is what the proposals in (37) through (39) attempt to capture.

It seems to me that a natural framework for expressing these proposals is a version of the Discourse Representation Theory expounded in Kamp & Reyle (1993). The claim that some DPs serve as logical subjects of predication should translate as the claim that they introduce discourse referents. Following K&R (1993:168), by "introduces a discourse referent" I mean that the rule processing the DP introduces a referent either into the universe of the very DRS to which it is applied or into the universe of a superordinate DRS. This contrasts with rules that take care of quantifiers; these place a discourse referent into a newly created subordinate DRS.

I understand that K&R stipulate that when a DP "introduces a discourse referent" then, at the point of introduction, it is associated with all and only the conditions that come from material inside the DP. That is, even if a referent is introduced into a superordinate DRS, it will never be divorced from its DP-internal conditions; this in fact takes care of a problem discussed in Abusch (1994).¹² I take it that if certain discourse referents are formed e.g. via abstraction, they do not count as "discourse referents introduced by a DP" and cannot be placed into

¹¹ The claim that HRefP serves as a logical subject of predication squares entirely with Kiss's (1992, 1994) analysis of Hungarian, although she makes no comparable claims about the other positions.

¹² The example comes from Heim (1982): If a cat likes a friend of mine, I always give it to him. On the intended interpretation, a friend of mine is to be construed as having wide scope. But if only existential closure is outside the conditional and the predicate friend of mine is in the antecedent, the sentence will be incorrectly verified by a model where there is someone who is not a friend of mine. Abusch (1994) proposes a specific syntactic mechanism to percolate the predicate up to the quantifier.

superordinate DRSs, either.¹³

These qualifications in fact follow naturally from my assumption that a target of predication, and hence a discourse referent, is (based on) a witness set of the generalized quantifier denoted by the given DP. The natural formalization of this idea is slightly different from K&R's. K&R's discourse referents are plain variables, and DP-internal conditions are represented as predicated of them. I propose that the discourse referent a DP introduces is a variable that is *ab ovo* restricted (sorted) to range over (plural individuals formed from) witness sets of the corresponding generalized quantifier. E.g., the discourse referent introduced by two men is a variable over plural individuals made up of two men. (This differs from the usual notion of restricted quantification, which relies the (smallest) set the GQ lives on, i.e. its NP-set, rather than its witness.)

The behavior of DPs that occur in HRefP and Focus (the latter the functional counterpart of S&B's ShareP) is straightforwardly derivable from the properties K&R attribute to set denoter referents (singular or plural individuals, in present terms). What DRT gains from S&B, in turn, is an empirically more precise characterization of the working of distributivity, cf. the description of the silent each operator in S&B.

Let us assume, then, in general that the DRS construction algorithm does not take the simple phrase structures used in K&R as input but, rather, its operation is directly determined by the logical form S&B's analysis assigns to the sentence. This will have clear advantages in connection with inverse scope, for instance. K&R comment on the fact that not all noun phrases can take inverse scope, but eventually they opt for the stipulation that a syntactically lower noun phrase may be processed before a syntactically higher one, which is equivalent to assuming QR. Just as S&B's theory eliminates QR, it will make this overgenerating stipulation unnecessary and predict the correct orders in which noun phrases can be processed.

But there are reasons for more substantial modifications of DRT. These have to do with

¹³ Abstraction is an operation in K&R that intersects a DP's restrictor NP with VP. Abstraction is the standard procedure that forms an antecedent for "maximal reference anaphora," as in Most of the boys left. They (=all the boys who left) were tired. In addition, K&R introduce such abstraction-based referents for cardinal quantifiers (cf. η in (41) and (43) below) even if no anaphora is involved. Their motivation for the latter move concerns the treatment of existential there and binominal each. They propose the generalization that DPs which introduce a referent that is free for binding by an existential quantifier or by each can occur in these contexts. But this cannot be quite correct: DPs like (more/fewer) than 50% of the books occur in both contexts but are not cardinal (intersective) and hence, according to K&R's general theory, cannot fall under the generalization (cf. Sutton 1993). Although this observation undermines K&R's motivation, these abstraction-based referents for cardinals seem quite innocuous (precisely because they would be formed productively to support maximal reference anaphora anyway). So I will continue to use them, as K&R do.

the behavior of DPs that occur in HDistP and PredOp. Justification for the suggestions in (38) and (39) will be offered below. What is relevant at this point is that construing DPs in HDistP as logical subjects of predication and DPs in PredOp as predicate operators is essentially to follow Ben-Shalom's (1993) insight, cf. 2.1. DPs in HDistP now join the ranks of discourse referent introducers. The result, I believe, amounts to adding a procedural flavor to DRT. On this view, DPs that introduce a discourse referent do not only differ from other DPs in quantificational force and in how they support anaphora. Their contributions to the interpretation of the sentence are calculated using different verification procedures.

