SEBASTIAN LÖBNER

THE CONCEPTUAL NATURE OF NATURAL LANGUAGE QUANTIFICATION

Basically, there are two ways of describing a thing. I can describe a certain person A by saying what he is like, say, a tall and fat man in his thirties, or by describing the role he plays in some connection, introducing him, e.g., as the person who sold me the house in which I am living now. The latter would be a functional description, the former a sortal description. The two ways of referring to things though radically different, cannot be completely separated. A certain role or function presupposes certain qualities and, on the other hand, certain distinctive qualities may lead to a special role. An effective description will contain both functional and sortal features of the object. In this paper, I will try to formulate suggestions about the nature of natural language quantification. In the first part, I will say something about the function of quantifiers, and in the second, about what quantifiers are like. Because of the limited space available, reference will be made occasionally to other papers where I discussed some of the points relevant here in more depth and detail.

1. The case of definite plural and mass terms

Let me start the functional description of quantificational expressions with the consideration of simple sentences without quantifiers. From a logical point of view, the simplest sentences relevant here are combinations of a one place predicate with a definite argument term, i.e. sentences of the logical form p(a). This type is represented by sentences with a definite subject and a simple verb phrase. In the tradition of Montague (1973) and Barwise & Cooper (1981), definite NPs were treated as quantifiers along with genuinely quantifying NPs such as every mouse. But a closer analysis of the syntactic and semantic properties of definite NPs shows that they are individual terms in the sense of predicate logic rather than second order predicates. While this corresponds directly to intuition with respect to definite singular count terms, it might appear counterintuitive when applied to definite plural and mass or collective terms. Doesn't a term such as the children or the government refer to more than one individual and cannot hence be considered an individual term? The answer is no. The objection is invalid since it is due to a confusion of ontology and conceptual/logical content. From a logical point of view, definite plural and mass terms refer to what they refer to as one object, i.e. as an individual, regardless if it consists of several distinguishable parts. For a detailed argumentation, the reader is referred to Löbner (1987a) and, in particular, Löbner (1985). Link (1983) has provided a technical frame in which this analysis can be formulated.

I regard a predicate as a conceptual device which applied to an

from
'Proc. of the '87 Debrecen Symposium on Logic and Language'.
Ed. I. Ruzsa, A. Szabolcsi, Akadémiai Kiadó. Budapest, 1987, p. 81–94

argument may yield one of two truth-values, say, 1 for "true" and 0 for "false". Natural language predicates, the meanings of verbs, nouns, adjectives and other expressions, obviously do not yield a truth-value for every argument whatsoever. They are conceptual instruments developed and appropriate for certain purposes, but inapplicable for others. There are, thus, in general truth-value gaps for every predicate, i.e. cases where for certain arguments the predicate yields neither of the two truth-values. For every predicate p, there is an opposite predicate p', the negation of p, which may or may not be lexicalized, if p is. p' yields a truth-value in exactly those cases where p does, but always the opposite one. Independently of predicate negation, sentences of the logical form p(a) (and, of course, of any other form) can be negated using an operator denoted here by the sign '-'. Sentence negation converts the truth-value of the sentence, provided it has a truth-value. There is a different sense of sentence negation, corresponding to a different notion of falsity, which assigns the value 1 also to those cases where the negated sentence lacks a truth-value. But this is not the type of negation which I am referring to here. Rather "negation" here always means the strong, presupposition-preserving variant. (Cf. Horn 1985 for the distinction between "internal", i.e. presupposition-preserving, negation and "external" negation.) Exactly what kind of presuppositions is preserved will be explicitly stated below. Obviously, in case of sentences of the form p(a), sentence negation and predicate negation exert the same effect on the truth-conditions: -p(a) is true, false, or truth-valueless iff p'(a) is true, false, or truthvalueless, respectively.

