DEFINITES*

SEBASTIAN LÖBNER

ABSTRACT

The paper develops a uniform analysis of the definite article in its various uses and of definite NPs in general. Starting from the observation that singular and plural mass and count definites all refer to single, though possibly complex objects (Ch. 1), it is argued that the logical role of definites is that of individual expressions (terms). To treat definites as quantifiers is logically inadequate, but (referential) quantification involves definite reference to the domain of quantification (Ch. 2). In Ch. 3 a distinction between functional, relational, and sortal concepts is introduced along with a corresponding subcategorization of noun occurrences. This enables a systematic categorization of the uses of definites, the main distinction being that between semantic and pragmatic definites (Ch. 4). Semantic definites represent functional concepts which exist independently of the particular situation referred to, whereas pragmatic definites depend on that situation for unambiguous reference. In sketching a more elaborated theory of anaphors it is finally argued that the definite article *always* indicates that the noun is to be taken as a functional concept. Definites in general receive functional concept interpretations, but the definite article is unique in its role: all other determiners require a sortal or relational concept interpretation of the noun.

1. INTRODUCTION

1.1. Definite Noun Phrases and Definite Descriptions

In what follows I shall refer to any NPs which consist of the definite article *the* and a following simple or complex noun globally as "definite descriptions" (DDs). DDs are only a special case of definite NPs. Definiteness is not tied to the occurrence of the definite article. Rather it is to be considered a property of certain NPs and ProNPs, including complex NPs with a demonstrative or possessive determiner, nouns with preceding genitives, as well as proper names, personal pronouns, and demonstratives. In German, certain prepositional phrases in which the preposition and the definite article are contracted to a reduced form (as in *zur* < *zu der*, *beim* < *bei dem*, *fürs* < *für das* and others) are also definite (for details cf. Curme 1964: 58ff).

1.2. Start and Goal

The main theme of this paper is the meaning and function of the definite article. Semantically, however, definite descriptions are not a natural class. The analysis is therefore embedded in a study of definite NPs in general. I shall try to follow some basic heuristic principles which aim at conceiving the semantics of the definite article in a global way rather than restrict the consideration to some special cases. The first assumption is in the spirit of rigid compositionalism:

(I)   The definite article has one and the same meaning in all its uses. This applies to count noun as well as mass noun cases, and for singular and plural likewise.

I shall not pick out some special cases like anaphoric and deictic uses of DDs. In principle, also generic uses of DDs should be covered, but for the moment I have nothing to say about them.

Many, more or less unrelated languages have a definite article. An analysis of the semantics of the definite article should not be language-specific:

(II)   The meaning of the definite article is essentially the same in different languages.

This principle does not rule out the possibility that the definite article in one language is used in cases where it is not used in another language. The meaning of an expression constrains its use but does not determine it. For example, in English in certain cases a possessive pronoun is used where in German or French the definite article is (at least) preferred:

(1)   English: He kept his hand in his pocket.
        German: Er hatte die Hand in der Tasche.
        French: Il avait la main à la poche.

I shall try to do justice to principle (II) by describing the meaning of the definite article in terms which do not seem to be language-specific. Opposed to languages which have a definite article there are many languages that do not. (Some languages without a definite article have equivalent ways of expressing definiteness explicitly; cf. Krámský (1976) for a survey.) Many languages, however, e.g. Japanese, normally do not distinguish between definite and indefinite NPs. These languages presumably manage to express the same kinds of things without an article. Thus the meaning of the definite article cannot have any "substance" like the meaning of nouns, verbs, or adjectives. Let me put it this way:

(III)   The definite article is just the indication of a certain way of using the noun it is attached to.

This specific way of using the noun (or processing its meaning) is marked by the explicit forms of definiteness in those languages which possess that possibility and it is not made explicit in those which lack a comparable device. This does not mean that the definite article has no meaning at all. Nobody would say that number has no meaning. But number, too, is not made explicit in many languages.

1.3. Singular and Plural, Mass and Count Definites

In traditional formal semantics, a sharp distinction is drawn between singular and plural DDs and between DDs with a count or a mass noun head. Semanticists were forced to consider these cases as different, as long as they kept to the Russellian analysis of definites. According to Russell (1919: Chs. 15, 16) singular count noun DDs are to be taken as existential quantifiers uniquely describing individuals in the sense of logic. Plural DDs, however, would not correspond to individuals but to classes of individuals. Thus, singular and plural DDs and consequently the singular and the plural definite article do not only have different meanings but even different logical types. Singular mass nouns seem to represent yet another type: they do not fit at all into any treatment along these lines. In view of the linguistic data, however, there is no evidence for such fundamental distinctions.

If DDs of the three possible kinds – plural count, singular count and singular mass[1] – differ in meaning, it would be most natural to attribute the difference to grammatical number and to the subcategorization of the noun, instead of treating the definite article as ambiguous.[2] It has been pointed out by Hawkins (1978:110ff.) and other authors that the syntactic and referential role of the different kinds of definites is the same: all three types of DDs have the same complex range of uses.

As Bunt (1985:10ff.) has argued, the mass/count distinction does not apply to nouns as such but to noun occurrences. Some syntactic configurations require a mass noun interpretation and others a count noun interpretation. In particular, indefinite determiners and determiner phrases split into two subclasses with little intersection. Definite determiners however, are not discriminative. It seems to be reasonable to consider them neutral with respect to the mass/count distinction.

As for anaphoric DDs, to mention only one frequent case, the DD inherits the interpretation of the noun from its antecedent. Consider the following two sentences (2a) and (2b) and their continuation (3):

(2)   a.   She always puts an apple into the salad.
       b.   She always puts apple into the salad.

(3)   The apple makes the salad a little sweeter.

Apart from being introduced as a count or a mass term in (2a,b), there is no clue to decide the mass/count status of the noun *apple* in (3). Taken in isolation, the syntactic configuration *the* + singular noun in (3) is unspecific.

   The most natural interpretation of DDs is to take them as referring to one object in every case. Consider e.g. an anaphoric plural DD, such as *the children* in the following example

(4)   She has two children. ... The children are twins.

The DD refers to one complex discourse referent introduced in the first sentence as "two children". The plural in the continuation does not mean that there are several different discourse referents but that the discourse referent in question is composed of several units of the same kind.

   The mass/count status and the grammatical number of the head noun can be considered part of its meaning. The definite article indicates that the DD refers to that, possibly complex, object to which the noun, as a predicate, applies in the situation referred to. *The children* refers to the entire complex object to which *children* applies; *the child* to the entire object to which *child* applies (which is necessarily only one child); and *the snow* to the entire object to which *snow* applies.

   Link (1983) has developed a logical system that allows a uniform treatment of all DDs in this manner. Individuals in Link's system can be either individuals in the classical sense, or "sums" of simple individuals, or homogeneous quantities of the same substance.

   In the next section I will provide semantic evidence for the adequacy of such a system for the interpretation of natural language NPs.

2. THE LOGICAL TYPE OF DEFINITES AND THEIR RELATIONSHIP TO QUANTIFICATION

Russell has introduced the idea that the individuals of first order predicate logic be identified with those objects to which proper names refer and which (referential) singular count DDs "describe". Plural NPs, in contrast, do not correspond to individuals but to classes, i.e. entities of a higher logical type (cf. e.g. Russell 1919: Chs. 15/16). For mass nouns there was no room at all in the logical framework. This is, however, only a singular theoretically possible application of first order predicate logic to natural language semantics, and in fact an inadequate one. In what follows, I will argue on logical grounds for a uniform treatment of singular, plural and mass DDs as individuals, which is one precondition for a uniform analysis of the definite article. An analysis with these formal properties and an alternative predicate-logical framework has been presented by Link (1983).

Formal semantics, from Montague (1973) to Barwise & Cooper (1981), has adopted Russell's identification of singular count terms and individuals. Definite NPs, now, however were "raised" to generalized quantifiers, denoting sets of properties of individuals rather than individuals. This step made it possible to treat definite, indefinite, and quantificational NPs uniformly as second order predicates, yielding a correspondence between the syntactic structure and the semantic interpretation of NP+VP-sentences which could not have been closer.

The relationship between syntax and semantics should, however, be subject to empirical investigations and not be fixed as strictly isomorphic as is done in the dogmatic approach of Montague Grammar. Syntax and semantics are (at least possibly) governed by independent regularities. In particular, it is not open to an arbitrary decision what logical status is to be assigned to certain classes of expressions. Individual terms e.g., and quantifiers play specific and different roles in the system of first order and higher predicate logic. If NPs are assigned the status of one or the other kind of expression in the logical framework used, then their actual semantic properties should match those of their "translations" in logic. It will be argued, that natural language NPs do not form a logically uniform class. Definites are individual terms and as such have different logical properties than quantifiers, which in turn are the proper correspondents of quantificational NPs.

2.1. Definites are Individual Terms

In the following discussion, I assume generally that natural language sentences and the logical formulae thought of as equivalents have a truth-value only if certain conditions (i.e. presuppositions) are fulfilled. A sentence or formula is either true or false or neither. A sentence is true if and only if its negation is false. Negation, hence, is the strong, presupposition-preserving variant, and falsity must be distinguished from mere non-truth. Consequently, a sentence φ and its negation $\sim\varphi$ either have opposite truth-values, or both lack a truth-value.

In predicate logic, individual terms, or "terms" for short, combine with predicate symbols to form a formula. Let P be a one-place predicate constant and t a term, then $P(t)$ is such a formula. For every predicate symbol P we can introduce its negation $\bar{P}$. $\bar{P}(t)$ is true if and only if $P(t)$ is false. Let us say "P is true for t" if $P(t)$ is true. The latter expression can also be used with arbitrary NPs in the place of t. The following conditions are formulated independent of the specific syntactic status of individual terms.

In predicate logic, individual terms have the following logical properties, which are all concerned with negation:

(T1)   Individual terms cannot be negated.

(T2)   (Consistency) If P is true for an individual term t, then $\bar{P}$ cannot be true for t.

284

(T3) (Relative Completeness) If P is false for an individual term t, then $\overline{P}$ is true for t.

We can now decide if an NP must be analysed as an individual term or not by checking the respective properties:

(T1') The NP can be negated.

(T2') If (NP+VP) is true and $\overline{VP}$ is the negation of VP, then (NP+$\overline{VP}$) cannot be true.

(T3') If (NP+VP) is false, then (NP+$\overline{VP}$) is true.

Let me start the discussion with the observation that indefinite NPs are not terms since they characteristically violate (T2). Cases where both a predicate and its negation yield true sentences with an indefinite NP are easy to imagine.

(1) Many people have dish-washers and many people don't.

(2) One girl is tall and one girl is small.

(3) I have a car and you have a car.

The latter is not an overt case but is usually interpreted in a way that *I have* is incompatible with *you have*.

Also condition (T3) does not hold for indefinite NPs in general. If, say, *three students are Italians* is false, it does not follow that three students are not Italians. (Imagine a case of four students, two Italian, and two not.)

Quantificational NPs, to exclude a second group of NPs, can violate each of these conditions. Quantifiers are semantically second order predicates (cf. Barwise & Cooper 1981, and Löbner 1986) and as such they can be negated. Note that the negation of a quantifier dominating a sentence is tantamount to the negation of the whole sentence ("outer negation") and, in general, has a different semantic effect than the negation of the predicate ("inner negation"). At least some quantificational NPs can be negated:

(4) Not $\left\{ {}^{all}_{many} \right\}$ children are watching the TV.

(T2) is violated by the so-called "weak" quantifiers including *some N, many N* and the like (Cf. Barwise & Cooper 1981:182, 219). Universal quantifiers fulfil condition (T2), but not (T3), as the following examples show. Let us consider a group of children and assume that children are either boys or girls. Then the predicate "boy" is the negation of the predicate "girl" (for children). Now, the sentences

(5)   All children are boys.

(6)   All children are girls.

cannot both be true.[3] This illustrates the consistency of universal quantifiers. But they can both be false (if the group of children is mixed). And this contradicts condition (T3), since the falsity of (5) does not automatically lead to the truth of (6).

   In contrast to quantificational and indefinite NPs, definites fulfil all three conditions. To begin with, they cannot be negated (T1):

(7)   *Not $\begin{Bmatrix} \text{the children are} \\ \text{the child is} \\ \text{the music is} \end{Bmatrix}$ playing.

Negation is possible, though, in combination with focusing on the subsequent NP:

(7) a.   Not $\begin{Bmatrix} \text{the CHILDREN are} \\ \text{the CHILD is} \\ \text{the MUSIC is} \end{Bmatrix}$ playing.

Focusing affects, however, the semantic structure of the sentence. Sentences (7a) are different from sentences (7). (7a) presupposes that somebody (or something) is playing and denies that it is the referent of the NP who is playing. Horn would call this an instance of "metalinguistic negation" (cf. Horn 1985, in particular pp. 166 ff.). In contrast to the truth-functional presupposition-preserving "descriptive negation", with which we are concerned, metalinguistic negation can be applied to virtually every part of a sentence. Note that cases such as (7a), but not (4), call for a contrastive *but*-conjunction.