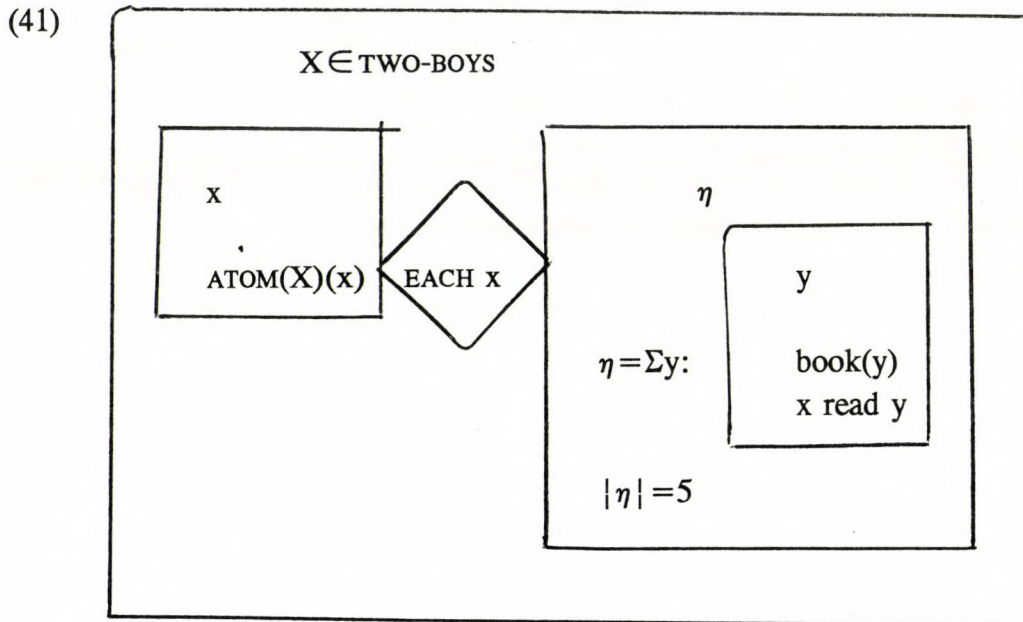
This procedural intuition may be reminiscent of Brentano and Marty's distinction between categorical versusthetic judgments, as revived in Kuroda (1972) and Ladusaw (1994). At present I am not in a position to judge how far a natural parallelism might go.¹⁴ On the other hand, the same procedural intuition may set apart my version of DRT from its DPL-style reincarnations.

To illustrate, the representations I will be arguing for are as follows.

The first example is much like in K&R. The differences are (i) that X is now understood as a variable over plural individuals, not sets, and (ii) X is a restricted (sorted) variable. I will use the following notational convention: $X \in DP$ is a variable ranging over plural individuals whose atoms are the elements of some witness set of $\llbracket DP \rrbracket$. Note that K&R's Σ operator (abstraction) forms the intersection of the sets of books and things read by x ; this is a maximal set.

¹⁴ The parallel between the predicational mode and categorical judgments seems clear: "[T]he categorical judgment is assumed to consist of two separate acts, one the act of recognition of that which is to be made the subject, and the other, the act of affirming or denying what is expressed by the predicate about the subject" (Kuroda 1972:154). On the other hand, Kuroda's and Ladusaw's suggestion seems to be thatthetic judgments are existential statements. This differs from my claim conceptually and also factually (counters include DPs with proportional/presuppositional determiners, which can at best occur in there-sentences with a coda).

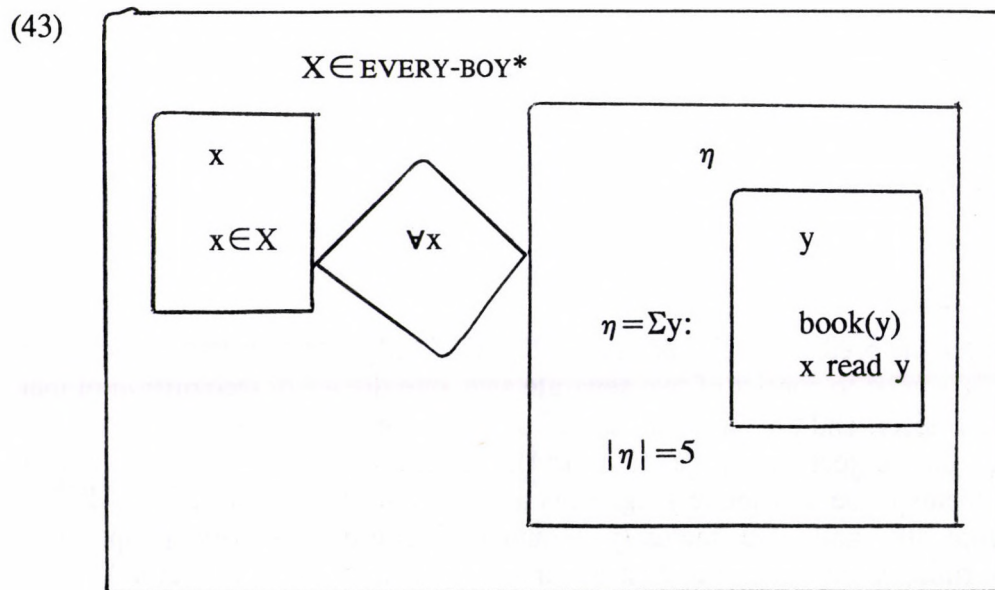
(40) [_{RefP} Two boys₁ [_{AgrSP} t₁ EACH read₂ [_{AgrOP} exactly five books₃ [_{VP} t₁ t₂ t₃]]]]



Beghelli--Ben-Shalom--Szabolcsi (1995, Section 5) contains a further illustration of the crucial use of K&R's assumptions.

The second example involves every boy that, according to my proposal, introduces a set referent. Notation: $X \in \text{DP}^*$ is a variable ranging over witness sets of $[[\text{DP}]]$.

(42) [_{AgrSP} every boy₁ read₂ [_{DistP} t₁ Dist [_{AgrOP} exactly five books₃ [_{VP} t₁ t₂ t₃]]]]



This replaces a "tripartite" structure in K&R.¹⁵

With these general considerations in mind, let us return to the justification of (37) through (39).