Hence, if we combine a definite plural or mass term with a simple predication, the effect of sentence and predicate negation should be the same, provided the analysis is correct. To check this, consider the following situation. Four pawns of a normal game of chess, and nothing else, is what the following sentences are about. These pawns, as usual, are each either white or black. With respect to these pawns, therefore, white and black yield opposite truth-values. The four sentences to be checked are

(1)	the pawns are white	d+p	(3)	the pawns are not white	-(d+p)
(2)	the pawns are black	d+p'	(4)	the pawns are not black	-(d+p')

I chose a neutral notation to combine d, which corresponds to the definite plural term, and the predicate term, in order not to anticipate the decision upon the logical status of d. Let case 1 be such that the pawns are black and let two of them be black and two white in case 2. Apparently we get clear truth-values in the first case, but not in the second:

(5)

case 1 ABCD		case 2 ABCD
0	(1)	?
1	(2)	?
1	(3)	?
0	(4)	?

In the mixed case, (1) and (2) are clearly not true; hence, (3) and (4) are not false. If (1) were false, (3) were true. But if the pawns are not white, they must be black, whence (2) would be true, which it isn't. Analogously, (2) cannot be false. Hence, both (1) and (2) lack a truth-value and consequently (3) and (4). It thus turns out that sentence negation and predicate negation do not differ if the argument place is filled by a definite plural term. The same is true of definite mass terms. Think of a sentence such as (6), together with its corresponding negations, in an analogous situation:

(6) the food is vegetarian

Apparently, besides eventual sortal restriction, predicates do not yield a truth-value when provided with an argument which is not homogeneous in terms of the relevant truth-criteria. In the case of definite plural terms a broad truth-value gap opens between the clearcut positive and negative cases.

(7)

false	(no truth-value)	true
0		●
00	0●	●●
000	00● 0●●	●●●
0000	000● 00●● 0●●●	●●●●

But this phenomenon is not restricted to definite plural or mass terms, as is shown by examples such as

(8) the Japanese flag is red (9) Istanbul is in Europe

The truth-value gaps are due to the existence of the following presupposition which applies to every predication whatsoever:

(10) **presupposition of argument homogeneity** (PAH)
The argument of a predication is homogeneous with respect to the predication.

PAH is what I would like to call a structural presupposition, as opposed to specific presupposition induced by certain lexical items. Another structural presupposition, e.g., is the presupposition of non-ambiguity of definite terms. PAH will play a role in different connection below again.

2. Fill the gap with quantification

The function of nominal quantification, now, is to bridge the gap between global falsity and global truth. If we replace the definite plural term in (1)-(4) by a quantificational NP, the truth-value gaps in the mixed cases are filled, as is demonstrated in (1q)-(5q):

(1q)	all pawns are white	q+p
(2q)	all pawns are black	q+p'
(3q)	not all pawns are white	-(q+p) or q'+p
(4q)	not all pawns are black	-(q+p') or q'+p'

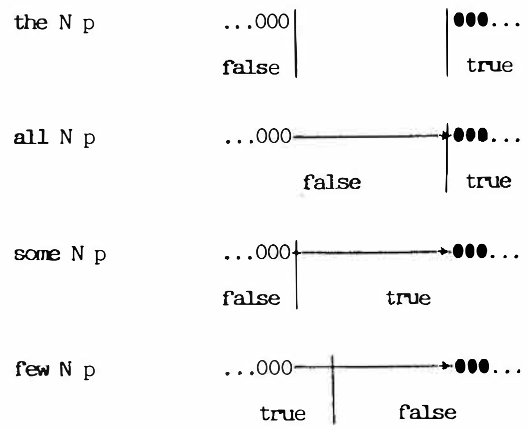
In addition to the disappearence of the truth-value gaps, (5q) shows that in the mixed case predicate and sentence (or equivalently quantifier) negation have different effects on the truth-value.

(5q)

case 1 ABCD		case 2 ABCD
0	(1q)	0
1	(2q)	0
1	(3q)	1
0	(4q)	1

If a predication is applied to an object which is complex in terms of the predication (in that it is possibly inhomogeneous), the two extremes of global truth and global falsity span a natural scale of possible cases. Quantificational sentences yield truth-values for all possible cases on the scale, in particular for those between the extremes. They usually do this in just cutting the scale into two parts, a negative and a positive range, as in the cases displayed in (11).

(11)



The quantifiers resulting in a bisection of the scale are those called monotone (cf. Barwise and Cooper 1981, van Benthem 1984, Löbner 1987b). They either provide a lower bound but no upper bound for the extent to which the predication applies or an upper bound but no lower bound. In addition more complex partitions of the scale can be constructed using expressions such as some but not all, three or seven etc.