   In addition to condition (T1), definites obviously satisfy the consistency condition (T2): it is impossible that both a predicate and its negation are true for a definite NP. Sentences such as (8) are contradictions.

(8) $\begin{bmatrix} \text{The children are} \\ \text{The child is} \\ \text{The music is} \end{bmatrix}$ loud and $\begin{Bmatrix} \text{the children are} \\ \text{the child is} \\ \text{the music is} \end{Bmatrix}$ not loud.

Condition (T3) is tantamount to the claim that the negation of the whole statement is equivalent to the negation of the predicate. For singular definites the equivalence is obvious.

(9)   Cesar is a good fellow.

is false if and only if

(9′)   Cesar is not a good fellow.

is true.

But how about plural definites? In the Russellian tradition of formal semantics the plural definite article is treated as a synonym of *all*. If this were correct, plural DDs should violate the completeness condition in the same way as universally quantifying NPs do. They should exhibit a difference between the negation of the predicate and falsity of the sentence.

Let us consider an example. Suppose there are ten children playing in the backyard, near a pool of muddy water. Some of them may have fallen into that pool and are dirty. The others are clean. We assume that each child is either clean or dirty. The predicates "dirty" and "clean" can thus be considered negations of each other in this particular situation. If the group of children is homogeneous, i.e. if either all of them or none are dirty, there are no problems: sentences (10) and (11′) are true if (11) and (10′) are false and vice versa:

(10)   The children are dirty.

(11)   The children are clean.

(10′)   The children are not dirty.

(11′)   The children are not clean.

But let us now assume that some of the children are dirty and some are not. Then, obviously, neither sentence (10) nor (11) is true. But they are not false either, not in the sense of "false" used here. If they were false, in the strong sense, then their respective negations (10′) and (11′) would be true. But they aren't. (10), (11), (10′) and (11′) are thus all truthvalueless.

It may be worthwhile to point out that the truth-value gap observed here is not specific for plural DDs. Such gaps occur in a completely analogous fashion whenever the predicate at issue happens to apply only to part of the indiviual referred to. Imagine little John among those children. John did not fall into the pool but stepped into it up to his knees. He is partly dirty but the rest of him is clean. Consequently the sentences (12) and (12′) and their negations all lack truth-values in that particular situation:

(12)   John is dirty.

(12′)   John is clean.

If a definite NP is used as an argument of a predicate, the predicate must be

applied to the referent of the NP as a whole, as one thing. But if the referent is not homogeneous with respect to the predicate, if it is split, so to speak, by the predicate, then the predicate will not yield a truth-value. (One way out would be to take a majority view. To consider the children dirty, e.g., if the majority of them are. But in this case, again, the application of the predicate would be such that P is true if and only if P is false.)

For every NP there is a range of predicates that yield a truth-value in a given situation, and under the constellation considered the predicates "dirty" and "clean" do not belong to the range of *the children*. (They do belong, however, to the predicate range of *all children*.)

Hence, since for arbitrary predicates P, either P is true and its negation false or neither P nor its negation yield a truth-value, it can still be maintained that if P is false then its negation is true. The relative completeness condition holds for all kinds of definite NPs. There may, however, be truth-value gaps. Completeness is thus only completeness *relative* to the respective range of predicates.

We have thus shown that all definites and only definites exhibit the characteristics of individual terms in the sense of predicate logic. In particular, they do not share the properties of quantificational NPs which characteristically violate conditions (T1) and (T3).[4]

The analysis of definite NPs as individual terms makes a theory of predication both necessary and possible. If the denotation of an NP is a complex object, there are in principle several ways to apply a predicate to it. Some predicates will apply to the whole via application to every part (distributive predicates like *snore*), others will apply to the whole but not to parts (collective predicates like *gather*), and some will be unspecific (*play, weigh*). In general the global application to the whole will be less strict than the explicit application to every single element in case of NPs containing *every* and *each*.[5]

2.2. The Relationship Between Definites and (Referential) Quantification

It may be useful at this point to go further into the details of the relationship between definites and quantification. In Barwise and Cooper (1981) and in Löbner (1986), a general notion of quantification is outlined, according to which there is always a fixed domain of quantification involved. Qantification, then, specifies if and to what extent the predicate which is combined with the quantifier applies to elements or parts of the domain of quantification. In Löbner (forthcoming) it is argued that two kinds of quantification must be distinguished: generic and referential quantification. The basic picture of Generalized Quantifier Theory, with a given domain of quantification as the basis of quantifications, applies only to referential quantification. Let me briefly illustrate the difference.

Referential quantification refers to a given domain of quantification. Referential quantifiers can be paraphrased by partitive construction in which the domain of quantification appears explicitly as a definite NP. Consider the following cases:

(13)   a.   {All / Most / Many / Few / Some / No}   apples are sour.

          b.   {All / Most / Much / Little / Some / No}   water is poisoned.

If (13) refers to a certain quantity of apples (water), out of which some may be sour (poisoned) and some not, (14) is a paraphrase of (13):

(14)   a.   {All / Most / Many / Few / Some / None} *of the* apples are sour.

          b.   {All / Most / Much / Little / Some / None} *of the* water is poisoned.

But the sentences in (13) might also be taken as generic statements about apples and water in general. And under this interpretation, (14) is not a paraphrase.

This distinction becomes clearer if one considers adverbial instead of nominal quantification. Under the referential interpretation, (13) can be paraphrased as (15), with a definitive subject and a quantificational adverb of extent:

(15)   a.   The apples are $\left\{\begin{array}{l}\text{all}\\ \text{to the most part}\\ \text{to a great part}\\ \text{to a small part}\\ \text{to some part}\\ \text{(not)}\end{array}\right\}$ $\left.\begin{array}{l}\\ \\ \\ \\ \\ \end{array}\right\}$ sour.

          b.   The water is   poisoned.

The corresponding paraphrases for the generic interpretation would be quite different. (16) has an indefinite plural subject and a quantificational adverb of frequency:

(16)   a.   Apples are $\left\{\begin{array}{l}\text{always}\\ \text{mostly}\\ \text{often}\\ \text{seldom}\\ \text{sometimes}\\ \text{never}\end{array}\right\}$ sour.

          b.   Water is   poisoned.

The examples show that referential quantification involves definite reference to a domain of quantification. In fact, referentially quantifying NPs can be used in the same configuration as simple plural count or singular mass DDs referring to the respective domain of quantification. The effect of a prenominal or adverbial quantifier in addition to the reference to the domain of quantification, then, is a differentiation of the predication. Without a quantificational expression there is only the alternative between global truth and global falsity of the predicate with respect to the domain referred to. Quanti-

fication allows the expression of intermediate cases and thereby extends the predicatè range for the sentence. This point is also illustrated by examples (10)-(11) and (5)-(6) above. If the group of children is mixed, the respective predicates do not belong to the range of the definite NP *the children*, but they belong to the range of any quantificational NP with the head *child/children*, regardless of the composition of the group.

It follows, again, that the logical and the syntactic status of definite NPs and quantificational NPs is different. Quantificational NPs cannot replace the DD in sentences with adverbial quantifiers or in partitive constructions[6] simply because the same predication cannot be quantified twice.[7]

2.3. Quantificational Theories of DDs

Quantificational theories of noun-phrase semantics, from Montague's PTQ (1973) to Generalized Quantifier Theory (GQT), as introduced in Barwise and Cooper (1981), treat all NPs as quantifiers. Even simple personal names and pronouns are raised to the level of second order predicates (i.e. quantifiers in the sense of GQT). This way a main obstacle to a logical semantics for natural language seemed to have been overcome: the apparent logical inhomogeneity of the category of NPs. The basic idea of Montague (1970a) was a grammar for natural language with a one-to-one correspondence between syntactic and semantic structure, a very rigid version of Frege's principle of compositionality. A closer investigation of linguistic data of the kind considered suggests, however, that NPs are not a homogeneous syntactic and semantic category and that the relationship between syntax and semantics might be more complex than in Montague's original model. Meanwhile, revisions of the uniform treatment of NPs are being developed, cf. Link (forthcoming) and Lønning (forthcoming):

Independent arguments against a quantificational treatment of definites (and indefinites) have been put forward from the standpoint of discourse representation theory (Kamp 1981, Heim 1982, Barwise 1985). Quantification introduces scope boundaries that cannot transgress the boundaries of a sentence. This fact is incompatible with the idea of anaphoric reference as coindexing of discourse referents. Although these arguments are not absolutely cogent – in principle, anaphora might be analyzed in a different way – they are at least highly suggestive. (This does not imply that I consider the Discourse Representation Theories referred to as an adequate model for the general semantics of NPs. I'll come back to this point towards the end of the paper.)

Let me conclude the discussion of quantificational theories of DDs with a last point. Russell's analysis considers existence and uniqueness of the referent of the noun of singular count DDs as the essence of the meaning of the definite article. The sentence *the N VP* "translates" into

(17) $\exists x(N(x) \ \& \ VP(x) \ \& \ \forall y(N(y) \rightarrow y=x))$

In this interpretation, the role of the noun is that of a *sortal* concept: there is one and only one object of the sort N. Hence the uniqueness clause; which is necessary because, for any sortal concept N, it is always possible that there is more than one object of that sort. In what follows, I shall argue that this is *not* the typical use of the definite article. Often the definite article is combined with a noun that represents a concept which necessarily applies to only one object (at most), cf. DDs such as *the sun, the present president of the U.S., the smallest prime number.* If N is such an inherently non-ambiguous expression, the formula (17) becomes in some cases logically equivalent to (18), since the uniqueness clause is then redundant:

(18) $\exists x(N(x) \ \& \ VP(x))$

This, however, is the standard Russellian analysis of the sentences of the form *(a* N)VP, with the *in*definite article in place of the definite. But this consequence is clearly unacceptable. With such nouns, the indefinite article is not only not equivalent to the definite article but unacceptable – another serious linguistic inadequacy of the existence-plus-uniqueness account, cf. (19):

(19)   a.   The smallest prime number is 2.
       b.   A smallest prime number is 2.

2.4. Uniqueness vs. Non-ambiguity

The problem with Russell's account is that it is not uniqueness which is essential to definiteness. Uniqueness is a (possible) property of sortal concepts, namely the property that there is only one object of the respective kind. Uniqueness theories of definites consider the head noun complex of a DD to provide sortal information about the referent. This sortal information must apply to exactly one object in the respective context. Thus, the role of the noun is to provide contrastive information which allows to single out the intended referent. This conception lies at the ground of Russell's analysis as well as the approaches of Hawkins and Heim.

Heim, for instance, takes the definite article to impose the constraint that there must be a discourse referent previously mentioned or else "familiar" (i.e. immediately salient for deictic DDs), which satisfies the sortal information provided by the head noun. Definiteness is thus reduced to the property of the referent of being the unique object which exhibits certain characteristics that distinguish it from other possible referents.

The basic idea of Hawkins approach is similar. He considers it essential for definiteness that the referent belongs to a certain "shared set". Both Heim and Hawkins claim that their theories are elaborations of Christophersen's familiarity theory. Christophersen, however, explicitly denies the uniqueness approach to definiteness: "*the* does not mark a contrast; it does not select a single object from among several things contemplated." (1939:70). His con-

ception of familiarity is different. For him, the definite article associates the referent with previous experience. "By the unambiguous reference to outside knowledge (not contained in the idea of the word itself), the word is felt to stand for one definite individual ..." (1939:73). It is thus not uniqueness, but non-ambiguity[8] which is essential for definiteness. Non-ambiguity is the property of an expression that allows for only one interpretation (possibly under additional constraints). Uniqueness of reference is always an accidental property of a sortal concept, – the property that it happens to apply to only one object. Non-ambiguity, in contrast, may be an inherent property of (also non-sortal) concepts. Imagine a group of men and women. The concept "oldest woman among them" is inherently non-ambiguous; due to the superlative there cannot be more than one objects to which this concept applies. Under the same circumstances, certain sortal concepts, e.g. "woman with white hair" or "woman older than eighty", may allow a unique reference to the same person, but it is then merely accidental that there is only one person to which these descriptions apply. I agree with Christophersen that the crucial feature of definiteness is non-ambiguity of reference.

Situation Semantics has recently presented an idea which points into the same direction. Barwise and Perry (1983:152ff.) regard definite NPs as functions from situations to objects. In the remainder of the paper I shall develop a similar line of reasoning, arguing that definites are unambiguous functional expressions, assigning the head noun a quite different conceptual role than that of a sortal concept. The properties of existence and non-ambiguity are already explained by the logical status of definites as *terms*. If terms refer at all, they refer to something and they refer unambiguously. But I shall formulate a more substantial theory of definites below.