7. Two types of collective readings

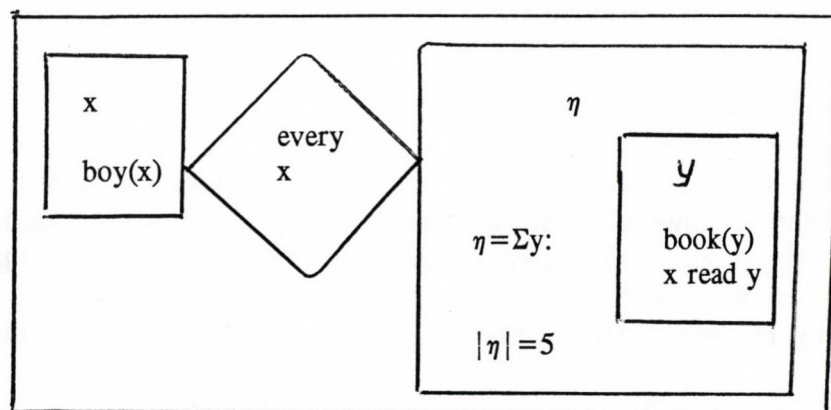
First consider the contrast between collective interpretations supported by DPs in HRefP versus DPs in PredOp:

- (44) a. Ez a hat fiú fel-emelte az asztalt. HRefP
 'These six boys lifted up the table (together)'
- b. Ez a hat birtok körül-öleli a kastélyt.
 'These six estates surround the castle (together)'
- (45) a. Több/kevesebb, mint hat fiú emelte fel az asztalt. PredOp
 'It took more/less than six boys to lift up the table (together)'
- b. Több/kevesebb, mint hat birtok öleli körül a kastélyt.
 'More/Less than six estates surround the castle (together)'

Following Kamp & Reyle (1993), I propose that in (44) the subject introduces a plural individual referent and 'lifted up the table' is predicated of it collectively. More precisely, K&R treat bare indefinites as "set denoters," although they note that these sets are in one-to-one correspondence to plural individuals and that the plural individual view is in fact intuitively preferable. I am switching to plural individuals on the technical level, too, reserving the option of having set referents for another kind of DP.

In K&R's theory, collective predication is the only way to obtain a collective interpretation for the sentence, and in fact, they do not discuss convincing examples that would force one to think otherwise. But the examples in (45) are such. The subjects do not introduce

15



a discourse referent either in a technical sense (see the anaphora facts below) or in an intuitive sense. The sentences in (45) are in no way "about" some boys or estates. Thus I claim that these sentences receive their collective interpretation in a different way. Namely, it is the predicate that denotes a group, as opposed to a set of individuals, and what the DP does is to count the atoms of this group. E.g.,

- (46) 'The collective that surrounds the castle and consists of estates has more/less than six atoms'

Thus I would say that the sentences in (45) have a collective interpretation but their subject DPs are not interpreted collectively.^{16 17}

So, in line with K&R, I assume that DPs in HRefP/Focus denote plural individuals that can be subjects of collective or distributive predication, while DPs in PredOp are counters. In distinction to K&R, however, I assume that the latter can count either the elements of a set, or the atoms of a group, whichever the predicate they operate on denotes. This takes care of (44) versus (45).

8. Two types of discourse referents

In this section I discuss various aspects of (38), i.e. that DPs in HDistP introduce a set referent.

¹⁶ K&R propose an analysis for Most of the men saw the same film / gathered (at the same place) that is similar to the above in that a set referent is constructed from the restrictor and the VP, but they note that this merely ensures that the film does not vary with the men; they do not need to see it together. They believe that the latter type of reading is not possible with most, but they conjecture that if for some speakers it is, then they allow most N to introduce a set referent as a last resort. In other words, K&R do not consider the kind of data and analysis I do.

¹⁷ In English, some of the counting quantifiers have a variant that introduces a plural individual. This is claimed in Groenendijk & Stokhof (1984) and corroborated by S. Spellmire (p.c.). Thus, we have,

Some more/fewer than six men lifted the table [collectively].

These are comparable to few N versus a few N. The suspicion may arise that the English counterparts of the Hungarian examples only work with these variants (with the determiner some "suppressed," perhaps). Notice, however, that Few estates surround this castle clearly differs in meaning from A few estates surround this castle, and yet, both sentences are impeccable. Thus the phenomenon cannot be reduced to the subject introducing a plural referent. -- I should add that that corresponding Hungarian DPs in PredOp do not allow for the plural construal at all.

'Every lawyer / many lawyers hired a secretary that had interviewed
they had interviewed'

If {3sg}, interview distributive;
 if {3pl}, *

(50) Hatnál kevesebb / Sok ügyvéd vett fel olyan titkárnőt, akivel előbb elbeszélgetett{3sg}
 *elbeszélget-tek{3pl}.

'Less than six lawyers / many lawyers hired a secretary that he had interviewed
they had interviewed'

If {3sg}, interview distributive;
 if {3pl}, *

The demarcation line lies exactly where K&R place it in English on the basis of judging the available interpretations. Only in the case of DPs that occur in HRefP/Focus does the plural pronoun corefer with "the DP itself." In the other two cases, the plural pronoun picks up DP's smallest live-on set or a contextually given set as its antecedent. Naturally, the collective interview reading requires a plural pronoun subject.

8.2 Essential quantifiers and distributivity

The fact that DPs in HDistP are never linked to a plural pronoun in this context might suggest that they are interpreted in essentially the same way as those in PredOp, namely, as generalized quantifiers. The difference would consist in the first type having distributivity built into their definition.

In fact, Partee (1995) observes (extending a claim in Gil (1989, 1995)) that all essentially quantificational DPs are distributive. Let me reinterpret "essentially quantificational" as those DPs whose determiner is not purely intersective and which cannot be taken to denote (atomic or plural) individuals, either. Every N and proportionals are essentially quantificational. Furthermore, non-individual denoting DPs whose restrictor is presupposed not to be empty are essentially quantificational, too. The reason is that a presupposition that pertains to only one argument of the determiner prevents the determiner from being symmetrical (and hence intersective).

It is possible to maintain that all DPs in HDistP are essentially quantificational. Recall what we have here: 'every N,' 'many N,' 'at least/more than n N', and 'also, even' phrases. Crucially, it is not counter-intuitive to say that when több, mint hat fiú 'more than five boys' occurs in HDistP, we presuppose that there are boys. Maybe we are even thinking of boys drawn from a known superset of individuals, that is, the phrase may even be specific in Enc's

(1991) sense.