The function of nominal quantifiers is thus the differentiation of an otherwise global application of a predicate to a complex object. The cases considered so far involve reference to a certain object such as a collection of pawns. In the count term cases this object constitutes what is traditionally called the domain of quantification. The underlying definite reference to the domain is

implicit in sentences such as (1q) but explicit in other quantificational sentences.

(12) all the pawns are white
(13) some of the pawns are white
(14) the pawns are all white
(15) the pawns are partly white

The last sentence, and possibly the one before, contain an adverbial quantifier, which in view of the function of quantifiers appears to be the most natural way to express quantification. Note that sentence (15) is ambiguous between a group reading roughly equivalent to (13) and a distributive reading under which each single pawn is to some part white.

In Löbner (1987b) I have called this type of quantification "referential" as opposed to "generic" quantification which does not involve reference to the domain of quantification but the consideration of a totality of abstract cases. The difference between those two types, however, is not relevant for the following discussion and will not be pursued further. So far, this may suffice as a functional description of quantification. In what follows, I will try to give a sortal specification, sketching what appears to be the conceptual characteristics of natural language quantification. The discussion will start with an analysis of non-nominal quantifiers, which exhibit these characteristics in a more perspicuous manner.

3. From FALSE to TRUE (or vice versa): the dynamic characterization

There is a set of basic non-nominal quantifiers in natural languages for which I have coined the term "phase quantifiers" (cf. Löbner 1987b). These operators can be understood dynamically in the sense that they express the transition from a negative to a positive section (or phase) on some scale or vice versa, or the lack of a transition. Let me start with temporal quantifiers which illustrate the idea in a very direct way.

3.1 Transitions in time

In a sense, the concept of phase-quantification is prototypically represented by the basic meaning of already and its correlates not yet, still and no more. I have presented an extensive analysis of the German schon ("already") in its various uses elsewhere (Löbner, to appear) and I will therefore restrict myself here to a very brief sketch of the main idea. The basic use of already is the one as a sentence adverb in imperfective sentences.

(16) it is already dark

Imperfective sentences are predicates about a time of reference t' (cf. Löbner, to appear, Löbner 1987c). The logical structure of a simple imperfective sentence such as

(17) it is dark

is just a first order one-place predication p with a temporal argument, i.e.

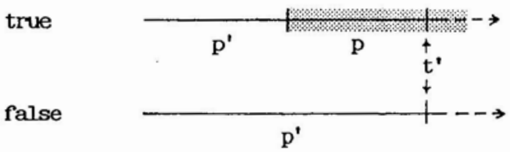
(18) p(t')

if, for the sake of simplicity, we neglect the contribution of tense to the sentence meaning. (17) is true if (16) is, but what <u>already</u> adds to the meaning of (16) is the condition that it is dark after not being dark. (17) is false iff it is not dark **yet**. The use of <u>already</u> presupposes a possible development from a state at which it is not dark to a state of darkness, i.e. from a negative phase in terms of the embedded sentence to a positive phase. (16) is true if the positive phase is reached at time t' and false if t' is in the initial negative phase. In general, a sentence of the form

(19) already(t', p)

is true if the reference time t' lies beyond the transition point of an initial negative phase in terms of p to a succeeding positive phase. It is false if t' lies before any transition point, i.e. if up to t' no transition has taken place. These conditions are illustrated in the following diagram:

(20) **already**(t',p)



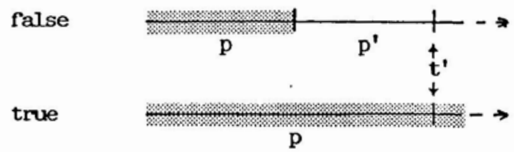
In contrast, the simple sentence (17) does not concern any development in time, but only one time t' and the respective state at that time in terms of p. Again, quantification - accepting for the moment that (16) is a case of quantification - means a differentiation between plain truth and falsity.

