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An Outline of Genericity

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In this paper, I try to clarify the notion of **genericity** in natural language. I show that the phenomena considered as generic fall into two quite distinct classes, namely either **reference to kinds** or **default quantification**. Default quantification, which includes habituals, is treated as adverbial quantification and formalized in the framework of discourse representation theory. Reference to kinds, which includes taxonomic NPs, is treated by assuming kind individuals which have an ontological structure relating them to certain objects, the specimens of the kind. I investigate some related phenomena, as e.g. the distribution of *any*, the accentual structure of generic sentences, generic anaphora and the interpretation of bare NPs. The aim of this paper is to sketch a rough map where all the phenomena considered as generic find their proper place. Therefore, the range of subjects which are treated is quite broad, but inevitably there are many areas which are only touched upon and will need much further research.

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1. TYPES OF GENERICITY

1.1 A Reference Classification of Genericity

I will start by giving a classification of generic NPs. There is no theoretical claim in this classification; I will even show that a uniform notion of a "generic NP" is not a well-founded one. The sole aim of the classification is to serve as a reference system for later discussion.

1.a) The lion is a ferocious beast. **(singular definite generic NP)**
b) The lions are ferocious beasts. **(plural definite generic NP)**
c) A lion is a ferocious beast. **(singular indefinite generic NP)**
d) Lions are ferocious beasts. **(generic bare plurals)**
e) Gold is a precious metal. **(generic bare singular)**
f) One cat, namely the lion, is a ferocious beast.
Some cats, namely the lion and the tiger, are ferocious beasts.
(taxonomic NPs)
[g) John smokes. **(habitual sentence)**]

Habitual sentences have been treated as generic at least since Chafe (1970) and Lawler (1973), although there is nothing like a "generic NP" in them. But there is actually an important theoretical insight in grouping habituals together with at least one sort of generics. I will come back to this issue later.

If we look at the examples given above, it becomes immediately clear that genericity cannot depend on the syntactical or morphological form of the NP. Every "generic" NP cited so far could occur as a non-generic NP in other contexts. And as far as I can see, no language marks exactly those NPs which are to be interpreted as generic.

But there are NPs which can only be interpreted as generic. For example, the English NP (not the common noun) *man* can only be interpreted as generic, and there are some markers for taxonomic NPs, like *kind*, or German *Art*, *Sorte*.

2.a) Man has lived in Africa for more than 2 million years.
b) Some kinds of cats live in the bush.
c) Einige Katzenarten leben in der Steppe.

I will come back to those NPs in due course.

1.2 The Two Underlying Types of Genericity

The reference classification of generic NPs presented in (1) could indicate that there is a bewildering complexity with generic NPs. I will show that, on the contrary, we have to distinguish only two kinds of genericity. To show this, I will look at the distribution of the types of generic NPs with respect to different classes of predicates. I will look at four diagnostic contexts.

We will start with considering kind predicates like *be extinct*, which can be analyzed as having the selection restriction that the subject must be a kind. We observe that sentences with indefinite singular NPs do not pass this test.

Diagnostic context (i): Kind predicates
3.a) The lion is extinct.
b) The lions are extinct.
c) *A lion is extinct.
d) Lions are extinct.
e) Bronze was invented before 2000 B.C.
f) A cat, namely the lion, is extinct.

Secondly, we will consider **dynamic predicates** (i.e. non-stative predicates). Again we note that sentences with indefinite singular NPs do not pass this test. Their verbal predicate must be stative, whereas in other cases, the verbal predicate may be dynamic (as observed for definite generic NPs by Heyer 1985).

Diagnostic context (ii): Dynamic predicates

4.a) The rat reached Australia in 1770.
b) The rats reached Australia in 1770.
c) *A rat reached Australia in 1770. (generic reading)
d) Rats reached Australia in 1770.
e) Rice was introduced in East Africa some centuries ago.
f) A rodent (namely the rat) reached Australia in 1770.

Thirdly, as noted by Lawler (1973), some generic NPs cannot combine with predicates expressing accidental properties, but only with predicates expressing properties which are in some way **essential** for the referent of the generic NP. Since dynamic properties are always accidental, this explaines why indefinite generic NPs cannot combine with dynamic verbs. As the attentive reader will already expect, singular indefinite NPs do not pass this test.

Diagnostic context (iii): Accidental properties (Lawler)

5.a)	The madrigal is popular.	a')	The madrigal is polyphonic.
b)	The madrigals are popular.	b')	The madrigals are polyphonic.
c)	*A madrigal is popular.	c')	A madrigal is polyphonic.
d)	Madrigals are popular.	d')	Madrigals are polyphonic.
e)	Music is popular.	e')	Music is polyphonic.
f)	A type of music (namely, the madrigal) is popular.	f')	A type of music (namely, the madrigal) is polyphonic.