In fact, Hungarian even offers further subtle confirmation of Partee's hypothesis. Consider the PredOp data discussed in (45), repeated here:

- (51) a. Több/kevesebb, mint hat fiú emelte fel az asztalt. PredOp
 'It took more/less than six boys to lift up the table (together)'
 b. Több/kevesebb, mint hat birtok öleli körül a kastélyt.
 'More/Less than six estates surround the castle (together)'

If több/kevesebb, mint hat N is replaced by az N-ek közül több/kevesebb, mint hat 'more/fewer than six among the Ns,' the collective readings disappear. Similarly, if we have sok 'many' or kevés 'few' here and they are interpreted proportionally, the collective readings disappear. We may say that both changes result in essentially quantificational DPs.

8.3. Set referents in HDistP

It seems now that both the anaphora facts and the distributivity of phrases in HDistP would follow automatically if we assumed that they receive an essentially quantificational, "tripartite" analysis. I submit, however, that there are other facts that receive a natural explanation if we assume that these DPs introduce a discourse referent of some sort, and the same facts remain mysterious if they are treated as quantificational.

The Hungarian data are critical in developing this argument. The reason is that the diagnostics I will use have to do with non-maximal reference anaphora and referential variation. In English, allegedly only universals reside in DistP. But a universal has a unique witness that is identical to its restrictor (smallest live-on) set, whence we cannot test whether it supports non-maximal reference anaphora or whether it exhibits variation. In Hungarian, however, DPs like 'many men' and 'more than five men' also occur in the same HDistP position as 'every man,' thus the relevant tests can be performed. Furthermore, since the same DPs occur in PredOp, too, minimal pairs can be formed to isolate the properties present only in HDistP. I assume that universals are to be analyzed analogously to other DPs in HDistP.

In accordance with their inability to antecede c-commanded plural pronouns, cf. (48)-(49), DPs in HDistP and PredOp are alike in that they do not normally support non-maximal reference anaphora. In the examples below, we are assuming that some new fans of OT are phonologists, whence the subject of the second sentence cannot be anaphoric to the all the linguists who began to take an interest in OT last year. But anaphora to a subset of them that contains just many syntacticians is apparently out in both (52) and (53). For perspicuity, I will star the English translations of the unacceptable Hungarian examples:

- (52) Tavaly is sok nyelvész elkezdett érdeklődni az optimalitás-elmélet iránt. ??Különféle szintaktikai problémákra próbálják alkalmazni.
'Last year, too, many linguists (**HDistP**) began to take an interest in Optimality theory.
??They are trying to apply it to various syntactic problems'
- (53) Tavaly is sok nyelvész kezdett el érdeklődni az optimalitás-elmélet iránt. *Különféle szintaktikai problémákra próbálják alkalmazni.
'Last year, too, many linguists (**PredOp**) began to take an interest in Optimality theory.
*They are trying to apply it to various syntactic problems'

On the other hand, consider the following contrast:

- (54) a. Több, mint hat diánkunk megbukott.
Rosszul tudod, végül átengedték őket.
'More than six students of ours (**HDistP**) flunked.
You are wrong, in fact they passed'
- b. Több, mint hat diánkunk bukott meg.
* Rosszul tudod, végül átengedték őket.
'More than six students of ours (**PredOp**) flunked.
* You are wrong, in fact they passed'

Here the standard "maximal set" of those students who flunked cannot be the antecedent of 'they' in the response. If it was, then the response in (54a) would be a contradiction (the students who flunked eventually passed), which it is not. Seeking a way out, one might think that the subject of 'they passed' refers to the set of all those students who *you thought* flunked. But this would not distinguish between the HDistP and the PredOp cases, so this analysis is not correct.

I conclude that the DP in HDistP introduces a set that is salient enough for anaphora to build on when the standard maximal set is of no help. This set is a witness of the generalized quantifier denoted by the DP.¹⁸ But a DP in PredOp crucially does not support this kind of anaphora, because it does not talk about individuals at all.

Next, consider the de re interpretations of the complement subjects below:

¹⁸ We can control for the possibility that this set is in fact the antecedent's restrictor (smallest live-on set) by changing the response from 'they passed' to 'half of them passed.' The relevant halves can easily be different, so it is transparent that we are indeed talking about (half of) the more than six students in question.

- (55) a. Legalább két kritikus úgy gondolja, hogy több, mint hat zseni megalondult.
'At least two critics hold that more than six geniuses (**HDistP**) have gone crazy'
- b. Legalább két kritikus úgy gondolja, hogy több, mint hat zseni bolondult meg.
'At least two critics hold that more than six geniuses (**PredOp**) have gone crazy'

Farkas (1995) argues that the descriptive content (DC) of any noun phrase may be evaluated with respect to the worlds introduced by superordinate clauses; in this case, this entails that whatever determiner the complement subject should have, the entities referred to may be geniuses in the speaker's world, not in the critics' worlds. This in fact does not follow from the present proposal and thus, if correct, the mechanism Farkas proposes needs to be incorporated. On the other hand, there is a difference between the possible interpretations of (55a,b) that goes beyond what the evaluation of the DC explains. Namely, (55a) can mean that there is a fixed set of more than six geniuses such that a fixed set of at least two critics hold that they have gone crazy. That is, on this reading the geniuses and the critics are chosen independently. In contradistinction to this, in (55b) it may at best be a coincidence if the critics hold about the same geniuses that they have gone crazy; there is no reading that guarantees it. This difference between (55a) and (55b) follows straightforwardly if we assume that the DP in HDistP introduces a referent corresponding to a witness, but the DP in PredOp merely tells us how many geniuses each critic holds have gone crazy. As was mentioned above, K&R assume that discourse referents may be introduced into either the current DRS box or into any superordinate one; this squares with another proposal Farkas (1995) makes. (The reason why the critics do not vary with the members of the witness in (55a) is that there is no distributive operator associated with this witness in the matrix clause.)

With these, I take it to be established that DPs in HDistP introduce discourse referents. But why, then, do they fail to support anaphora in (48) and (52)?