3. PRELIMINARIES TO A SYSTEMATIC CLASSIFICATION OF DD USES: A SEMANTIC SUBCATEGORIZATION OF NOUNS AND CONCEPTS

Those studies that try to cover a broader range of DD uses – Hawkins (1978) and Heim (1982) – regard the anaphoric (and deictic) uses of DDs as the paradigm cases. Other uses they try to cover by some sort of generalization of the anaphoric case. But there remain a variety of uses which evade such a treatment and cannot be handled satisfactorily in either approach. Hawkins' Location Theory fails to apply to such simple sentences as *Close the window* (cf. Chr. Lyons 1980), and he is unable to formulate in a precise way conditions under which associative anaphoric and similar uses are possible. Heim would need essential amendments to her theory for all but the anaphoric uses. If other uses were incorporated not much would be left of the original idea of File Change Semantics. I believe that the path taken by Hawkins and Heim – i.e. starting from the anaphoric and deictic uses of DDs as the basic pattern – is a dead-end. Instead, I shall take, as it were, the opposite starting point: those cases where the definite article is necessary for semantic reasons.

It is these uses which should provide the clue to the semantics of the definite article. For a proper definition of these cases and a systematic classification of DD uses we first need an appropriate semantic subcategorization of nouns.

3.1. Sortal and Relational Nouns

It is usually assumed that nouns can occur with any determiners, in particular with the definite article as well as with the indefinite (or, equivalently, without any article in case of mass and plural count nouns).

There are, however, semantic subclasses of nouns that differ in the range of determiners with which they combine in certain contexts. Some nouns, in a sense, require the definite article. Also, some nouns, such as *father*, occur with possessive complementations while others, e.g. *man*, do not. In mainstream modern linguistics the category N of nouns is usually not subdivided. In the work of more traditional grammarians, however, we can find such distinctions; Cf. e.g. Behaghel (1923, I: 22ff.) who distinguishes between "absolute Begriffe" and "relative Begriffe" (absolute and relative concepts). It is an open question whether the semantic subcategorization I have in mind requires a syntactic differentiation. I shall first introduce the subcategorization as one of lexical noun meanings, just in order to illustrate the difference by means of typical cases. Later it will become clear that the distinctions apply to uses or occurrences of nouns rather than to nouns as such.

Nouns have two basic interpretations. Taken in isolation they can be considered either *sortal* nouns or *relational* nouns. Sortal nouns classify objects, whereas relational nouns describe objects as standing in a certain relation to others. These are two fundamentally different ways to characterize objects, and one cannot be reduced to the other.

Let me illustrate the difference with something like a minimal pair: *woman* and *wife*. *Woman* is a sortal concept. It is the conjunction of other sortal concepts such as *human, female, adult*. Logically, sortal concepts are just one-place predicates. They can be negated, and some sortal nouns have lexicalized negations within a certain range of objects (cf. the complementary character of *man* and *woman* within the range of human adults). *Wife*, on the other hand, is a relational concept. Although it contains also sortal specifications ("human" and "female") the essential meaning is being the female spouse of someone. A "wife" is always the wife *of* someone (although in certain contexts the husband may become the victim of abstraction). It is the relationship of being married to a man which determines the referent of *wife*. This relationship cannot be replaced by a conjunction of one-place predicates. Even the complex sortal noun *married woman* is not synonymous with *wife*, cf. *John's married woman* as opposed to *John's wife*. If one abstracts from the relationship and regards the sortal content of a noun only, sortal and relational nouns can become, in a sense, coextensional. Thus every woman (in the more general sense of female human) is a daughter, and every daughter

is a woman, so *daughter* and *woman* (as sortal concepts) have the same extensions – but they have of course quite different meanings. Relational nouns are logically not one-place predicates but correspond to predicates with two or more arguments (i.e. to relations).

Many nouns are ambivalent in that they can be used as sortal nouns and as relational nouns. An example may illustrate this point. When I enter a furniture shop and ask for "a table" I use *table* as a sortal noun. As such it contains certain conventional characteristics concerning size, shape, height, and proportions (among others), that distinguish tables from beds, trunks or an orange box. But if John invites Mary to his sort of improvised room, it may well happen that he points to an orange box and tells Mary: "This is my table. Please, take a seat". In this case he is using the noun as a relational noun. The object in question exhibits the features of a typical table only to a very modest degree, but what he means is that it plays the role a table plays, it *functions* as a table.

3.2. Subtypes of Relational Nouns

The type of relational nouns can be further subdivided into several subtypes in a way that will be relevant for the following discussion. The most important subclass is that of functional nouns. For functional nouns, the relation that defines their reference is a function. Functions relate objects unambiguously (or one-to-one) to others. Hence, functional nouns are inherently unambiguous, and this semantic property matters in the present discussion. Functional nouns (if they refer at all) always identify a referent. Sortal nouns, in contrast, only classify their referents. Under certain circumstances it may happen that there is exactly one object which fits the classification. But this would be accidental. Functional concepts, e.g. *mother of John*, do not allow for more than one referent.

I assume that the functions underlying functional nouns are in general partial functions. But for the sake of simplicity I will not make this explicit in each case.

Functions assign values to arguments, unambiguously. What, then, are the arguments of the functions underlying the meaning of functional nouns? Consider a functional noun such as *weight*. *Weight* is clearly a relational noun. It is a certain measure, related in a certain way to physical objects. And since every object has only one weight at a time, *weight* is a functional noun. Now, weight is always the weight *of* some object. Hence some object is involved as an argument: *weight* is a function from objects to values on a certain scale. But the weight of an object is again variable. It depends on time, location, and circumstances. My weight today is different from my weight tomorrow, it is different on earth and on the moon, and it would be different if I ate more. In possible world semantics one would say that the referent of a functional noun also depends on a possible world index. I prefer to talk of situations instead. In view of the fact, that the referent (or value) of a

functional noun depends, in general, on the situation referred to, I regard all functional nouns as involving a situation as one of their arguments. Different functional nouns may relate to different components of the situation, and for special purposes it is certainly important to distinguish subclasses of functional concepts, e.g. those with time-dependence and those without. Others, in particular mathematical functional nouns, may appear to be completely independent on the situation, but since nothing is really absolute it is better to provide for a situational argument in case it may be needed.

The situational argument of functional nouns plays a crucial role in certain types of intensionality, involving alternatives of the actual value of a functional noun.[9] Consider sentences such as

(1)   Her weight has changed.

(2)   Guess her weight.

(3)   Taken on the moon, her weight would be ideal.

As the examples illustrate, the situational argument is usually not explicit. It may, of course, appear explicitly if necessary. There are a number of functional nouns which involve only a situational argument. *Weather* is one, *time* another (in uses like *what time is it*), *sun, moon, earth* are used in this way, and in theoretical contexts also *speaker, hearer*, etc. Most functional nouns, however, involve a second argument. I already mentioned *wife*, which can be considered representative for all those functional nouns that refer to certain social or other roles, cf. *president, referee, driver, bride, victim, murderer*. The probably most perspicuous cases are nouns referring to unique parts of objects: *head, body, roof, top, surface*, etc. Other nouns of this type are those that represent conceptual dimensions of various kinds, such as *height, age, weight, status, profession, nationality, character, name, address, telephone number* (cf. Löbner 1979:111ff., 173 and Löbner 1981). Or, to cite some linguistic terms: *subject, intonation, interpretation, meaning, category* (of something) etc. Yet a different kind of functional nouns assign to objects certain events which occur only once (cf. the discussion of "once only-events" in Galton 1984:56ff.): *birth, death, beginning, end*. Functional nouns are ubiquitous both in everyday speech and in scientific terminology.

Some but not very many functional nouns are based on two further arguments in addition to the situation; I am thinking of examples such as *relationship, difference, distance.*

It should be mentioned that relational and functional nouns are not necessarily count nouns. *Hair, blood, kinship, property, baggage* (of someone) are functional mass nouns with an additional argument. *Air* in *the air was mild* is used as a simple situational functional noun.

Not all relational nouns, however, are functional nouns. Many relational nouns are "only" relational, i.e. they involve relations that are not one-to-one

but (possibly) one-to-many. In what follows I use the term *relational* to refer to these relational nouns in the narrower sense. The most concrete examples are provided by kinship terms such as *sister, daughter, aunt, cousin, grandmother*. Others refer to social relations: *friend, relative, neighbour, room-mate, compatriote, competitor,* and the like. *Hand, eye, part, member* refer to parts which can occur more than once. All these examples involve an additional argument.

3.3. Functional, Relational, and Sortal Concepts

Up to now I have spoken of different types of *nouns*. However, although there are centainly typical nouns that exemplify the distinctions in question, nouns, taken as lexical units, cannot be subcategorized in a strict way. The distinctions rather apply to (types of) *uses of nouns*. Henceforth, I shall therefore talk of functional, relational, and sortal *concepts* instead. Nouns can contribute to the meaning of a sentence as concepts of one of these kinds. Some nouns represent sortal concepts and others represent relational concepts. But relational meaning always involves also sortal specification, and accordingly many relational nouns can also be used as sortal concepts. On the other hand, sortal concepts can also turn into functional concepts, e.g. if in a special environment certain sortal characteristics become tantamount to a specific role.

Montague has introduced the notion "individual concept" (first in Montague 1970b:132; see also 1973:260). Individual concepts are functions from possible worlds to individuals. If one replaces possible worlds by situations, functional concepts of the simple type without additional arguments are individual concepts in that sense. But the converse is not true. "Individual concept" is a set-theoretic notion, and although it is meant to model intensional entities, it is an extensional conception. An individual concept is just a set of ordered pairs with the only restriction that there cannot be pairs $<s,x>$ and $<s,y>$ with different second members. This does not mean that they really represent a *concept*. The so-called functions of set theory are only potential extensions of functions in the intensional sense. The original idea of a function as developed by Frege (1891) is an (effective) assignment of values to arguments, following some general rule. The functions of set theory are the extensional shadows of such functions, the same way as sets themselves are the extensional shadows of sortal concepts. If we regard only such concepts as "reasonable" which can be explicitly defined with a finite amount of information, then there are many more sets of ordered pairs than there are relational and functional concepts. Concepts in the sense relevant here are always concepts in the intensional sense. They can be understood as effective mental procedures with a certain input/output characteristic. The concept of "father", e.g., is a procedure that effectively assigns persons to persons given the relevant situational information. It may, in practice, be very difficult or even impossible to determine the father of some person. But such a situation

would be due to an insufficient supply of relevant information rather than to a deficiency or indeterminacy of the concept "father".

In the subsequent definitions I use the abbreviation *EGP* for "effective general procedure" in the following sense. A procedure is *general* if and only if it applies in the same way to different possible inputs; and it is *effective* if and only if it produces an output when provided with all the relevant input.

Definitions

A *one-place functional concept* (FC1) is an EGP which assigns objects to given situations.

A *two-place functional concept* (FC2) is an EGP which assigns objects to objects in a given situation.

A *one-place relational concept* (RC1) is an EGP which in a given situation assigns to objects the value "true" iff a certain relationship obtains between the object and (elements of) the situation.

A *two-place relational concept* (RC2) is an EGP which in a given situation assigns to objects the value "true" iff a certain relationship obtains between that object and another object in that situation.

A *sortal concept* (SC) is an EGP which in a given situation assigns to objects the value "true" iff that object in that situation exhibits a certain property.

One-place relational concepts and sortal concepts may be difficult to distinguish. But this is not a central point in this connection. In what follows, I will often talk of functional and relational concepts as *linking* their value to the situation (and the argument) given.

3.4. Noun Types and Concept Types

DDs with a functional head noun obviously yield functional concepts. Since DDs are terms, the basic interpretation will be a FC1. The arguments of a functional head noun can be made explicit in ways which differ for FC1, FC2, and FC3 nouns. The arguments of FC3 nouns (*distance* etc.) are added with prepositional phrases of the form *between A and B*. The non-situational argument of FC2 nouns is specified by means of various possessive constructions: *my father, John's address, the name of the town*. The relation between the second argument and the value is generally treated as possession: a country *has* a government; a person *has* a father, a head, hands, a profession, etc.; a sentence *has* a meaning, a structure, a subject. Conversely, the value is said to *belong* to its "possessor".

Situational arguments take the form of prepositional, adverbial, or adjectival attributes: *the weather today, the present situation, the temperature in Bangkok*.

The argument place can also be occupied by a variable, either corresponding to an indefinite – *the colour of one of your hats* – or introduced by a quantifier – *everybody's mother*. If the arguments are not explicitly specified,

they are assumed to be given in the context. Relational nouns, when used in the plural with the definite article, also give rise to functional concepts – cf. *her arms, his parents, the Members of Parliament*. They assign to the additional object the totality of the objects which stand in the relevant relationship to it. Often relational nouns can be disambiguated to yield a functional concept by certain attributes. Cf. *the left hand, the Foreign Ministery, my eldest son*.

Since functional nouns are inherently unambiguous, they do not allow the indefinite article as long as it can be presupposed that they have a referent. Only in those contexts that focus on the very existence of a referent, the indefinite article or its negation *no* is natural with such nouns, cf. the following examples:

(4)   Does a makak have *a tail*?