Finally, we will look at the generic NP itself. Vendler (1967), Nunberg & Pan (1975), Carlson (1982) and Dahl (1985) pointed out that not every noun allows for a definite singular generic NP. Basically, the noun must be semantically related to a **well-established kind**. This test blocks sentences with definite singular and plural NPs and sentences with taxonomic NPs.

Diagnostic context (iv): Well-established kinds

6.a) The lion is ferocious.
b) The lions are ferocious.
c) A lion is ferocious.
d) Lions are ferocious.
e) Gold is precious.
f) A cat (namely the lion) is ferocious.

7.a) *The lion with three legs is ferocious.
b) ?The lions with three legs are ferocious.
c) A lion with three legs is ferocious.
d) Lions with three legs are ferocious.
e) Gold which is hammered flat is precious.
f) *A kind of lion (namely the lion with three legs) is ferocious.

The reason why (7.b) is not completely bad is not relevant for the questions we are concerned with here: *the lions with three legs* can be analyzed as referring to the sum individual of all the lions with three legs, but is then not a proper generic NP. The difference can be easily seen if a kind predicate is involved, which cannot be applied to individual sums.

8.a) The lions are extinct.
b) *The lions with three legs are extinct.

Now let us evaluate the four tests. Tests (i) - (iii) filter out singular indefinite generic NPs, and test (iv) filters out definite generic and taxonomic NPs. I will

call NPs which pass test (i)-(iii) **D-generic** because the most typical representatives of them seem to be definite generic NPs. NPs which pass test (iv) I will call **I-generic**, alluding to indefinite generic NPs.

generic NP	D-Generics	I-Generics
singular definite	X	-
plural definite	X	-
singular indefinite	-	X
bare plural	X	X
bare singular	X	X
taxonomic	X	-

We see that two types of generic NPs, bare plurals and bare singulars, occur in both classes. One of them, bare plurals, has been the main focus in the semantic analysis of genericity, in the tradition of the classical analysis of Carlson (1977). I think that, in hindsight, this was not the most felicitous decision. If we want to develop a semantics for genericity, we should concentrate at first on those NPs which occur only in one class, for example singular definite generic NPs and singular indefinite generic NPs, and then try to extend the analysis to cover NPs occuring in both classes.

I will argue that D-Generics and I-Generics are in fact quite different syntactically as well as semantically. In short, I will analyze D-Genericity as reference to a specific type of individuals, namely **reference to kinds**, which basically is NP-oriented. I-genericity, on the other hand, will be treated as **default quantification**, which has scope over the verbal predicate as well. Let us start by looking at I-Genericity.

2. I-GENERICITY, OR DEFAULT QUANTIFICATION

2.1 I-generic sentences

Let us first look at the type of NPs which occur as I-generic NPs. The basic rule here is that every indefinite NP can occur as an I-generic NP. By "every indefinite NP" I have in mind every syntactic type of indefinite NP (count noun with article, bare plural, bare mass term), as well as NPs which are deliberately complex, like *lions with three legs*. This is shown by the following example.

9.a) There is a lion (with three legs) in the cage.
b) There are lions (with three legs) in the cage.
c) There is gold (which is hammered flat) in the safe.

Secondly, we found that the verbal predicate in I-generic sentences expresses an essential property. As a verbal predicate like *is ferocious* does not necessarily express an essential property by itself, one has to assume an operator with scope over the verbal predicate which expresses this essentiality.

There is another reason why we should assume that this operator has scope over the verbal predicate. In many languages, I-generics can be formally marked by some device (which is used to mark habituals as well). Now, this marker is either some auxiliary (as in the English *used to*-construction or the corresponding German *pflegt zu*-construction), some adverb (like English *usually*), or an affix of the main verb, as in Swahili, Japanese, Turkish and many other languages. I give two examples, one from German and one from Swahili:

10.a) Ein Loewe pflegt gefaehrlich zu sein.
a lion uses dangerous to be
'A lion usually is dangerous'

b) Mtoto hu-penda micheza.
child HAB-love plays
'A child loves games'

But we never find a case where the marker of I-genericity is part of the NP. This holds at least if we exclude adjectives like *typical* in *a typical lion*, which do not strictly mark I-generic NPs, because they occur also with non-generic NPs, e.g. in predicative NPs as in *Simba is a typical lion*. The syntactic position of the markers of I-genericity, then, shows quite clearly that I-genericity involves the verbal predicate.

Our basic findings concerning I-genericity can be summarized as follows:

i) Every NP which can serve as an indefinite NP can also serve as an I-generic NP, in an appropriate context.
ii) I-generic sentences have an operator with scope over the verbal predicate, expressing the notion that the property of the verbal predicate is an essential one for the subject referent.