First, to account for (48), we may stipulate that coreference in the strict sense involves a relation between a pronoun and an expression denoting a singular or plural individual. Then one (natural) difference between bare indefinites like *hat fiú* 'six boys' and inhabitants of HDistP is that the referent the former introduces is an (atomic or plural) individual but the referent that the latter introduces is a set. As was noted above, such a distinction can be accommodated in K&R's framework with a minimal modification.

This assumption is beneficial in explaining, in fact, why (according to S&B), bare indefinites do not move into [Spec, DistP] even when they are interpreted distributively and have to receive their distributive interpretation in a different way. We may stipulate that Dist selects for a set.

Second, to account for (52), we may stipulate that when plain coreference is not involved, maximal reference anaphora is preferred over anaphora to some other salient set. This assumption needs to be substantiated by further work.

I wish to note here that my prime reason for pursuing the assumption that DPs in HDistP (and DistP) introduce a set referent does not lie in the facts discussed in this subsection. The prime reason has to do with the procedural intuition to which I turn below and with the consonant details of S&B's analysis. Thus I take it that it suffices if there are facts that point to the existence of such referents in classical DRT terms, even if the proposed DRT treatment of these facts is just preliminary for the time being.

8.4 HDistP: Grab a witness and predicate distributively

Let us now see what the proposed analysis really is.

There is a sharp intuitive difference between Hungarian sentences that have HDistP or PredOp filled, even if there is no truth conditional difference. DPs that occur in both positions are especially instructive in this regard.

- (56) Tegnap sok fiú meg-betegedett. HDistP
 yesterday many boy pfx-sickened
 'Many boys fell ill yesterday' = There is a set of many boys such that each fell ill yesterday
- (57) Tegnap sok fiú betegedett meg. PredOp
 yesterday many boy pfx-sickened
 'The boys who fell ill yesterday were many' = The number of boys who fell ill yesterday is large

The first sentence is about a set of boys; the second is not. This difference seems quite sharp despite the fact that in both cases 'many' may be proportional and/or we may be talking about boys that are drawn from a known set.

The analysis of HDistP that I am advocating is a generalization of Ben-Shalom's (1993) proposal for inverse scope and Chierchia's (1993) proposal for pair-list readings, which is based on Groenendijk & Stokhof's (1984). As was reviewed above, Ben-Shalom assumes that inverse scope is effected by a binary quantifier whose working can be illustrated as follows:

- (58) a. Three referees read every/two abstracts
 b. for every $x \in A$, three referees read x
 where A is a witness set of the quantifier every/two abstracts

Chierchia assumes that pair-list readings are effected by a binary quantifier whose working can

be for present purposes simplified as follows:¹⁹

- (59) a. What did every/two boys read?
 b. for every $x \in A$, what did x read
 where A is a witness set of the quantifier every/two boys

That is, in both cases the quantifier that takes inverse scope or induces a pair-list reading is said to contribute a set to the interpretation of the sentence, associated with the distributive operation "every $x \in A$." These authors assume that this behavior of the quantifier is "unusual:" it obtains specifically in the inverse scope or pair-list context. My proposal differs from theirs in that I am assuming that offering up a witness to distributive predication is how quantifiers in HDistP always operate.

E.g., to illustrate with an English example, I am assuming that Every referee read three abstracts, on its direct $S > O$ reading is also calculated in the manner of (60b), rather than (60c); whether (60b) is thought to involve a binary quantifier is immaterial:

- (60) a. Every referee read three abstracts
 b. for every $x \in A$, x read three abstracts
 where A is a (=the) witness set of the quantifier every referee
 c. every(referee)(read three abstracts)

It is worth emphasizing that the word "every" in (60b) stands for the distributive operator and in (60c) for the actual determiner. Thus the following Hungarian example makes the contrast more transparent, perhaps:

- (61) a. Több, mint hat fiú el-ment. HDistP
 more than six boy away went
 b. for every $x \in A$, x left
 where A is a witness of 'more than six boys'
 c. more-than-six(boy)(left)

Two observations that are crucial for this analysis are as follows:

- (62) If Det is conservative and increasing,

¹⁹ Note that in Szabolcsi (1994a) I argue against using (59) as the general representation of pair-list readings, because it does not fit the full range of quantifiers that support pair-list; but here I appeal to (59) for an insight to be applied to a crucially restricted kind of examples.

$\text{Det}(N)(P) = \text{for some witness } A \text{ of } \text{Det}(N), \text{ for every } x \in A, P(x).$

(63) Only (conservative and) increasing quantifiers occur in HDistP.

(62) tells us that under certain circumstances the two ways of construing the operation of the quantifier are logically equivalent. (63) tells us that precisely these circumstances obtain in HDistP. This indicates that switching to the "grab a witness + predicate distributively" construal in HDistP yields logically faithful interpretations.

Recall now the heuristic strategy formulated in (9) that has been used in most chapters of this book:

(64) What range of quantifiers actually participates in a given process is suggestive of exactly what that process consists in.

Since the "tripartite" construal would be generally applicable, i.e. would give truth-conditionally correct results for decreasing and non-monotonic quantifiers as well, it does not explain the restriction that only increasing ones occur in HDistP. This restriction suggests that HDistP is indeed characterized by the alternative "predicative" mode of operation.

Note in this connection that HDistP accommodates semelyik fiú 'none of the boys' and Péter sem 'Peter either,' which seem to contradict the increasingness claim. But Szabolcsi (1981) argued that semelyik fiú is just the negative concord form of minden fiú 'every boy;' similar claims have been made about negative concord in Italian by Haegeman and Zanuttini (1990). Similarly, Péter sem is the negative concord form of Péter is 'Peter also.' So these are not counterexamples. All genuinely decreasing quantifiers, as well as the non-monotonic ones, occur in PredOp.