(5)   This car has *no clutch*.

All determiners, with the exception of the definite article and the possessive pronouns, require the noun to be taken as a sortal or relational concept. They all involve the possibility of several objects of the same kind. Numerals and the indefinite article count objects of one kind; demonstratives select between objects of the same kind, but in different regions; quantificational determiners refer to a totality of objects of the same kind.

Two-place functional nouns do, however, occur with other determiners. These cases can be explained by reference to more than one argument. If the additional argument of a two-place functional noun is implicitly or explicitly existentially bound (or left open), the result is a sortal concept. This sort of existential closure is present when a functional concept is combined with an inherently comparative adjective (all scalar adjectives are of this sort).

(6)   She is a *good* mother.

It also underlies statements such as

(7)   He doesn't like mothers.

and is explicit in

(8)   The mothers of some of the children didn't like the proposal.

What appears to be quantification with functional nouns, in sentences such as

(9)   Every mother loves her child.

is in fact quantification over implicit arguments of the functional noun. (9) means the same as

(10)   Every child's mother loves him.

Likewise, plural is possible with functional nouns, if there is a plurality of arguments involved either explicitly (cf. 8) or implicitly (as in 7)).

3.5. Semantic and other Functional Concepts.

Functional concepts do not necessarily owe their non-ambiguity merely to semantic constraints. The concept of "mother" might be considered functional on semantic grounds, if it is taken to mean the woman who gave birth to a person (but in vitro fertilization has already complicated this matter.). It is impossible to conceive of a person as having more than one mother unless the term *mother* is taken in different senses, corresponding to different functional concepts. The notion *wife*, however, is a case of a functional concept which is one-to-one only under an additional (non-semantic) monogamy constraint. Whether in a certain language community a noun can constitute a functional concept, in general depends on all sorts of constraints, some being semantic and others belonging to other realms of life. We shall see in the next chapter that there is a whole scale between logical necessity and near-accidentality.

Let me conclude this section with the remark that functional concepts are not just one variety of noun interpretation. They are in fact ubiquitous in natural language semantics. Janssen (1984) has pointed out a considerable range of phenomena in the area of NP semantics where individual concepts (in fact, I want to add, functional concepts) are involved. But functional concepts also underlie several other phenomena, including wh-questions, focusing and thematic roles. I will come back to the latter, when I discuss the anaphoric use of DDs.

4. USES OF DEFINITES. SEMANTIC AND PRAGMATIC DEFINITENESS

After the introduction of functional concepts, it is now possible to discuss the various uses of definite NPs in a more systematic manner. I will focus the discussion on definite descriptions but include the other types of definites as well, since they fit in naturally. Roughly speaking, there are two kinds of uses for definites. In those cases which I want to call "semantic definites" the referent of the definite is established independently of the immediate situation or context of utterance. It is the semantic definites which evade theories such as Heim's (1982) and which fit most easily into the theory to be developed here. "Pragmatically definite" NPs, on the other hand, are essentially dependent on special situations and contexts for the non-ambiguity (and existence) of a referent. They include deictic, anaphoric, and endophoric uses of definites. (Endophoric DDs, sometimes called "cataphoric", carry with them an attribute that links their referent explicitly to the situation referred

to.) Semantic definites refer unambiguously due to general constraints; pragmatic definites depend on the particular situation for unambiguous reference. I define:

An NP is a *semantic definite* iff it represents a functional concept, independently of the particular situation referred to.

4.1. Semantic Definites (1): FCIs

Proper Names and Similar Expressions

The clearest examples of semantic definites are *proper names*. Within a certain range of situations, proper names refer unambiguously to certain objects. They constitute constant functional concepts, as their value does not vary with their possible arguments. Equal names for different objects can be considered different partial functions with different domains of arguments. Some names have a broad domain of situations in which they refer to the same object, e.g. geographical names or names of abstract entities such as dates or numbers. Personal names have a more limited domain of use, in particular bare first names. But they do not rely on the particular situation alone for reference. Personal names in English have not the form of a DD. But in colloquial German, we use personal names with the definite article throughout. Note that in English artificial names such as "the Empire State Building" or "the London Symphony Orchestra" have the definite article.

Very close to proper names are those DDs that consist of the definite article, a sortal noun, and a proper name of some sort, cf. *the year 1984, the word 'the', the People's Republic of China, the number zero, the opera Rigoletto*. They form FCIs in the same way as proper names do thanks to the proper name they contain. Phrases involving functional and relational specificatory nouns, such as *president Marcos, our friend Ferdinand, his wife Imelda* have a similar status. Although the additions are often disambiguating, they do not *establish* the FCI involved. Hawkins (1978:140ff.) mentions another group of cases which can also be subsumed under this category. They consist of an abstract sortal head noun and a subordinate clause which explicitly specifies a certain abstract entity of the sort indicated. Cf. *the rumour that Reagan is going to resign, the question whether the indefinite article is a numeral, the idea to have pizza now, the fact that she was married, the dream to become rich*.

There is no semantic difference between proper names and denotations of certain abstract entities, such as *the definite article* or *the past tense*. They, too, are constant FCIs.

Sometimes, due to special circumstances, DDs with sortal head nouns acquire the status of a proper name at a certain place. Hawkins (1978:118ff.) calls this use "larger situational use based on specific knowledge", which is probably not a very fortunate term. This use is situational only in the sense that the domain of FCIs of this kind is locally restricted. Examples would be *the Little Mermaid* in Copenhagen, *the Wall* in Berlin, or *the Tower* in London. They can be considered a special sort of proper names, too.

Indexicals

A more interesting case of FCIs is provided by first and second person singular personal pronouns. They are (non-constant) FCIs restricted to situations of utterance. *I* assigns the utterer, *you* the addressee to the situation of utterance. I take *I* and *you* to be semantic definites, as there are effective general procedures to determine the utterer and the addressee of an utterance. The status of *we* and *you* (plural) is less clear. What is included in the referent of *we* and *you* in addition to the utterer or addressee respectively may depend on the particular situation. Probably the best way to look at *we* and *you*$_{pl}$ is to consider them RC2 concepts with the implicit arguments *I* and *you*$_{sg}$, respectively.

Simple FCl DDs

Among DDs in particular, the basic representatives of semantic definites are FCIs. There are first of all DDs with a simple FCl head noun that depend on immediate constituents, common to all situations, e.g. to the temporal and spatial location. Such concepts are rather rare, cf. *the weather, the time, the air, the moon*. There are quite a few examples which seem to be of this kind, but are better considered FC2 concepts with an implicit argument. Hawkins (1978:118ff.) calls them "larger situational use based on general knowledge". Examples are DDs such as *the Prime Minister*. The relevant situations would then be located within the territory of a state which has a prime minister. In Löbner (1979) I took this view myself but now I prefer the FC2 interpretation. There is a linguistic argument for this view: nouns such as *weather* have their (only) situational argument specified in a different way than the argument of *prime minister*.

$$(1) \qquad \text{the weather} \left\{ \begin{array}{l} \text{in England} \\ \text{?? of England} \end{array} \right\}$$

$$(2) \qquad \text{the prime minister} \left\{ \begin{array}{l} \text{?? in Britain} \\ \text{of Britain} \end{array} \right\}$$

The argument of concepts such as *prime minister* is not a location or territory but a state, i.e. a more abstract kind of thing. Better candidates for FCIs with a local domain are public institutions which fulfil a specific function for a particular district: *the post office, the station, the pub, the laundry*. There are general constraints which allow speakers to presuppose the existence and uniqueness of a referent in an arbitrary location. The constraints may be of limited validity though, and the regions may be limited too. Within a normal

size apartment there is *normally* one toilet, one kitchen, one living room etc., and it is due to that general constraint that *the toilet, the kitchen, the living room* can be used as functional concepts. Crucial for the FC character of a DD, and hence for the possibility to use it without former explicit introduction of a referent, is not the extension of the situation of reference but the existence of some general constraint due to which the denotated object has a certain function in that environment. Hawkins (1978:119) describes the condition that the DD has to provide an FC1 on the basis of general constraints only very vaguely when he writes: "What seems to be required is only that situations of various kinds, e.g. weddings, villages, countries, etc. generally contain certain objects." This formulation is insufficient in that it does not require a unique role for the respective object.

Complex FC1 DDs

Certain adjectival attributes combine with sortal or relational nouns to form complex FC1 expression. Among these are superlatives and ordinals as well as *next, last, only, same*. With singular nouns, superlative and ordinals are obviously functions that single out a certain member from a collection referred to implicitly. They require the possibility of alternatives and hence relational or sortal nouns. When applied to functional nouns, they force implicit reference to different arguments with different function values. Cf.

(3)   the {next / last / third / most successful} president of the association

Only is similar in the sense that it involves the possibility of other referents of the same kind. If superlatives or *last* are combined with plural nouns as in

(4)   the fattest wrestlers

the outcome is usually vague. This does not mean, however, that DDs of this type are ambiguous, but that their respective reference depends on a contextually determined relation.

Another case which belongs here is NPs of the form *the other*+N. The adjective *other* adds a relational meaning to the objects that fall under N: to be different from some other "N(s)" given in the context. The result is a functional concept: "those N(s) other than xy".

4.2. Semantic Definites (2): FC2s

FC2s provide one-to-one (i.e. unambiguous, functional) links from arguments to their values. The argument, in turn, will be linked to the situation referred to in one of several possible ways. Let S be the situation referred to, A the argument, and V the value. The basic picture is that of a chain of links:

(5)   (S)————————————(A)————————————►(V)
                                        FC2
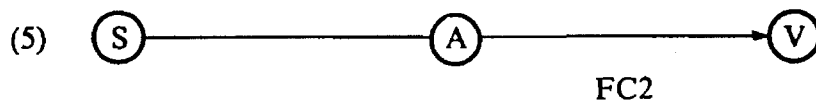
Now I would claim that definiteness of an NP involving a FC2 noun does not concern the nature of the overall link between S and V, but only the nature of the link between A and V, i.e. the link immediately provided by the functional noun.

The usual conception of definiteness is such that the referent of a definite expression must be determined in an *absolute* sense. Heim's (1982) and Hawkins' (1978) theories are implicitly committed to this notion of definiteness, which can be found explicitly in Lyons (1977:178ff.). Under this perspective, definiteness is considered a property of reference. This, however, applies only to the simple cases, as provided by the FC1 definites just discussed, and the pragmatic definites yet to follow. In the simple cases the referent of the definite is directly linked to a situation, hence the nature of reference coincides with the nature of the last link in the chain. As already mentioned in the previous section, however, the argument of an FC2 noun can be non-definite. Consider NPs such as
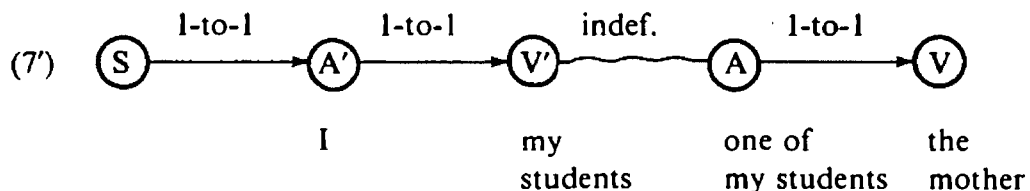
(6)   the mayor of a small town in Wales

(7)   the mother of one of my students

In (6) there is a chain of reference involving an indefinite argument:

(6′)   (S)∼∼∼∼∼∼∼∼∼∼(A)————————————►(V)
              (indefinite)   FC2

Hence, the overall reference of the NP (6) is *not* determined. Yet the definite article is used here as well as in (7), which is referentially more complex:

              1-to-1   1-to-1   indef.   1-to-1
(7′)   (S)————————►(A′)————————►(V′)∼∼∼∼∼(A)————————►(V)

              I   my   one of   the
                          students   my students   mother

Quantificational arguments, too, lead to a disruption of the referential chain by underdetermined arbitrary links. Cf.

(8)   Every man loves his mother.

The FC2 NP *his mother* contains (logically) a bound variable argument.

Definiteness – as far as it is indicated by the use of the definite article (or possessive constructions) – is not a matter of overall reference, but only a matter of a link which is provided by the noun following the article immediately. If the link provided by that noun is unambiguous, then the definite article will be used. The article is, as it were, only responsible for the link it is immediately concerned with. Accordingly we need two different conceptions, one for the definiteness of a noun as expressed by the use of the definite article and another for the determinedness of the referent of the overall NP.[10]

FC2s with explicit arguments
In what follows, I will restrict myself to FC2 NPs with definite arguments. As I already mentioned, the proper way of connecting an argument to an FC2 noun is a possessive construction. Possession is also the basic conceptual scheme in which the association of a function value with its argument is expressed in statements such as: *everybody has {a head/ a father/ a name/ a weight}*, etc.