The adverb <u>still</u>, in those uses which are correlated to <u>already</u>, is in a twofold way opposite to <u>already</u>. The sentence

(21) it is still dark

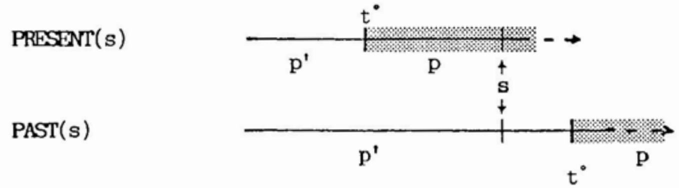
presupposes a development from **darkness** to the contrary and states that the reference time t' is **not** beyond the transition point. Thus, <u>still</u> in this use functions as the dual of <u>already</u>, being equivalent to simultaneous negation of the embedded predicate p and negation of the whole. In the diagram this is reflected by the exchange of the positive and the negative phase, combined with the exchange of the truth-values for the whole statement.

(22) **still**(t',p)



Another instance of temporal phase quantification is tense itself. The basic tense distinction is the one between past and non-past (cf. Comrie 1985), marked in English and in most other languages by the past and present tense, respectively. Tense locates the situation s expressed by the sentence relative to the time of utterance t°, either as past or non-past, non-past being a proximal and non-earlier phase with respect to t° and past a non-proximal, i.e distal, and earlier phase. Let <u>p</u> denote proximity in this sense and <u>p'</u> distality (see Löbner 1987c for details on the analysis suggested here.) [1]

(23) **PRESENT**(s)



As time goes by, situations pass from the non-past to the past, and tense specifies whether the transition has taken place.

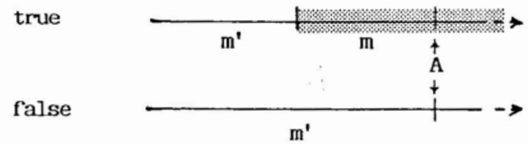
3.2 Transitions on other scale

A further group of relevant cases are the scalar adjectives. They involve all sorts of scales, such as size, weight, length etc., which again are cut into two phases according to criteria which are strongly context-dependent (cf. Bierwisch & Lang (eds.) 1987 for an extensive analysis). A sentence such as

(24) A is big

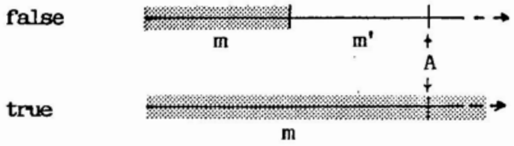
expresses that according to some such criterion, A is marked in size in the sense of being bigger than comparable unmarked cases.

(25) **big**(A)



(m for markedness). The antonymous adjective <u>small</u> is dual with respect to <u>big</u>, stating that the object is not bigger than unmarked cases.

(26) small(A)



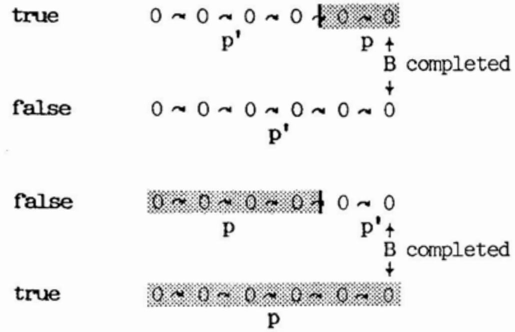
Antonymous pairs of adjectives are furthermore related by the condition that the upper bound of markedness must be lower on the scale than the lower bound. The scale is parted into three sections marked - unmarked - marked. Let me mention in this connection that many/few and much/little are further instances to be analysed in this sense (cf. Löbner 1987b).