8.5 Distributivity and essential quantification, again

The distributive character of HDistP phrases is now captured by the presence of the distributive operator. This is an empirically weaker account than Partee's would seem to be, in that it does not predict that essentially quantificational DPs outside HDistP are also distributive. But let us ask to what extent Partee can predict this. Partee (1995) in fact does not present the distributivity claim as a formal result, merely as a potential empirical generalization. The reason, I believe, is this.

If essentially quantificational DPs are all interpreted as "traditional" generalized quantifiers, then of course distributivity follows from the fact that Dets are relations between sets and the theory simply does not in any way cater to collective readings. We know, however, that

collective readings exist, so an extension of the traditional theory is necessary and, as van der Does (1992) shows, possible. But suppose now that we can define a non-presuppositional, non-proportional determiner *kevés* 'few' that delivers "the number of the atoms of the collective that consists of Ns and VP-ed is small." There seems to be no inherent difficulty in defining a presuppositional and/or proportional version of this same determiner. Thus it may be an empirically correct decision to exclude these latter versions but, from a logical perspective, their exclusion is a stipulation.²⁰

Note also that while essential quantifiers all seem to be distributive, not all distributive quantifiers are essentially quantificational. That is, not only do we have distributive readings for sentences with *hat fiú* 'six boys' that denotes a plural individual, but distributive readings with purely cardinal *sok fiú* 'many boys' and *hatnál több fiú* 'more than six boys' in PredOp are also impeccable.

Finally, *a legtöbb fiú* 'most of the boys' is an inherently proportional and an invariably distributive quantifier in Hungarian, but it resides in HRefP and not in HDistP.

In other words, while my proposal certainly does not bring all instances that fall under Partee's generalization under the same heading, the deeper nature of the entailment from presuppositionality / proportionality to distributivity is in fact an open question for the time being, and the relevant examples plainly cut across the positions HRefP, HDistP, and PredOp.

What remains to be accounted for on my analysis is the fact that these DPs are presuppositional. As Ben-Shalom (p.c.) points out, this may follow from the fact that if there is no non-empty witness to serve as the subject of predication, predication will not be just false but would not even take place. In fact, on this view a DP like *több, mint hat fiú* in HDistP will presuppose the existence of more than six boys, not just the existence of boys, which I believe is correct.²¹

²⁰ Naturally, further research may show that this effect derives from representational/procedural factors, like many considered in this paper.

²¹ We may observe in this connection that Diesing (1992) proposes to account for a somewhat similar intuition concerning the specific versus non-specific interpretations of bare and modified indefinites. Some of the crucial respects in which her proposal differs from the one developed here are as follows. (i) She assimilates specific (presuppositional) indefinites to restricted quantifiers and (ii) she assumes that non-specific indefinites always introduce variables captured by an existential closure operator.

Many of the observations motivating my analysis can be seen as reasons for rejecting Diesing's. Ad (i), treating specific indefinites as quantificational prevents her theory from accounting for the data that motivate K&R to assume that these DPs introduce plural individual discourse referents. In fact, Diesing's only empirical argument for the quantificational analysis comes from antecedent contained deletion. However, if any bit of S&B's theory of LF is correct, then the fact that we observe some LF movement does not in itself allow us to diagnose that

facts make this at least understandable. The former DPs are unambiguously "predicational" or "counters," whereas the latter may be either. Maybe English has both options for some QPs, too. Since English surface structure does not give a cue as to which we are dealing with, different speakers and/or different contexts may make one version more salient than the other.

Second, consider the fact that minden fiú 'every boy' and a legtöbb fiú 'most of the boys' cannot appear in PredOp. At first blush it might seem that the reason is that they are restricted quantifiers. But this cannot be the correct generalization. As was pointed out in (39), the determiners of DPs in PredOp need not be intersective. For one thing, kevés fiú 'few boys' is always in PredOp, whether it is proportional or cardinal. Similarly, sok fiú 'many boys' is free to have a proportional reading in PredOp. And finally, I pointed out in the discussion of (51) above that modified numerals in PredOp may be partitive, i.e. presuppositional, in which case they are not intersective, either.

The generalization I offered was that all the DPs PredOp accommodates are "counters." Minden fiú 'every boy' is naturally excluded then. But why is a legtöbb fiú 'most of the boys' excluded? (It is confined to HRefP.) According to the standard analysis, it is equivalent to 'more than 50% of the boys,' and a fiúknak több, mint 50 százaléka does occur in PredOp. One thing we might say here is that a legtöbb fiú is a counter, and it is just an idiosyncratic fact that it does not occur in PredOp (as is the case, although less sharply, with legalább hat fiú 'at least six boys'). Alternatively, we may say that a legtöbb fiú is not even a counter. In fact, this is exactly Sutton's (1993) informal suggestion, who observes the following contrast in connection with binominal each:

- (66) a.* The professors met most of the boys each.
b. The professors met more than fifty per cent of the boys each.

This contrast is paralleled by the following:

- (67) a.* There will be most of the boys in the yard.
b. There will be more than fifty per cent of the boys *(in the yard).

It seems, then, that being a "counter" is also in part a representational/procedural notion.

11. Appendix on Hungarian

Two issues arise in connection with Hungarian that need to be briefly commented on, even though I am not developing a syntax of the language here.

- (68) What positions do postverbal DPs occupy and what are their scope options?
- (69) As was observed in (31), the table summarizing the distribution of Hungarian DPs in the distinguished positions, a modified numeral must occur in PredOp unless (i) there is already another modified numeral in PredOp, or (ii) Focus is filled, or (iii) the verb is negated. Why?

Let us now begin with (68).

All literature on Hungarian agrees that postverbal DPs scope under preverbal ones (for the one exception, see fn. 5). What has never been seriously examined, to my knowledge, is what scopal options postverbal DPs have within their own domain. Given that the postverbal field is assumed to have a flat structure, É.Kiss's general proposal makes either of the following two predictions:

- (70) a. If operators in Hungarian c-command their scope at S-structure (in terms of first branching node c-command), then quantifiers in the postverbal field can be interpreted in either order.
- b. If operators in Hungarian precede and c-command their scope at S-structure, then quantifiers in the postverbal field are interpreted in left-to-right order.