For personal pronouns there is the special possibility of corresponding possessive pronouns; some NPs can be preposed in the genitive; else the definite article precedes a complex consisting of the FC2 noun and a prepositional phrase of the form *of*+NP. If the argument NPs are all semantically definite then we get definites that are capable of first mention use (Hawkins 1978:138 ff.):

(9)   my wife

(10)   the President of the U.S.

(11)   the meaning of the definite article

(12)   the second wife of the former husband of my father's lover

Among those definites which are definite "through and through", there are of course all sorts of possible links, including deictic and anaphoric links. Hawkins (1978) covers only reference chains with no more than two links.

FC2s with implicit arguments
In many cases, the argument of an FC2 is left implicit. It is then, in general, either a quantified variable or pragmatically definite. Hawkins (1978) mentions two uses of definites which belong to this category. One is what he calls the "introductory situational use", and the other is the so-called "associative anaphoric use". The former use is exemplified by sentences such as

(13)   This is the clutch.

which is a case of a FC2 noun (*clutch*) with an argument (a car) that is

provided by the immediate physical environment. In that sense it has an implicit deictic argument. The introductory character is not essential to this kind of use, which would also be instantiated by an utterance of

(14)   Step on the clutch!

Introductory statements such as (13) are, however, interesting in that they could not be used as such if the noun were not a functional noun in its own right, i.e. if it would not represent a general functional concept.

A further example of implicitly deictic FC2 definites is Hawkins' "larger situation use based on general knowledge", present in sentences such as (15).

(15)   The Prime Minister has resigned.

In these cases the location of the utterance belongs to the territory of a state to which in turn the FC2 "Prime Minister" is assigned. (Of course, this is only one possible interpretation. The implicit argument can also be determined otherwise.) Very frequently, texts contain anaphoric expressions which refer indirectly to objects (or to be precise, discourse referents) introduced earlier. Standard examples are sentences such as Hawkins'

(16)   Fred discussed a book in his class yesterday. He knows *the author.*

These are cases of FC2s with an implicit anaphoric argument. Neither Hawkins (1978:123ff.) nor Heim (1982:372ff.) manage to formulate the proper conditions under which this use (and FC2s with implicit arguments in general) is possible. It is not a matter of sufficiently close relations that occur in a sufficient frequency, as Hawkins assumes. This would not guarantee an unambiguous link. On the other hand, "sufficient frequency" is not essential either. Some functional concepts can apply to very few arguments and also the relation may be quite indirect. The crucial condition is that the head noun in these uses provides a general two-place functional concept for which there is an appropriate argument in the immediate linguistic context.

4.3. Semantic Definites (3): Configurational Uses

There is one use of definites which is very interesting in this connection, because it provides an insurmountable obstacle to all theories of definiteness based on sortal uniqueness. I am thinking of sentences such as

(17)   He was the son of a poor farmer.

(18)   I do not want my daughter to marry the lover of her sister!

(19)   He put his hand on her knee.[11]

(17) does not imply that "he" was the only son of his father. (18) implies that the speaker has at least two daughters and does not exclude the possibility that the "daughter" referred to has more than one sister and that the "sister" referred to has more than one lover. (19), finally, does not imply that "he" puts his only hand on her only knee.

Of course, such examples can also involve real functional concepts. Cf.

(20)   He was the husband of late Alma Mahler.

(21)   I do not want my mother to marry the father of my wife.

(22)   He skratched her back.

The nouns involved are necessarily either relational or functional. Statements of this kind are impossible with sortal nouns. Cf. the inappropriateness of (23) in situations where there is no specific referent for *the foreigner*:

(23)   I do not want my daughter to marry the lover of the foreigner.

The examples cited here differ from the ones discussed above in that the definite NPs in these sentences are not really referential, except for the respective subject NPs. This is more obvious in the first examples (17)-(19), which involve relational concepts (*son, daughter, lover, sister, hand, knee*). If they were referential, these concepts would not be unambiguous in the situation at hand. Instead of referring directly to a particular situation, such statements are, in a sense, generic. They refer to an abstract situation (in the sense of Barwise and Perry (1983) in which only those objects figure that are explicitly mentioned. Within that abstract situation and, as we shall see, relative to the way the situation is built up, the concepts used are unambiguous. As abstract situations consist essentially of objects and certain relations between them, I shall refer to them as "configurations".

The configuration referred to in (17) consists of just two objects, the father and the son:

(24)

son

"a poor farmer"   "he"
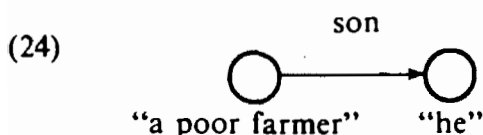
No other objects, in particular no further sons of that farmer figure in that constellation. Hence the relational concept "son" in fact provides a *functional* link from the father to the son. Similarly, in (19), four objects constitute the configuration expressed:

(25) "he" ⃝
hand ⟍
"his hand" ⃝ ⟋ put on ⟍ ⃝ "she"
knee
⃝ "her knee"
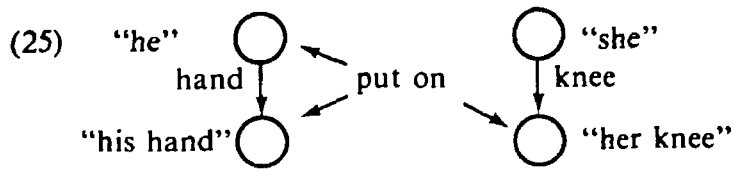
Again, the relational concepts "hand" and "knee" are used unambiguously relative to this configuration. The configuration referred to in the embedded construction in (18) is slightly more complex:

(26) "I"   "my daughter"   "her sister"
(a) ——————————→ (b) ——————————→ (c)
daughter   sister

↑   │ lover
marry ⟍   ↓
⟍————————————→ (d) "the lover of
her sister"
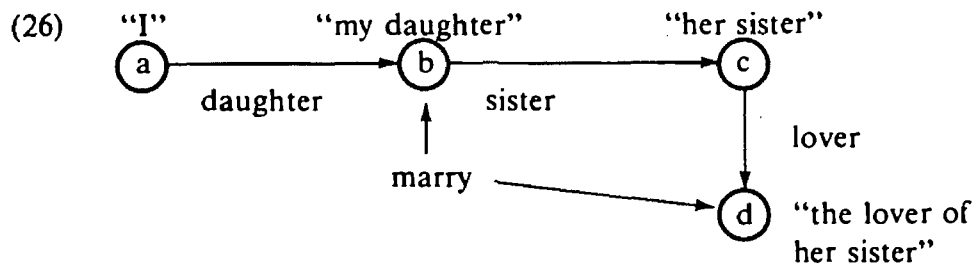
This configuration contains two daughters, b and c, of the person a. But only b figures as a's daughter while c figures as b's sister. The respective links between the constituents of the configuration are an essential part of it. We now understand why sortal concepts cannot play the role played by relational or functional concepts in this kind of use: they would not provide a link between different objects. Sentences involving such abstract situations convey the notion that the *real* situation referred to is of that *type*, in the sense of Barwise and Perry (1983). They are true whenever the abstract situation involved can be anchored in the real situation. In the case of (18) and (26) the actual situation may well contain even more daughters of the speaker and more lovers of his daughters, and in this case (18) or (26) would apply to any sub-constellation of this type. Sentences (17) and (19) are different from (18) in this respect: there is in any case only one subsituation of the actual situation of the type (24). In that sense, (18) is more general or generic than (17) and (19).

It is worthwhile to note that the relationship between the abstract situation which is expressed and the actual situation, i.e. the kind of reference involved, is indefinite: there is *a* subsituation of that abstract kind contained in the actual situation. Indefinites, both in Situation Semantics and in Discourse Representation Theory, give rise to free variables (i.e. "indeterminates" in the terminology of Barwise and Perry 1983, or "discourse referents" in the sense of Heim 1982). The configurational definites in the examples discussed also introduce free variables into an abstract situation. Both the uses of indefinites and of configurational definites generate in a first step an abstract situation (roughly equivalent to the discourse representation in Heim (1982) and Kamp (1981) which then must be anchored in one of several possible ways in the actual situation *referred* to.

Again, we see that the definite article does not express definite reference but only the non-ambiguity of the link provided by the following noun.

The same kind of indirect reference via an abstract situation is present in sentences such as

(27)   He was taken to (the) hospital.

In many such cases the definite article is omitted in English but would be used in German:

(28)   E: She goes to church.
       G: Sie geht in *die* Kirche.

(29)   E: He came after lunch.
       G: Er kam nach *dem* Mittagessen.

In such cases one does not refer to any particular object but rather to an abstract situation, in which *a* hospital, *a* school, *a* lunch is an essential constituent. Further examples would be

(30)   He is my friend.

(31)   Switch the light on.

(32)   He broke his leg.

all of which withstand a plain referential interpretation.

4.4. Pragmatic Definites

In the cases treated so far, the head noun was always a functional concept, either by virtue of its lexical meaning plus, occasionally, additional general constraints, or due to the restriction to limited abstract configurations within which relational concepts can be used unambiguously.

Pragmatic definites, in contrast, have sortal or non-functional relational head nouns. They depend on the particular situation for unambiguous reference. I shall distinguish three uses: endophoric, anaphoric, and deictic definites.

Endophoric Definites

By endophoric definites I mean noun phrases with relational or sortal, i.e. potentially ambiguous, head nouns which carry a disambiguating attribute with them. They are sometimes called cataphoric. The attribute links the referent of the head noun unambiguously to other objects and may be a relative clause or a prepositional or adverbial phrase. One relevant case are

308

NPs with "establishing relative clauses" (Hawkins 1978:131ff.), such as the italicized NP in the following example, taken from Hawkins:

(33)   What's wrong with Bill? – *Oh, the wor·an he went out with last night* was nasty to him.

The phrase *woman X went out with last night* is a RC2 linking women to X, and if it is further presupposed that X (in this case, Bill) did not enjoy the company of more than one lady, it serves in fact as an FC2. This FC2 links the referent of the DD to "Bill".

If one disregards the inner structure of such DDs – the sortal head plus the establishing relative clause which provides a functional link – one could simply regard them as FCIs, and hence as semantic definites. The linguistic evidence, however, favours a classification as pragmatic definites. First, we have seen that the definite article only concerns the definiteness of the immediately following noun. And, second, the kind of definiteness (or reference) involved here is apparently no different from the following case, where the relative clause has been turned into a preceding main clause and *the woman* is just anaphoric.

(34)   What's wrong with Bill? – *Oh, he went out with a woman last night and the woman was nasty to him.*

Furthermore, in those cases where semantic and pragmatic definiteness is overtly distinguished, endophoric definites group together with anaphoric definites.

Not every relative clause is an establishing relative clause. The crucial condition is that it must provide a functional, i.e. one-to-one, link of the referent to other given material. This material can be deictically or anaphorically linked or a bound variable. For the latter case cf. examples such as

(35)   Each man has the wife he deserves.

A deictic endophoric DD occurs in the sentence

(36)   Who was the person that called you up this morning?

In a novel of Chandler I found an endophoric DD with a link to an anaphoric definite:

(37)   Her name, according to *the plaque* on her desk was Adrienne Fromsett.

When this sentence occurs, the desk and a referent for *her* have been explicitly introduced before, but no plaque was mentioned. In this case, the attribute *on*

her desk not only locates the referent of *the plaque* in a limited area. It also provides a functional link in that context. The desk belongs to a certain person, and the plaque indicating the user of the desk belongs to that desk, in turn.

Anaphoric Definites

It is commonly accepted that there are direct and indirect anaphors. Direct anaphors have an antecedent with the same head noun and an indefinite article, if they are DDs or demonstrative definites. If the anaphoric expression is a pronoun, it agrees with the antecedent in number and gender.

Hawkins (1978:107) cites instances of more indirect kinds of anaphora, including nominalizations and paraphrases. I shall restrict myself to the straightforward cases (with the exception of the yet different "associative anaphora" involving FC2s, discussed above).

The theoretical difficulty with anaphoric definites is the fact that they have sortal or relational head nouns which are not inherently unambigous, but refer back to an object previously introduced. In the next section I will offer a theoretical explanation of my own. Suffice it here to say that the subclass of anaphoric definites has a unique composition. It includes DDs with sortal or relational (but not functional) head nouns, demonstrative noun phrases with sortal or relational head nouns, demonstrative pronouns, and third person personal pronouns. Among anaphoric definites there are also cases with a non-establishing relative clause, cf.

(38)   The woman that squints has found a husband after all.

(39)   Yesterday I met the man who studies buddhism.

Such DDs, when taken as a whole, represent just sortal concepts and require previous mention of an object which fits the whole description. Note the possibility of demonstratives here in contrast to nouns with an establishing relative clause. The relative clauses here clearly do *not* provide a functional link for the referent of the head noun, but just additional sortal information. I shall argue below that anaphoric NPs constitute a semantically heterogeneous class. Demonstrative NPs function differently from definite NPs. (Hence the difference in distribution. Demonstrative definites cannot occur in all the uses of definites mentioned before, including the endophoric use).