The analysis of I-genericity now seems to be rather obvious, given the theories of indefinite NPs of Kamp (1981) and Heim (1982). As is well known, Kamp and Heim proposed theories in which indefinite NPs are not quantifiers, but predicates which get their quantificational force by other quantificational elements. Consider the following example in Heim's analysis:

11) Often, if Pedro has a donkey, he beats it.
If Pedro has a donkey, he often beats it.
MANY([**have'**(x,y), **donkey'**(y), x=**Pedro'**],[**beat'**(x,y)]).

Here, MANY is a universal quantifier which has two arguments, the **antecedent** and the **consequent**. It can be interpreted as: Many cases which have x,y meeting the antecedent are such that x,y meet the consequent as well. The quantifier can be specified by adverbs like *always, often, rarely, never*, or it can be left unspecified and is in this case interpreted as some sort of universal quantification.

12) If Pedro has a donkey, he always/often/rarely/never/$\emptyset$ beats it.

Before we analyze I-generic sentences in more detail, let us look at some general principles of quantifier interpretation in the style of Kamp and Heim. Quantifiers have the following form in this theory:

13.a) QUANT[$x_i..x_j$;$x_n..x_m$](ANTECEDENT[$x_i..x_j$],CONSEQUENT[$x_n..x_m$])
= QUANT[X;Y](ANTECEDENT[X], CONSEQUENT[Y])

Here, $x_i..x_j$ are the variables of the antecedent part, and $x_n..x_m$ are the variables of the consequent part which are bound to the quantifier QUANT in Heim's theory. In Kamp's theory, $x_i..x_j$ are the discourse referents introduced in the antecedent part, and $x_n..x_m$ are the discourse referents introduced in the consequent part, respectively. Essentially, $x_i..x_j$ and $x_n..x_m$ are free in the antecedent and consequent part. But antecedent and consequent may contain some more free variables, which are bound by operators having wider scope, and this makes it necessary for the variables which are actually bound to the quantifier to be coindexed on them (here, I list the antecedent variables and the consequent variables in square brackets following the quantifier). X and Y is a convenient shorthand notation for the set of variables $x_i..x_j$ and $x_n..x_m$, respectively. Normally, there is some overlap in variables between antecedent and consequent, that is, $X \cap Y \neq \emptyset$. QUANT is associated with a number or a certain proportion, e.g. *most* is associated with "more than half". The formula (13.a)

then can be interpreted approximately as:

13.b) In QUANT variable assignments **a**, for which ANTECEDENT[X] is true, CONSEQUENT[Y] is true.

But this only holds if Y is a subset of X. If there are variables in Y which are not in X, they must be existentially quantified. This amounts to the following:

13.c) QUANT[X;Y](ANTECEDENT[X],CONSEQUENT[Y]) <=>
For QUANT variable assignments **a**, for which ANTECEDENT[X] is true, there are variable assignments **a'** which are identical to **a** with the possible exception that they differ in the assignment for variables in Y\X, for which CONSEQUENT[Y] is true.

For example:

14) Every lion has a mane.
EVERY[x;x,y]([**lion'**(x)], [**mane'**(y) & **have'**(x,y)])
= ∀x[**lion'**(x) -> ∃y[**mane'**(y) & **have'**(x,y)]]

This can be read as: For every assignment **a**, for which **lion'(x)** is true, there is an assignment **a'** identical to a with the possible exception that **a'**(y) ≠ **a**(y), for which **mane'(y) & have'(x,y)** is true. This amounts to the first-order formula given above.

Now, let us return to I-generic sentences. They can be analyzed in a similar way to quantified sentences: The so-called "generic" NPs are just indefinite NPs without quantificational force of their own, and the quantifier can be associated with the verbal operator we noticed with I-generic sentences. This becomes even more obvious if we consider the fact that I-generic sentences resemble sentences with overt adverbial quantifiers (a point already made by Biggs 1978, who traces genericity back to a quantificational adverbial which is not expressed overtly; for adverbial quantification in general cf. Lewis 1975):

15.a) A lion has a mane.
b) A lion always/mostly/often/seldom/never has a mane.

In fact, exactly this theory was proposed by Heim (1982). There are somewhat similar accounts by Farkas & Sugioka (1983) and Pelletier & Schubert (1987). Furthermore, this theory captures the intuition that an I-generic NP does not refer to a particular referent, that is, is not bound to an existential quantifier (cf. Jackendoff 1972).

If there is an overt adverbial quantifier, the analysis seems to be quite clear. Consider the following example, which can be paraphrased as: in many cases, if x meets the antecedent, i.e. is a lion, then x meets the consequent, i.e. is ferocious.