The reason why these predictions have not been scrutinized, I believe, is that having more than one scopal expression in the postverbal field is not usual and the judgments are rather difficult. (This is understandable: Hungarian goes out of its way to provide means to disambiguate scope; the postverbal field is not a usual domain for scope interaction.) But if we now look at the postverbal field with the moral of work on English in mind, we can construct critical data that are quite straightforward to judge. Such examples involve plural definites, universals, and modified numerals, especially decreasing ones. The choice of 'a Tuesday' for Focus allows us to control for the possibility that a postverbal quantifier scopes out of the postverbal field; if the Tuesdays don't vary, scope interaction is confined to the postverbal field.

- (71) a. Egy keddi napon harapta meg hatnál több kutya Katit és Marit.
 a Tuesday day-on bit pfx six-than more dog Kati-acc and Mari-acc
 'It was on a Tuesday that more than six dogs bit Kati and Mari'
 OK (a Tuesday >) more than six dogs > Kati and Mari'
 OK (a Tuesday >) Kati and Mari > more than six dogs'
- b. Egy keddi napon harapott meg hatnál több kutya minden fiút.
 'It was on a Tuesday that more than six dogs bit every boy'

- OK (a Tuesday >) more than six boys > every boy'
 OK (a Tuesday >) every boy > more than six dogs'
- c. Egy keddi napon harapott meg hatnál több kutya kevés fiút.
 'It was on a Tuesday that more than six dogs bit few boys
 OK (a Tuesday >) more than six dogs > few boys'
 ?? (a Tuesday >) few boys > more than six dogs'
- d. Egy keddi napon harapott meg minden kutya kevés fiút.
 'It was on a Tuesday that every dog bit few boys
 OK (a Tuesday >) every dog > few boys'
 * (a Tuesday >) few boys > every dog'

What we find is essentially the same pattern as in English. 'Kati and Mari' and 'every boy' easily take inverse scope over a modified numeral. With great difficulty, 'few boys' can take inverse scope over another modified numeral (H. Bartos, p.c.). But it is unthinkable for 'few boys' to take inverse scope over a universal.²²

These facts are inconsistent with both (73a) and (73b). What this means is that scopal order in Hungarian is not fully determined by S-structure. The inverse scopal orders must be due to LF movement.²³

How can we account for the data? As an auxiliary assumption I postulate (following Brody 1989 and others) that the position of the finite verb is derived by fronting. V first moves to the head of the Aspectual Phrase (AspP) and merges with the overt prefix in Asp if there is any. In aspectually simple cases and, more importantly, if the sentence contains no Focus or PredOp, V stays there. If the sentence contains what I called Focus or PredOp, V moves on to the head of the next functional projection, leaving its prefix behind. For simplicity, I specify only that this head carries a [+F] feature and assume that Focus and PredOp are its alternative specifiers.²⁴ V-movement to [+F] is comparable to Subject/Aux inversion in English.

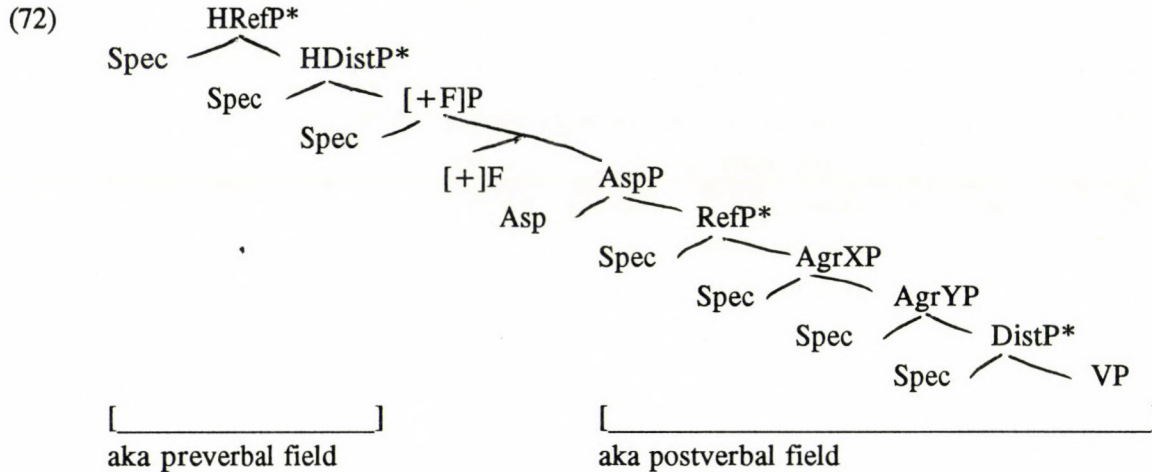
With these in mind, I will assume that Hungarian has two "scopal fields," the visible

²² I chose a subject-object word order to make the judgments simpler. It seems to me that the judgments are contingent merely on linear order, however.

²³ Bartos (1995) argues that movement into the preverbal field in Hungarian supports an Earliness type approach to spelling out Phonetic Form, and the above LF data are also compatible with this within the framework of Brody (1994).

²⁴ Or, there might in fact be two distinct functional projections here, one that hosts Focus and another that hosts PredOp; see also the discussion of (69). The choice is irrelevant here.

preverbal one and an invisible postverbal one which contains LF landing sites, as follows:



The preverbal field is essentially as has been assumed in the foregoing discussion, with Focus and PredOp as specifiers of [+F]P, in complementary distribution. As regards (H)Dist, I assume that each (H)Dist head has an event quantifier as its share, albeit I do not assume SharePs all over the place. The linearly $n + 1$ th event quantifier quantifies over subevents of the linearly n th; the event variable resides in the VP.