Deictic Definites

Deictic definites, which comprise DDs and demonstratives with sortal or relational head nouns, differ from anaphoric definites in that they refer immediately to components of the situation of utterance. Hawkins (1978: 110ff.) distinguishes two "deictic" uses: what he calls "visible situation use" and so-called "immediate situation use". These two uses are quite different. As examples of the second type, he cites sentences such as

310

(40)   Beware of the dog!

(41)   Harry, mind the table!

In both cases the referent is supposed to be invisible, and the existence of a referent is brought to the mind of the adressee by the use of the DD (which implies its existence). These uses, however, in fact involve functional concepts: the dog that *belongs* to the house, the table that always stands where it stands. They are deictic in that they refer to the situation of utterance for the argument of the FC. But being FCs, the DDs in (40) and (41) are semantic definites and hence do *not* belong here. Note also that the definite article in (40) and (41) cannot be replaced by a demonstrative.

It is not easy to draw the line between FC1s and deictic definites. Consider the following example. John and Mary (believe it or not) always have a bottle of mineral water beside their common bed. One night, John is already sleeping. Mary wakes up and feels thirsty. She fumbles for the bottle in the darkness, but cannot find it and wakes up poor John:

(42)   John, would you pass me the water, please?

John, still half asleep, reaches for the bottle without even trying to *look* at it and passes it to Mary. He just *knows* where the bottle is. This use of *the water* is an FC1 use. Although the range of situations is very restricted, there is a general constraint which establishes the FC1 "Mary's and John's bedroom bottle". It is not a particular bottle containing a particular volume of water. Rather the bottle will be replaced by another one when it is empty. But how if John and Mary do not have this custom, but just *happen* to have a bottle of water beside the bed? The utterance of (42) could be equally successful. Neither Mary nor John might be able to perceive the bottle, they just *know* that it is there, in this particular situation. Is this use deictic? It is certainly not *demonstrative* in any sense, for sure. I would tend to regard it as deictic. One could then define deictic uses as those which employ accidental information about the particular situation of utterance.

A clear case of deictic definites is the second use mentioned by Hawkins, his "visible situation use". This use is possible if one and only one object of the kind belongs to the situation of utterance, if that object is visible (at least for the addressee) and known to him as such. As an example, Hawkins cites

(43)   Pass me the bucket!

The pragmatic description is so far correct, I assume. But I should not like to restrict the use to visible cases alone. Other perceptions are possible as well:

(44)   Where does the terrible smell come from?

(45)   Can't you stop the noise?

Other definites which can be used deictically are demonstrative pro-NPs and NPs with a demonstrative determiner. In English also third person personal pronouns occur in deictic use, in contrast to German. In a situation where John and Mary are sitting in their garden and notice an unknown woman entering their property, Mary might say

(46)   What's *she* doing here?

but in German (at least in my dialect) I would use a demonstrative pro-NP:

(47)   Was macht *die* denn hier?

4.5. Remarks about the Significance of the Distinction between Semantic and Pragmatic Definites

The basic distinction drawn above between semantic and pragmatic definites is significant in several ways.

1. We have seen that, because of their inherent non-ambiguity, functional nouns allow only for the definite article, except of existential contexts. The article is thus redundant in connection with functional nouns, at least if the functionality of the noun is based on its lexical meaning. The redundance of the definite article in semantic definites offers an explanation for the absence of any article in certain cases of definites. One general example are personal and other proper names.

But there are also cases involving count nouns used as definites without an article. English as well as German are languages which only gradually aquired articles, both definite and indefinite. The present state, characterized by near-obligatoriness of articles with singular count nouns is the result of a steadily growing range of application of the definite (and the indefinite) article. A last set of definites that occur without an article is a set of some functional NPs of general use, such as *God*, and especially many more or less idiomatic configurational uses like *go to school, loose patience, face to face* (cf. Jespersen 1933:167ff.).

2. In German, cliticization of the article to a preposition as a host (the contracted forms mentioned above) is possible if and only if the NP is semantically definite and not too complex, as has been pointed out by Haberland (1985) and Hartmann (1980). Cf. examples such as

(48)   Ich habe einen Brief *vom* Harald bekommen.
        [I got a letter from Harald.]

(49)   Er schreibt *vom* Nordpol.
        [He's writing from the North Pole.]

312

(50)   *am* Abend, *im* Mai, *zur* Halbzeit
        [in the evening, in May, at half-time]

(51)   Er hat *beim* Poker 2 Pfund verloren
        [He lost 2 Pounds playing poker.]

Contracted forms are particularly frequent in configurational uses:

(52)   Er muß {*in das/ins} Krankenhaus/ {*zu der/zur} Schule.
        [He has to go {to(*the) hospital/to (*the) school}.]

(53)   Sie will mit ihm {*zu dem/zum} Standesamt gehen.
        [She wants to go with him to the registrar's office.]

Characteristically, the contracted forms are not possible in the same phrases as soon as they are used to refer "pragmatically" in our sense to specific objects:

(54)   Er muß wieder {*ins/in das} Krankenhaus zurück, aus dem er schon entlassen war.
        [He must go back {*to/to the} hospital from which he had already been discharged.]

3. In some German dialects in the Rhineland there are two different definite articles (cf. Hartmann 1982). One can be characterized as weak. It has a schwa in all its forms (e.g. [də R]/[də]/[ə t] for the three genders of nominative singular). The other is strong, with short tense vowels (the respective forms being [dɛ]/[di], [dat]). Both forms are unstressed and cannot be considered demonstratives. The weak article is used exclusively in semantic definites, the strong one in pragmatic definites.
4. Karen Ebert in her excellent study of the Frisian dialect Fering (used on the islands of Föhr and Amrum off the German North Sea coast) also reports the existence of two different definite articles (cf. Ebert 1970 and Keenan and Ebert 1973). Again, one form, the "A-article" is phonetically weaker than the other, the "D-article" and the ranges of the respective articles coincide with the distinction between semantic (A-article) and pragmatic (D-article) definiteness.

4.6. Referentially Quantifying NPs

In Section 2.2. I claimed that referential quantification involves definite reference to the domain of quantification. Quantification requires the possibility of dividing the domain of quantification into a positive and a negative part with respect to the predicate quantified. Explicit reference to the domain of quantification can accordingly only be made with plural or mass definites.

A look at the different uses of definites shows that referentially quantifying NPs indeed have the same range of uses. Cf. the semantically inherently definite quantifiers in (55)-(57):

(55)   *All the water* is polluted.   (FC1)

(56)   *Many members of the parliament*   (FC2 + argument)
       voted against the law.

(57)   You had better use *both hands*.   (configurational)

The subject in (58) involves endophoric reference:

(58)   *Some people who watched the last episode of "Schwarzwaldklinik"*
       were shocked.

Sentence (59), when uttered in an appropriate situation, can be deictic:

(59)   Look here, *three eggs* are broken.

For an anaphoric quantifier cf. the NP *each lass* in the following text, taken from a fairy tale:

(60)   Once upon a time there lived two lasses, who were sisters, and as they
       came from the fair they saw a right handsome young man standing at
       a house door before them. .... And he had a golden ball in each hand.
       He gave a ball to *each lass*, saying she was to keep it;...

The NP *each hand* is semantically definite, involving the FC2 *hands* with an implicit anaphoric argument "he".

5. THE MEANING OF THE DEFINITE ARTICLE

In the previous section we have seen that functional nouns require the definite article unless they occur as arguments of existential predicates. We have also seen that definiteness as it is expressed by the definite article is not a matter of the overall reference of the NP but only of the immediate head. This became clear in view of FC2 definites with non-definite arguments. (A further point in this connection is the fact that endophoric definites – which have sortal heads but functional concept meaning – require the "pragmatic" definite article in dialects with an overt distinction.)

On the other hand, the definite article forces a functional reading onto relational nouns. This can be seen from the configurational uses as well as from simpler examples such as

(1)   I wanted to buy that book. But I had forgotten *the author*.

Books can have more than one author. Hence, the noun *author* is only a relational concept, as far as its lexical meaning is concerned. But the use of *the author* in (1) excludes the possibility of more than one author. If one looks at the cases of semantic definites only, one might thus want to say that the definite article is used if and only if the head noun is interpreted as a functional noun. But semantic definites always involve relational nouns. How about the sortal head nouns of pragmatic definites? It would be easy to stop at this point and embrace the view that there are in fact two different definite articles with different meanings. But I think that we may go further and gain not only a uniform semantics for all uses of the definite article and of definites in general, but also a stronger theory of anaphora.
My central claim is this:
In all its uses, the definite article has the meaning of indicating that the noun is to be taken as a functional concept.
The functional concept can be either independently established or situational. I will spend the rest of this section to explain the notion of a "situational" functional concept.

5.1. The Definite Article in Endophoric DDs$_{12}$

Among the pragmatically definite NPs it is the endophoric DDS that provide the key to this class as a whole. Endophoric DDs consist of a sortal or relational head noun and additional attributes which under the sortal or relational constraints that are provided by the head noun yield a functional concept. It is furthermore essential that the referent is linked to other objects; otherwise we get cases of semantic definites as discussed in 4.1., with the characteristic "weak" articles in those languages which distinguish between semantic and pragmatic definiteness. Let us now have a closer look at the inner structure of endophoric DDs. Hawkins in his discussion of "establishing relative clauses" (which are the crucial disambiguating attributes of endophoric DDs), contrasts the following sentences, taken as answers to the question *what's wrong with Bill?*
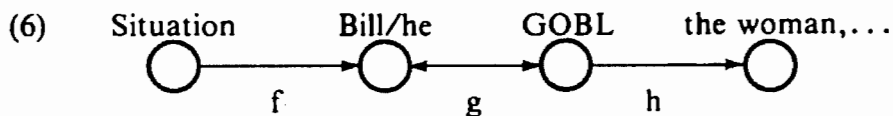
(2)   *The woman he went out with last night* was nasty to him.

(3)   *The woman* was nasty to him.

(4)   *The woman who was from the South* was nasty to him.

(5)   *The woman who some sailor dated last night* spread nasty rumours about Bill.

Among these sentences, only (2) has an endophoric subject. The addition *he*

went out with last night can be used to establish a functional link from "Bill" to the referent of *the woman*, Bill himself being linked to the situation. Thus, the referent of the DD, too, is (indirectly) linked to the situation. In (5), the definite NP *Bill* is replaced by an indefinite NP. The chain is interrupted (or incomplete), "the woman" not linked to the situation. (3) is not endophoric because there is no disambiguating information at all. And (4) is similar in that the whole information is sortal and does not link the referent of *the woman* unambiguously to anything. The relative clause can be taken as providing a relational link from the South to that woman, but this link is a one-to-many link.

Now the only endophoric DD, the subject of (2), works as follows. First there is *he*, a definite pronoun with a pre-established (or presupposed) referential link to the situation. "He" is said to have gone out last night with somebody. The temporal specification "last night" is definite and it is restrictive enough to single out a single event of going out (one usually goes out with somebody only once a night). Hence there is an individual event GOBL of going out linked to Bill (the referent of *he*). Since Bill figures in a unique role of that individual event GOBL, there is a relational link between Bill and GOBL; in addition, it can be assumed that the link is the only one from Bill to an event of this kind, and hence, in fact, functional.

Now to every event of the sort go-out-with-somebody there is one and only one object figuring in the object role (note, that the object may be complex'.). In our case, the object is said to be a woman, hence a single person. Simplified, the chain of links between the situation and the referent of the subject looks as follows:

(6)   Situation   Bill/he   GOBL   the woman,...

$$\text{Situation} \xrightarrow{\ f\ } \text{Bill/he} \xleftarrow{\ g\ } \text{GOBL} \xrightarrow{\ h\ } \text{the woman,}\ldots$$

f is the functional link linking Bill to the situation. g is the actor/action-link between Bill and GOBL and h is the comitative link from GOBL to Bill's company. The event GOBL is an important constituent of the chain. It is introduced by the verb, and the links between it and the neighbour constituents are provided by the thematic roles of the verb.

5.2. Digression: Thematic Roles are Functional Concepts

In the example just considered the thematic roles of the verb *go out with* correspond to functional concepts. This is not an accidental property of this verb but a general structure: verb roles are functional concepts. This fact is reflected by the basic assumption of case grammar and related theories that within one sentence every thematic role can be specified at most once. (The fact that one verb complement may fill two or more thematic roles, does not contradict the functional nature of the thematic roles: two functions may have the same value.)

Many, but not all, verbs can be used to refer to events, i.e. abstract entities located in time. For such verbs, the semantic roles correspond to functional concepts that assign to individual events of that kind the respective participants. For acts of the kind "give", e.g., there is the role of the giving part, of the object given, and of the receiver, each corresponding to a syntactic argument. There are other functional concepts, too, which may play a role. The time and location of an act of giving; the equivalent received for the object given; the purpose of the act; the reason etc. The values of these functions can be specified by means of various adverbial expressions.