3.3 Nominal quantifiers

There are two scales which play an eminent role in natural language semantics. One is the time scale already dealt with, and the other is the quantity scale. Quantity specifications are incorporated into the morphology of nominal expressions in many languages and quantity quantifiers such as the English every and some play a key role in sentence structure. I will argue that the standard quantifiers (or to be precise: determiners, in the terminology of Barwise & Cooper 1981) some and every can also be seen as phase quantifiers in the sense illustrated in the previous section. Let B be a domain of quantification and P a predication. Let me abbreviate universal quantification over B with respect to P as ∀(B,P) and existential quantification as ∃(B,P). If one evaluates ∀(B,P), one has to check the elements of B one by one with respect to the predication P. The sentence is true if we encounter no counterexample throughout and false otherwise. Similarly, ∃(B,P) turns out false if we find no positive cases and true if we do. Van Benthem (1987) has therefore proposed to model ∀ and ∃ as finite automata which perform such an evaluation procedure. Any such procedure is based on some enumeration of the elements of B. (In case of mass term quantification we can think of an enumeration of the elements of a partition of B instead.) An enumeration is a scale. Obviously, it does not matter, which scale we use (in van Benthem 1984 this property of natural language quantifiers is called QUANT). What matters is the occurrence of positive or negative cases and not, when they occur. We are therefore free to restrict the consideration to canonical enumerations which have at most one switch between positive and negative cases. In case of existential quantification, we must then start with the negative cases and proceede eventually to the positive ones, whereas for the universal quantification we proceede from evidence to counterevidence. This order is necessary if we want to keep the outcome open when we start, and it is natural in view of epistemic considerations. Proceeding this way, we will or will not have crossed the critical transition between opposite cases when we arrive at the end of the enumeration. The resulting picture is analogous to the others given above:

(27) ∃(B,P)

∀(B,P)



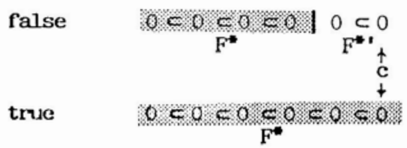
3.4 only

Only is a focussing particle. It operates on a partition of the sentence into foreground and background or focus and what I would like to call "cofocus". In general, the expression in focus is a predicate, which applies to something which is defined by the cofocus. Consider one example:

(28) Mary only loves John and two Italian linguists

Under the interpretation thought of here, only focusses on John and two Italian linguists. This is a predicate over something which is defined by the cofocus Mary loves -, (as ιx(Mary loves x)). Only adds the restriction to the sentence that the cofocus applies to nothing more than is explicitly specified in the focus. In view of the broad variety of uses of only, it generally appears reasonable to define "more" in turns of implicative scales: With respect to the cofocus C, A is more than B ("A C-more B"). To return to our example, in terms of the cofocus given here, "John and two Italian linguists" is more than "John and an Italian linguist", and this, in term is more than John alone, since if Mary loves John and two Italian linguists it follows that she loves John and an Italian linguist, and so on. We can now think of an evaluation procedure for only in the following way. The focus predicate F licenses certain objects in the role defined by the cofocus. We start from some object licensed by F and proceede in the upward direction of the implication scale up to the point, when the actual value of the cofocus is reached. If we remain within the range of objects licensed by F, the outcome is positive; if however we leave that range, the sentence is false. Let c be short for ιx(Cofocus x), and ⊃ for C-more, F* for "licensed by F":

(29) only(c,F)



4. The formal representation

These results can be formulated in mathematical terms along the following lines. We will first define the crucial notion of an admissible chain and then give a general definition of phase quantifiers, which applies to all cases mentioned above.

4.1 Admissible chains

In all the cases considered above the predication quantified applies to elements of a partially or linearly ordered domain. The domain of quantification itself is in every case a chain, i.e. a linearly ordered subset. It has an upper bound, e.g. the time of reference or the last element of the enumeration, and it contains at most one transition between opposite elements with respect to the crucial predication.

(30) Definition

If P is a predicate with domain $D(P)$, $<$ a partial ordering on $D(P)$, e an element of $D(P)$, then c is an **admissible chain** in terms of P, e, and $<$, for short $c \in AC(>,e,P)$, iff

(1) c is a chain with respect to $<$, i.e. a linearly ordered subset of $D(P)$.

(2) e is the maximum of c.

(3) (optional) c starts with a negative phase of P: for some $x \in c$: if $x' < x$ and $x' \in c$, then $P(x')=0$.

(4) monotonicity: P is a monotone increasing function on c (in terms of 0 and 1): for every $x,x' \in c$: if $x < x'$, then $P(x) \rightarrow P(x')$.