On their way from VP to the preverbal field, DPs pass through their agreement positions to check Case features. In addition, I assume that DPs move to HRefP and HDistP successive cyclically. This movement utilizes the RefP and DistP positions in the postverbal field.²⁵ In distinction to the above, DPs may move from their agreement positions to the specifier of [+F]P in one swoop.

Let us now turn to the postverbal field. The data reviewed suggest that in the postverbal field, Hungarian is much like English on S&B's description. I.e. there is LF-movement to DistP and RefP by the appropriate DPs, and there is reconstruction into VP. I note the following minor differences:

(i) RefP and DistP flank not just AgrSP but all the agreement positions, generated in a random order. This is to account for the fact that the order of postverbal DPs is independent of grammatical function and the fact that the linearly first can always take scope over the linearly

²⁵ There are various ways to execute this that I will not choose among. (i) DP first adjoins to the LF-relevant projection DistP and then hops to HDistP; similarly for RefP/HRefP. (ii) DP passes through DistP on its way to HDistP, but its intermediate trace, for some reason, does not prevent the subsequent LF-movement of another DP into the same position. (iii) We need to assume (H)RefP and (H)DistP recursion anyway. So we may postulate extra LF-relevant positions that serve no other purpose than hosting the intermediate traces of DPs moved to HDistP and HRefP. Considerations in Koizumi (1994) may be relevant here.

second.

(ii) There is no designated position corresponding to ShareP, at least not one that DPs move into. Recall that in the foregoing discussion I assumed Focus to be merely a functional counterpart of ShareP, which means that it does host bare indefinites that scope below HDistP but is not designed for specifically this purpose. On the other hand, PredOp was the functional counterpart of both agreement and VP-internal positions that host modified numerals in English. Since the Hungarian postverbal field has no [+F] head, it has no specifiers comparable to Focus or PredOp. The corresponding DPs are simply in their agreement positions at S-structure, and stay there or reconstruct into VP at LF.

When a DP is in the postverbal field at S-structure, it sits in its agreement position. If it is a universal (and, possibly, a DP like *több, mint hat fiú* 'more than six boys,' although the data are somewhat too subtle to be sure), it will have passed through DistP, which is a semantically significant step now, exactly as in the case of universal subjects in English.

There are two kinds of LF movement that may create postverbal inverse scope, by which I mean a scopal order that does not match linear order. One is the movement of an appropriate DP to RefP. The other is the reconstruction of any appropriate DP into VP. As in the discussion of S&B at the outset, I assume that only semantically insignificant movement can be undone by reconstruction. Thus a DP that has passed through RefP or DistP cannot be reconstructed. Essentially, all and only those DPs that are linked to PredOp by a parasitic chain can be reconstructed into VP.

These assumptions derive the data in (71) as follows. In (71a), the inverse reading is due to the movement of 'Kati and Mari' into RefP. In (71b) and (71c), the inverse reading is due to the reconstruction of 'more than six dogs' into VP; in the latter case the marginality of this reading needs an independent account, as in English. In (71d), the inverse reading is unquestionably out because 'every dog' cannot reconstruct into VP.

With this general picture in mind, let us turn to (69), the question pertaining to the behavior of postverbal counting quantifiers.

Recall that PredOp is in complementary distribution with Focus before the finite verb stem. It differs from Focus in two ways. First, DPs in Focus, denoters of singular or plural individuals, are associated with exclusion-by-identification, while DPs in PredOp do not receive any "extra" interpretation. (See É.Kiss (1994) and Szabolcsi (1994b).) Second, DPs in Focus are negated directly, while DPs in PredOp are not:

- | | | | |
|------|--|----|--|
| (73) | Mari ment el.
Mari went away
'It is Mary who left' | -- | Nem Mari ment el.
not Mari went away
'It is not Mari who left' |
|------|--|----|--|

- (74) Kevés fiú ment el. -- Nem ment el kevés fiú.
 few boy went away not went away few boys
 '(There are) Few boys (who) left' 'There aren't few boys who left'

Given these differences (plus another reason, having to do with the behavior of *csak* 'only,' discussed in Szabolcsi 1994b), it was convenient in the main text to distinguish Focus and PredOp. This paid off in view of the functional parallelism between S&B's ShareP and Focus with bare indefinites on the one hand, and S&B's AgrP/VP positions and PredOp on the other.

Nevertheless, the question in (69) remains. I adopt a suggestion by M. Brody (1989; p.c.). Whatever the exact relation between Focus and PredOp might be, they are specifiers of some head with a [+F] feature. (The head that has [+F] attracts the finite V.) The behavior of modified numerals, then, is exactly like that of *wh*-phrases in, say, English: they must check their [+F] feature overtly unless another item has checked its [+F] feature overtly. Modified numerals that remain postverbal are then analogous to *wh*-in-situ. Following Kayne (1983) and Longobardi (1991), Brody (1994) argues that *wh*-in-situ are linked to the [+wh] C by a secondary chain that is parasitic on the primary chain corresponding to overt movement. By analogy, postverbal modified numerals belong to a secondary chain linking them to the overt [+F]-checking position. This will make the correct prediction that a postverbal modified numeral does not take scope in PredOp; it takes scope in situ. This is confirmed by the fact that that another quantifier may scope between them. In (75), 'everyone' unambiguously scopes over 'few jokes:'

- (75) Mari / Hatnál több fiú mesélt mindenkinek kevés viccet.
 'It was Mary / There were more than six boys who told everybody few jokes'

Finally, we must ask why modified numerals are [+F]. A simple, perhaps also simplistic, answer might be this. The DPs that can introduce discourse referents and serve as targets of predication are actual or potential topics. The DPs that cannot introduce discourse referents are bound to be part of the comment. [+F] is perhaps nothing else than "is part of the comment."²⁶

²⁶ This view is consonant with the bipartite <grounding, claim> representations in Kálmán (1994). Kálmán argues that a [+F] constituent is part of the claim and the remnant of the grounding. I thank L. Kálmán and M. Brody for discussions on the feature [+F].

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