A very interesting question is whether there is a stock of general functional concepts which apply to large sets of verbs, or whether the functional concepts are more or less specific for every single verb. We cannot discuss this question here in any adequate manner. But there seem to be hints that point into the direction of the first alternative. For action verbs, the role of the agent is not only a functional concept but it is even unambiguous in the reverse direction (i.e. bi-unique), given sufficient temporal (and contextual) restriction of the situation. For an individual act of giving at time t_0 there is one and only one agent involved; but in the opposite direction, for that agent at time t_0, there is one and only one action (s)he performs. We can ask *who gives...* as well as *what does (s)he do*? In a similar way direct objects of transitive verbs or themes can be assigned to the individual events they figure in. But the answer to the question *what happens to X*? is, in a way, less determined than the answer to the question *what does X do*? If it is right that the subject role of many verbs is distinguished by the property of providing a functional relationship in both directions, then we would be closer to an explanation for the affinity of subjects, agents, themes, and topics: subjects of agentive verbs can be used as given material to which new events are linked, which, in turn, provide the basis for the introduction of additional objects via their thematic roles.

Not all thematic roles, however, involve events. Some verbs, e.g. *to have* and *to be*, express directly relations between their syntactic arguments. *I have a hammer* provides a possessive relation between the speaker and a hammer, which of course is (potentially) one-to-many. Similarly, locational predicates provide spatial relations between locations and objects or between objects. The nature of the relation depends on the situation. If the spatial region referred to is small enough, the relation may be functional. The location of an object is the most elementary FC2 which is unambiguous in both directions. Every (real) object is at one and only one location. And in every location there can be one and only one object. For this reason, very often locative specifications are used to form simple functional concepts such as *the girl behind you, the house over there, the book on the table.*

The mere copula use of *to be* does not provide any relational links, unless it combines the subject with a relational concept. Hence, sentences such as

(7)   Bill is bold.

(8)   Bill is a good pianist.

involve only one object and a predication about it. VPs of this sort can never be used to form endophoric DDs:

(9)   the man who is bold / the bold man

(10)   the man who is a good pianist

The additional information contained in a relative clause of endophoric DDs provides functional links between given material and the referent of the head noun, making use of the relational and eventually functional concepts provided by the thematic roles. Whether the thematic roles single out a unique object of the kind said, depends on the situation referred to. The definite article is in general not redundant in such DDs. It instructs the hearer to take the DD as a functional concept and in order to do so (s)he has to take the situation as constrained as is necessary to make the crucial relations unambiguous. A common way to do this is just to *assume* that there are not more objects of that kind in the relation specified.

5.3. The Definite Article in Anaphoric DDs

Once we have analysed the role of the definite article in endophoric DDs, we can account for the anaphoric cases too: they are, as it were, endophorics without the explicit specification of the functional link. I assume that the stepwise construction of a universe of discourse is comparable to the braiding of a complex multi-dimensional network. The discourse participants start from given objects or locations that figure as the first nodes of the net. (In case of completely fictitious discourse, such as fairy tales, a starting point is artificially introduced by specific phrases, such as *"Once upon a time..."*.) Further nodes are tied to existing ones exclusively via relational concept links; some nodes are objects, some are events. Many of the relational links are conceptually functional and the rest gains the status of functional links due to the unique position of the node and the link within the network. In addition, the nodes carry all sorts of predicative information. VPs either supply predicative information for existing nodes or introduce new objects or event nodes. Every node in the network is a potential discourse referent. The whole network is a complex abstract situation, in which every constituent – object or event – plays a unique role.

Anaphoric DDs are used to refer to nodes in the net. They usually provide only sortal information for the retrieval of their referents. But they can be completed to make the functional link explicit that links their referents to the net. Consider the following example:

(11)   ...The ball ran right forward to the door of *a house* that stood there, and the ball went into *the house* and she saw it no more.

The first occurrence of the DD *the ball* corresponds to a node k_1 already established; via the functional link "what happened (to the ball)?" an event node k_2 with the sortal information "run right forward" is tied to k_1. The functional concept "goal" links the node k_3, "the door," to k_2. The definite article indicates that the noun *door* is to be taken as a functional concept and, indeed, it is linked as a functional concept to the node k_4, via the reverse functional relation "belongs to". k_4 carries the predicative information "house". (Note that the indefinite does not establish a discourse referent out of the blue, but specifies the value of a common functional concept for an argument independently introduced! So far, the part of the net we have been considering, has the following structure:

(12)   the ball   run...   door   house
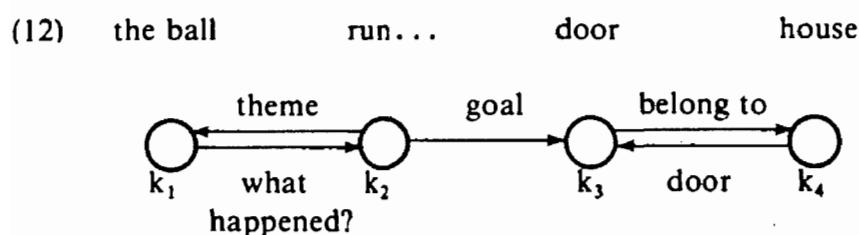
We skip over the relative clause and continue. After the event k_2, a new event is reported, k_5, again linked to k_1 by the FC "what happened" (we neglect temporal and causal structure). To the event k_5 of the sort "go" a goal is linked, "the house". Now, the hearer or reader of (11) will not introduce a new node for the NP *the house*, because the definite article instructs her/him in this case, also, to use the noun as a functional concept. This functional concept is provided by the particular network built up so far. Explicitly, it would be "the house the door of which the ball ran right forward to". Apparently, it is not necessary to repeat all this. (But it is possible, and in actual speech often enough such explications are used to disambiguate anaphoric expressions.) It is sufficient to employ some distinctive sortal information in order to refer to the node in question. By indicating by means of the definite article that the sortal noun is to be used as a functional concept, the speaker refers the hearer to a situation which is constrained to supply the necessary additional relational information. In this way, the use of anaphoric definites contributes to the coherence of texts. I mentioned earlier that all relational concepts also carry sortal information. With functional concepts, in particular, we can observe a trade-off between relational information and disambiguating sortal information: sortal restrictions often render a one-to-many relational concept a functional concept. The division of labour is overt in the case of endophoric DDs, and enables the suppression of explicit relational information in anaphoric DDs. In many cases even the sortal information can be reduced to a minimum. Third person personal pronouns can be taken in this sense: as definites with a minimum of sortal information that stand for more explicit functional concepts.

5.4. The Definite Article in Deictic DDs

The use of the definite article in deictic DDs is in principle no different from
the anaphoric use. Deictic DDs are hidden FCls with respect to the situation
of utterance. The common feature of all deictic definites is the condition that
the referent must be a part of the situation of utterance as it is accessible to the
discourse participants. The access to the situation can be mediated either by
perception or by memory. Both perception and memory provide structured
pictures of situations within which the representation of real objects have a
well-defined and unique place. Sortal or relational restrictions can help to
single out certain objects within the situation. Again, this will in general
require an appropriate restriction of the situation as a whole. Such restric-
tions are provided by various constraints. Think of Mary and John having
breakfast together. John says to Mary

(13)   Pass me the cornflakes, please.

Mary is aware of the cornflakes on her plate, in John's bowl, in the pack on
the table and may be of a spare pack on a shelf nearby. But she will know
which ones she has to pass, because several constraints exclude all but the
cornflakes in the pack on the table. John instructed her to use the noun
cornflakes as functional concept, due to which the cornflakes he wanted
figure in a unique role within a effectively constructible abstract situation.
Again, it is not essential that the head noun of the DD is sortal. The sortal
content of the head noun is only used to construct a functional concept out of
an appropriately restricted (and abstracted) situation.

5.5. The Meaning of the Definite Article

We may thus conclude with the hypothesis that the meaning of the definite
article consists in the indication that the noun is to be taken as a functional
concept.

The uniform analysis of the definite article depends on the possibility of
reinterpreting sortal nouns as clues to contextually given functional concepts.
To prevent a possible misunderstanding: I do not mean that in case of
pragmatic definites sortal or relational nouns change their interpretation to
become functional nouns when combined with the definite article. Rather the
information given with their semantic content, which by itself is insufficient,
is combined with additional non-lexical information to yield a functional
concept. If the head of a definite NP is lexically a sortal concept noun, the
application of the definite article does *not* have the effect of forming the
individual concept of "the only satisfier of that concept". (Rather, this would
be the effect of the combination of the noun with *the only*.) It is functional
connections that allow the speaker to refer to the referents of pragmatic
definites unambiguously, and the crucial identifying information is *not* provi-
ded by the noun in those cases.

This analysis accounts for the global properties of DDs, such as existence of a referent and non-ambiguity of the noun. It explains the logical status of DDs as terms (and not quantifiers proper). It predicts correctly that the definite article is obligatory with functional nouns and non-redundant in all other cases. The theory implies that the semantic scope of the definite article is *not* the whole discourse, as suggested in DRT (Discourse Representation Theory; I refer the reader to Heim 1982, Kamp 1981, Barwise 1985, and related works). According to Heim (1982), for example, the contribution of the definite article consists in a felicity condition constraining the previous discourse. The scope of the definite article is not even the whole sentence within which it occurs, nor the whole NP following it; it is just the noun it precedes.

The definite article indicates that the noun must be interpreted in one of two fundamental ways, viz. as a functional concept or as a sortal concept. Both kinds of concepts are equally represented in the lexicon of natural languages. Under a sortal interpretation the referent of the noun is taken to be of a certain sort, under the functional interpretation it is linked to other objects by general relations.

The fact that practically all functional concepts involve a situational argument furthermore reflects the deictic origin of the definite article in many (all?) languages which have a definite article. As for languages which do not have a definite article, it is plausible to assume that they just do not explicitly express the way the nouns are to be interpreted.

5.6. Discourse Representation Theories of the Definite Articles

In view of the theory developed above it should be clear that I do not agree with the DRT approach to definiteness. To begin with, it can by no means claim to be a theory of the definite article in general. It is just a theory of (simple and straightforward forms of) anaphora. The basic idea is to store and structure the verbal information of the previous discourse and link it to NPs. In this way, neither deictic nor semantic definites can be handled. For the deictic definites, situational infomation provided by the situation of utterance must be available to the constructor of the discourse universe. But it is not at all obvious how this kind of information, which is provided by non-verbal channels and is incomparably more complex, should mix with the meager verbal information of DRSs.

For semantic definites one would need an immense additional apparatus in order to update the discourse representation appropriately in any case only to be able to cover just the more trivial cases such as proper names or "associative anaphors". Semantic definites referring to the situation of utterance would still provide the same problems as deictic definites.[13]

As a theory of anaphora, too, DRT is too weak. The DRS which is constructed by the theory is essentially unstructured. DRT cannot account for the coherence of a text, although there are cross references between the

cards. It just assumes, but does not explain, that new discourse referents are introduced into the discourse representation structure by means of indefinite NPs. According to the theory sketched above they do not do this by themselves but they serve as sortal information about the occupants of roles that are provided independently through the thematic roles of verbs or other expressions such as prepositions. This way it can also be explained how the referent of a noun can be unknown or unfamiliar when introduced and known or familiar in the next moment without any new information having been added in between. The mere fact that an indefinite with the same head noun has occurred in the previous discourse cannot be the crucial point, since the anaphoric case cannot be taken as representative for all uses of the definite article.

5.7. Definite NPs in general

Not only DDs but definite NPs in general must be taken as functional concepts. This has already become clear for proper names and possessive NPs during the discussion of semantic definites. A word should be added about demonstrative NPs. All "determiners", except for the definite article and the possessive pronoun require the noun to be taken as a sortal or relational concept. For quantificational determiners this means that they require the domain of quantification to be divided into equal parts (cf. the remarks above about quantification with functional nouns). For the indefinite article it means that it serves to form a one-place predicate together with the following substantive phrase.[14]

Also NPs with a demonstrative determiner *taken as a whole* represent functional concepts. But the roles of the noun and the determiner are quite different. The noun must be taken as a sortal or relational concept, and the determiner instructs the hearer to pick out one of the possible referents. The choice, however, is not arbitrary but unambiguous. Usually, demonstratives distinguish degrees of closeness or remoteness. The demonstrative is then tantamount to a functional specification such as *the N at a certain distance*. We thus observe the same division of labour as with endophoric DDs: the head noun is sortal and the rest provides for the functional connection.

The localistic explanation of demonstratives is probably not general enough. What is crucial is not spatial distance but rather the degree of awareness of the object. If a demonstrative expression is accompanied by an ostensive act, this act is meant to direct the attention of the other person to a certain object in order to make it most or at least more prominent to his mind. Similarly, when demonstratives are used anaphorically, they direct the hearer's attention to objects of a certain degree of awareness. Again, "the N which is most/less prominent" is a functional concept. But it is different from the functional concepts used for the interpretation of anaphoric or deictic DDs, which refer to the situation as a structured complex.