Applied to the cases discussed above, the respective admissible chains are as follows:

already(t',p)	p-monotone time intervals (t,t'] for some t earlier than t'
still(t',p)	p'-monotone time intervals (t,t'] for some t earlier than t'
big(A)	m-monotone chains $\langle X,\ldots,A\rangle$ for some X smaller than A
some(B,P)	P-monotone enumerations of B
only(c,F)	$F^{*\prime}$-monotone accumulations of c, F^* being defined as: $F^*(x) \leftrightarrow \exists y(y \supset x \,\&\, F(y))$

The optional third condition is required in case of presuppositional quantifiers such as <u>always</u> and <u>only</u>, but not in the other cases. The crucial condition is the monotonicity constraint. Due to that, $AC(>,e,P)$ is always a homogeneous class with respect to the property of containing positive elements. If any admissible chain contains positive elements in terms of P, then every chain does, because in this case the maximal element e common to all chains must be positive.

The monotonicity condition does not allow a transition from P-positive to P-negative elements in the chain. Hence, admissible chains can only differ in consisting of one or two phases in terms of P, and if there are two phases, then the negative phase comes first. Admissible chains have just the minimal length required in order to present a nontrivial alternative.

4.2 Phase quantifiers

The meaning of a phase quantifier, now, is that the respective admissible chains do or do not contain positive elements. To formulate this accurately, we need one further notion, a quantifier $\exists\forall$ tantamount to "all and any":

(31) Definition
For any first order predicate logic formulae ϕ and ψ: if

(i) $\exists x\, \phi$

(ii) $\exists x(\phi \& \psi) \leftrightarrow \forall x(\phi \rightarrow \psi)$

then $\exists\forall x(\phi : \psi) \leftrightarrow_{df} \exists x(\phi \& \psi)$

In particular, $\underline{\exists\forall x(B(x):P(x))}$ means that "the Bs are P". The sentence is true iff all Bs are P and false iff all Bs are not P. Obviously, $\underline{\exists\forall}$ is not always defined. It presupposes the homogeneity of B with respect to P. $\underline{\exists\forall}$ is self-dual, i.e.

(32) $-\exists\forall x(\phi:\psi) \leftrightarrow \exists\forall x(\phi:-\psi)$

We are now in the position to define the four possible phase-quantifiers, given any predicate P, a partial ordering $<$ on the domain of P, and an element e out of the domain:

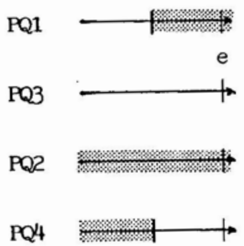
$\mathbf{PQ1}(>,e,P) \leftrightarrow_{df} \exists\forall c(c \in AC(>,e,P): \exists x(x \in c \,\&\, P(x))$

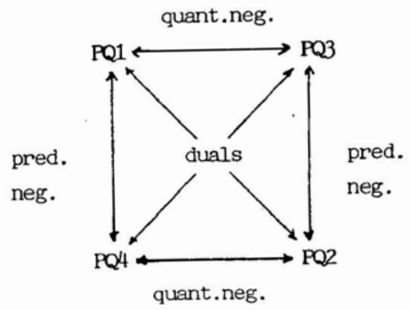
$\mathbf{PQ3}(>,e,P) \leftrightarrow_{df} \exists\forall c(c \in AC(>,e,P): -\exists x(x \in c \,\&\, P(x)) \quad = PQ1'(>,e,P)$

$\mathbf{PQ2}(>,e,P) \leftrightarrow_{df} \exists\forall c(c \in AC(>,e,P'): -\exists x(x \in c \,\&\, P'(x)) \quad = PQ1'(>,e,P')$

$\mathbf{PQ4}(>,e,P) \leftrightarrow_{df} \exists\forall c(c \in AC(>,e,P'): \exists x(x \in c \,\&\, P'(x)) \quad = PQ1(>,e,P')$

The four phase quantifiers represent the four possibilities displayed below and form a duality square:





Applied to the examples above, the definition yields:

already(t',p)	=	PQ1(later,t',p)
still(t',p)	=	PQ2(later,t',p)
not yet(t',p)	=	PQ3(later,t',p)
no more(t',p)	=	PQ4(later,t',p)
PRESENT(s)	=	PQ1(later,s,prox)
PAST(s)	=	PQ2(later,s,prox)
big(A)	=	PQ1(bigger,A,marked)
small(A)	=	PQ2(bigger,A,marked)
∃(B,P)	=	PQ1(after,b#,P)
∀(B,P)	=	PQ2(after,b#,P)
only(c,F)	=	PQ2(C-more,c,F*)