This explains why demonstratives cannot be combined with functional

nouns, unless additional arguments are implicitly involved, e.g. in a sentence such as the following:

(14)   This president is a tough president.

where the president (of the time and organization implicitly referred to) is contrasted with the presidents of other times, organizations, or alternative circumstances. The inherent non-ambiguity of functional concepts is incompatible with the possibility, which is implied by the use of demonstratives of alternatives of the same sort or, at least, the possibility of alternative locations. The only way to provide alternatives in either sense for the value of a functional concept consists in referring to alternative arguments. If this is impossible, i.e. if the arguments are all fixed, then demonstrative determiners – in the straightforward sense considered here – cannot be used with functional concept nouns. This accounts for the fact that demonstratives do not occur in uses such as the "associative anaphoric use", with FC2 heads referring implicitly to arguments fixed in the context.

(15)   A car stopped in front of the post office.
       {The/*This/*That} driver got out and ....

A further difference between the definite article and demonstrative determiners is also explained by the different status of the noun. The explicit sortal descriptive content of a demonstrative NP can be further reduced by the total omission of the head noun, leaving just the demonstrative in the function of an NP of its own. The same pronominalization process occurs with quantificational determiners. But this is impossible with the definite article – as our theory predicts.

To summarize, the definite article not only indicates the functional concept role of the noun, but it is also the only determiner which has this function.

A question which I cannot address here is whether the proposed analysis of the determiners should have consequences for the syntax of NPs. Do functional nouns, or better, nouns in functional concept role, constitute a syntactic subcategory of their own, different from a respective subcategory of nouns in sortal concept roles? There are data which seem to support this view: characteristic complements of functional nouns and the determiner distribution. Or should we keep to a uniform, undivided category of nouns? This is, in the first line, an empirical syntactic question, independent of semantic considerations. If this issue is settled we can start to think about how to relate the syntactic structure and the semantic roles of its constituents. I believe that it is possible to achieve a compositional analysis of NPs with uniform determiner and noun meanings. I do not know, though, what a theory would look like which connects syntax and semantics and lives up to the rigid standards of e.g. Montague Grammar. What I tried to do here is provide an independent

semantic analysis of definiteness which might contribute to the discussion of an overall theory integrating syntax, semantics, and pragmatics.

Seminar für Allgemeine Sprachwissenschaft
Universität Düsseldorf
Universitätsstr. 1
4000 Düsseldorf
Fed. Rep. Germany

NOTES

1. In addition to the three standard types, Bunt (1985:13) gives examples of plural mass nouns such as *oats* or *mashed potatoes*; but I think they can be considered marginal.

2. For formal theories which assign different meanings to singular and plural definite article, cf. e.g. Bartsch (1973), Scha (1981), and Barwise and Cooper (1981).

3. I generally exclude the pathological case of empty universes. In the next section it will become clear that all cases of what I call "referential" quantification presuppose a non-empty domain of quantification.

4. Cf. Löbner (forthcoming) for a more formal version of the argument. It is shown there that definites constitute not only filters – which is considered the characteristic property of definites in Barwise and Cooper (1981:183f) – but in fact ultrafilters.

5. Scha (1981) offers an extended discussion of the complexities of plural predication. See Link (forthcoming) and Lønning (forthcoming) for recent analyses in this area.

6. Cf. de Jong (forthcoming) for that. The determiner *all* is an exception in that it occurs in place of the definite article in partitive constructions. But then it is not a quantifier. Cf. the exceptional treatment of *all* in Barwise and Cooper (1981:206f) and the detailed discussion in Link (forthcoming). I do not talk about constructions such as *three out of four Americans*. The NP after *of* is again not quantificational here, and the whole phrase can only be taken as a generic quantifier.

7. Something which at a first glance might appear as double quantification can occur if adverbial quantification of extent is applied to singular objects, as in

(i)   Cologne is partly destroyed.

and if this kind of quantification is then embedded in a nominal quantification:

(ii)   Many towns are partly destroyed.

Of course, these are two different quantifications. The quantifier *many* modifies the application of the predicate *be partly destroyed* to "the towns", while *partly* concerns the application of the predicate *be destroyed* to single towns.

8. There is a German word which exactly expresses what I mean with "non-ambiguity": the term *Eindeutigkeit*. Unfortunately, there does not seem to be a straightforward English equivalent.

9. For an extensive discussion of this range of phenomena see Löbner (1979) and the summary in Löbner (1981). The type of intensionality referred to is that in *The temperature is rising*. It is intrinsically connected with a functional interpretation of the NPs involved.

10. One of those connections where the latter (overall) notion of definiteness is relevant is the so-called definiteness effect in existential *there* sentences which allow only for indefinite NPs in subject position. Woisetschlaeger (1983) discusses many examples of definite NPs (in the sense used here) which in fact can occur in the subject positions of such sentences. One group of examples involves FC2 nouns with an indefinite argument, e.g. *There was the smell of pot all over the appartment*. What matters, apparently, is the overall indefiniteness of the subject NP.

324

11. It might be objected that instead of (17) and (18), (17') and (18') would be preferred, and that the genitive as well as the possessive pronoun construction might not be definite.

(17') He was a poor farmer's son.

(18') I do not want my daughter to marry her sister's lover.

In German and in French, however, the analogous constructions are impossible. In German, e.g., (17)–(19) would translate as follows:

(17") Er war *der* Sohn eines armen Farmers.

(18") Ich möchte nicht, daß meine Tochter *den* Geliebten ihrer Schwester heiratet.

19") Er legte ihr *die* Hand aufs Knie.

12. With regard to the analysis of relative clauses in this connection, I owe much to the discussion in Ebert (1970:176ff.).

13. Cf. the considerations in Heim (1982:364ff) about how her theory should be modified in order to account for semantic definites. The modifications appear to be so fundamental that not much would be left of the original design of DRT.

14. I am fully aware of the insufficiency of this remark about the indefinite article. But I find myself in agreement with all major theories on this point. Cf. Hawkins (1978:175ff.) who considers the non-inclusiveness as fundamental – which excludes a functional interpretation of the noun. DRT translates indefinites as one-place predicates about discourse referents, and Situation Semantics, as far as can be judged from the scarce remarks in Barwise and Perry (1983) shares a similar view: the noun of indefinite NPs imposes sortal constraints on the anchoring of indeterminates.

REFERENCES

Bartsch, Renate, 1973: The semantics and syntax of number and numbers. In: J. Kimball (ed.), *Syntax and Semantics Vol. 2*. Seminar Press, New York, pp. 52-93.

Barwise, Jon, 1985: *A Model of the Treatment of Anaphora in Situation Semantics*. (Tech. Rep. Working Paper #1). CSLI, Stanford.

Barwise, Jon and Robin Cooper, 1981: Generalized quantifiers and natural language. *Linguistics and Philosophy* 4: 159-219.

Barwise, Jon and John Perry, 1983: *Situations and Attitudes*. M.I.T. Press, Cambridge, Mass.

Behaghel, Otto, 1923-1932: *Deutsche Syntax*. Carl Winter, Heidelberg.

Bunt, Harry C., 1985: *Mass Terms and Model-theoretic Semantics*. Cambridge University Press, Cambridge.

Christophersen, Paul, 1939: *The Articles. A Study of Their Theory and Use in English*. Munksgaard, Copenhagen and Milford, Oxford.

Curme, George O., 1964: *A Grammar of the German Language*. 2nd edition. Frederick Ungar, New York.

Ebert, Karen H., 1970: *Referenz, Sprechsituation und die bestimmten Artikel in einem nordfriesischen Dialekt (Fering)*. Doct. Diss., Univ. of Kiel. Nordfriisk Institut, Bredstedt, 1971.

Frege, Gottlob, 1891: *Funktion und Begriff*. Reprinted in: Gottlob Frege: *Funktion, Begriff, Bedeutung*. Vandenhoeck and Rupprecht, Göttingen, 1969, pp. 17-39.

Galton, Antony, 1984: *The Logic of Aspect*. Clarendon Press, Oxford.

Gärdenfors, Peter (ed.), forthcoming: *Generalized Quantifiers: Linguistic and Logical Approaches*. Studies in Linguistics and Philosophy Series. Reidel, Dordrecht.

Groenendijk, Jeroen A.G., Theo M.V. Janssen, and Martin B.J. Stokhof (eds.), 1981: *Formal Methods in the Study of Language* (= Mathematical Centre Tracts 135/136). Mathematical Centre, Amsterdam.

Haberland, Hartmut, 1985: Zum Problem der Verschmelzung von Präposition und bestimmten Artikel im Deutschen. *Osnabrücker Beiträge zur Sprachtheorie* 30: 85-106.

Hartmann, Dietrich, 1980: Über Verschmelzungen von Präposition und bestimmtem Artikel. *Zeitschrift für Dialektologie und Linguistik*, 47: 160-183.

Hartmann, Dietrich, 1982: Deixis and anaphora in German dialects: the semantics and pragmatics of two definite articles in dialectal varieties. In: Jürgen Weissenborn and Wolfgang Klein (eds.), *Here and There. Cross-linguistic Studies on Deixis and Demonstration*. Benjamins, Amsterdam/Philadelphia, pp. 187-207.

Hawkins, John A., 1978: *Definiteness and Indefiniteness*. Croom Helm, London.

Heim, Irene, 1982: *The Semantics of Definite and Indefinite Noun Phrases*. UMass Dissertation (Schriftenreihe des Sonderforschungsbereichs 99, Linguistik, Nr. 73). University of Konstanz, Konstanz.

Horn, Laurence R., 1985: Metalinguistic negation and pragmatic ambiguity. *Language* 61: 121-174.

Janssen, Theo M.V., 1984: Individual concepts are useful. In: Fred Landman, Frank Veltman (eds.), *Varieties of Formal Semantics*. Foris, Dordrecht, pp. 171-192.

Jespersen, Otto, 1933: *Essentials of English Grammar*. Allan and Unwin, London.

Jong, Franciska de, Forthcoming. The compositional nature of (in)definiteness. In: A. ter Meulen, E. Reuland (eds.), *The Representation of (In)definiteness*. M.I.T. Press, Cambridge, Mass.

Kamp, Hans, 1981: A theory of truth and representation. In: J.A.G. Groenendijk et al. (eds.) 1981, pp. 277-322.

Keenan, Edward L. and Karen H. Ebert, 1973: A note on marking transparency and opacity. *Linguistic Inquiry* 4: 421-424.

Krámský, Jiři, 1976: Some ways of expressing the category of determinedness. In J. Krámský, *Papers in General Linguistics*. Mouton, Den Haag, pp. 181-197.

Link, Godehard, 1983: The logical analysis of plurals and mass terms: a lattice-theoretical approach. In: R. Bäuerle, C. Schwarze, A. von Stechow (eds.), *Meaning, Use, and Interpretation of Language*. De Gruyter, Berlin and New York, pp. 302-323.

Link, Godehard, forthcoming: generalized quantifiers and plural. In: P. Gärdenfors (ed.) (forthcoming).

Löbner, Sebastian, 1979: *Intensionale Verben und Funktionalbegriffe. Zur Syntax und Semantik von 'wechseln' und den vergleichbaren Verben des Deutschen*. Narr, Tübingen.

Löbner, Sebastian, 1981: Intensional verbs and functional concepts: more on the "rising temperature" problem. *Linguistic Inquiry* 12: 471-477.

Löbner, Sebastian, 1986: Quantification as a major module of natural language semantics. In: J. Groenendijk, M. Stokhof (eds.), *Studies in Discourse Representation Theory and the Theory of Generalised Quantifiers*. GRASS 8. Foris, Dordrecht.

Löbner, Sebastian, forthcoming: natural language and generalized quantifier theory. In: P. Gärdenfors (ed.), forthcoming.

Lønning, Jan Tore, forthcoming: collective readings of definite and indefinite noun phrases. In: P. Gärdenfors (ed.), Forthcoming.

Lyons, Christopher, 1980: The meaning of the english definite article. In: J. Van der Auwera (ed.), *The Semantics of Determiners*. Croom Helm, London, pp. 81-95.

Lyons, John, 1977: *Semantics*. Cambridge University Press, Cambridge.

Montague, Richard, 1970a: *Universal Grammar*. In: R. Montague, 1974, pp. 222-246.

Montague, Richard, 1970b: *Pragmatics and Intensional Logic*. In: R. Montague, 1974, pp. 119-147.

Montague, Richard, 1973: *The Proper Treatment of Quantification in Ordinary English*. In: Montague, 1974, pp. 247-270.

Montague, Richard, 1974: *Formal Philosophy*. Richmond Thomason (ed.), Yale Univ. Press, New Haven and London.

Russell, Bertrand, 1919: *Introduction to Mathematical Philosophy*. Allan and Unwin, London.
Scha, Remko J.H., 1981.: Distributive, collective, and cumulative quantification. In: J. Groenendijk, M. Stokhof (eds.), 1981, pp. 483-512.
Woisetschlaeger, Erich, 1983: On the question of definiteness in "An Old Man's Book". *Linguistic Inquiry* 14:137-154.