(b# = last element of B in the enumeration)

In Löbner (1987b) I have emphasized the importance of duality relations for the semantic analysis. The four types are in a natural way related to monotonicity and persistency properties (see Löbner 1987b: 76f). It appears that the type assignment is also significant in a different sense: crosslinguistic evidence suggests that the four types form a descending chain in terms of the frequency of proper lexical items and an ascending chain in terms of markedness in several regards. According to the definition of ∃∀, the phase quantifiers are only defined if the set of admissible chains is not empty and homogeneous with respect to the property of the existence of P (or P') -positive elements in the chain. AC can only be empty due to violation of the optional condition (3). In case of already and only this condition in fact yields the relevant presuppositions (cf. Löbner to appear for already). The homogeneity condition is always fulfilled due to the monotonicity constraint on admissible intervals.

In a sense, PAH is at work here again. These quantifiers are essentially predicates about the admissible chains. The chains that come into consideration are all alike with respect to the predication. We can chose a single chain for evaluation, and the result will not depend on the choice. But this is only possible if the set of relevant cases is kept homogeneous.

NOTES

1 The analysis reported here is a slight modification of the ideas presented in Löbner (1987c), but is in accordance with Löbner (to appear). I consider situations as pairs of a facts and a time component. Under the perfective aspect, the factual component is an event, which is located relative to the time of utterance t°. Under the imperfective aspect, the temporal component, i.e. the reference time called t' above, is located on the time scale.

REFERENCES

Barwise, Jon & Robin Cooper: 1981, 'Generalized Quantifiers and Natural Language', **Linguistics and Philosophy** 4: 159-219.

van Benthem, Johan: 1984, 'Questions about Quantifiers', **Journal of Symbolic Logic** 49: 443-466.

- : 1987, 'Semantic Automata', in J. Groenendijk, D. de Jongh, M. Stokhof (eds.), pp. 1-25.

Bierwisch, Manfred & Ewald Lang (eds.): 1987, **Grammatische und konzeptuelle Aspekte von Dimensionsadjektiven.** Akademie-Verlag, Berlin.

Comrie, Bernard: 1985, **Tense**, Cambridge University Press, Cambridge.

Groenendijk, Jeroen & Dick de Jongh & Martin Stokhof (eds.): 1987, **Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers**, Foris, Dordrecht.

Horn, Laurence R.: 1985, 'Metalinguistic Negation and Pragmatic Ambiguity', **Language** 61: 121-174.

Link, Godehard: 1983, 'The Logical Analysis of Plurals and Mass Terms: A Lattice-theoretical Approach', in R. Bäuerle, Chr. Schwarze, A. von Stechow (eds.) **Meaning, Use, and Interpretation of Language**, De Gruyter, Berlin, pp. 302-323.

Löbner, Sebastian: 1985, 'Definites', **Journal of Semantics** 4: 279-326.

- : 1987a, 'Natural Language and Generalized Quantifier Theory', in P. Gärdenfors (ed.) **Generalized Quantifiers: Linguistic and Logical Approaches**, Reidel, Dordrecht, pp. 181-201.

Löbner: 1987b, 'Quantification as a Major Module of Natural Language Semantics', in J.Groenendijk, D. de Jongh, M. Stokhof (eds.), pp. 53-85.

- : 1987c, 'Ansätze zu einer integralen Theorie von Tempus, Aspekt und Aktionsarten', in V. Ehrich, H. Vater (eds.) **Temporalität**, Niemeyer, Tübingen.

- : to appear, 'German schon - erst - noch: An Integrated Analysis', **Linguistics and Philosophy.**

Montague, Richard: 1973, 'The Proper Treatment of Quantification in Ordinary English', in J. Hintikka, J. Moravcsik, P. Suppes (eds.) **Approaches to Natural Language**, Reidel, Dordrecht, pp. 221-242.

SEMINAR FÜR ALLGEMEINE SPRACHWISSENSCHAFT

UNIVERSITÄT DÜSSELDORF, DÜSSELDORF, FRG.