16) A lion is often ferocious.
MANY[x;x]([**lion'**(x)],[**ferocious'**(x)])

But which quantifier should we propose for I-generic sentences lacking an overt quantifier? It cannot be the universal quantifier, given the well-known fact that "exceptions" are admissible with generic sentences. There have been some proposals in recent years to assume instead an operator based on **defaults**, e.g. Platteau (1980), Strigin (1985), Heyer (1985), Carlson (1986) and Pelletier & Schubert (1987), or the similar notion of stereotypes, e.g. Geurts (1985). I think this is on the right track for the analysis of I-generics, but that this default operator should be analyzed as a quantifier in the sense of Kamp and Heim. I will simply call it DEFAULT.

Here, I am not going to talk much about the semantics of this default quantifier. Rather informally, it can be given as follows:

17) DEFAULT[X;Y](ANTECEDENT[X],CONSEQUENT[Y]) :<=>
For any variable assignment **a**, for which ANTECEDENT[X] is true, there is a variable assignments **a'** which is identical to **a** with the possible exception that **a** and **a'** differ in the assignment for variables in Y\X, for which CONSEQUENT[Y] is true, except when CONSEQUENT[Y] (relative to **a'**) is not consistent with the facts assumed so far.

The difference to other quantifiers is to be found in the last clause which restricts the universal quantification to cases in which the consequent is compatible with the explicit or derived information assumed so far. Of course, this presupposes that the facts assumed so far can be identified in some way. Basically, default quantifications are default rules as described by Reiter (1980). They should be handled in some kind of non-monotonic logic, for example in data semantics as proposed by Veltman (1987). Here, I simply want to make clear that the default operator we need should have the form of a quantifier in the Kamp/Heim analysis.

Let us consider three putative counterexamples which show how the definition of DEFAULT is intended to work.

18.a) A bird lays eggs.
b) A turtle grows very old.

One could argue that only female birds lay eggs, and that turtles only rarely live to be very old since nearly all of them are killed by predators when still young. But these objections can be rejected if one bears in mind the restriction in the definition of the default quantifier. In (18.a), the inference is blocked if among the facts assumed so far are the propositions that only female animals give birth, that laying eggs is a form of giving birth, and that birds are animals. In (18.b), the inference is blocked if the assumed facts contain, among others, the proposition that the life of an animal can be shortened by various external reasons. This shows that there is a lot to be expected from pragmatics, background assumptions and background inference to arrive at a correct interpretation of generic sentences.

There is another difference between DEFAULT and other adverbial quantifiers on the one hand and nominal quantifiers at the other. Nominal quantifiers can be unrestricted or restricted to some given domain (cf. 19.a,b). But this is not the case with the DEFAULT quantifier (cf. Croft 1986 for this observation) and for adverbial quantification in general: they always are unrestricted (cf. 19.c,d).

19.a) (Out of the blue:) Every lion has a mane. (non-restricted)
b) There are lions and tigers in the cage. Every lion has a mane. (restricted or non-restricted)
c) There are lions and tigers in the cage. A lion has a mane. (non-restricted only)
d) There are lions and tigers in the cage. A lion always has a mane. (non-restricted only)

A further important point is that the DEFAULT quantifier can employ different **"modal dimensions"**. (That genericity is a modal concept has already been observed by Dahl 1975, of course). As often with modal operators, language does not specify the modal dimension. With I-generic sentences, it can be linguistic necessity or analyticity as in (20.a), mathematical necessity as in (b), objective necessity as in (c) and in the examples we considered so far, deontic necessity as in (d), and even a sort of necessity which is to be relativized to time and space, as in (e).

20.a) A spinster is unmarried.
b) Two and two equals four.
c) A lion has a mane.
d) A boy doesn't cry.
e) Three kiwis are sold for one dollar.

f) A unicorn has a horn.

The last example, (f), shows that a generic sentence can be true even if there is no individual in the real world which satisfies the antecedent, a fact observed e.g. by Carlson (1982). The DEFAULT quantifier simply says that if an entity meeting the antecedent exists, then the consequent applies to it by default. Therefore, default quantification can be shown to be equivalent to quantification over possible objects. This shows once more that I-genericity has to be handled as a modal notion. But here, I will not go into the involved question how to model modality, e.g. with possible worlds or some other devices.

Related to the modal dimension is the strictness of the generic predication, that is, whether exceptions are admissible or not. Linguistic necessity and mathematical necessity do not allow exceptions, whereas other modal dimensions should allow them in principle.

The analysis of I-genericity can be extended to other kinds of indefinite NPs as well, e.g. to plural NPs like *three kiwis*, to bare plurals like *lions*, and to bare mass terms like *gold*, provided that a proper semantics of indefinite NPs of these types is given, as e.g. in Link (1983), Krifka (1987).

As an interesting and well-known example, let us consider sentences like *unicorns have horns*. The plural of *horns* was sometimes considered to be a syntactical dependent plural, defying a compositional analysis (see the discussion of *unicycles have wheels* in Chomsky 1975). Here, I want to show that they can be treated compositionally. Suppose we can handle collective (or better, cumulative) and distributive readings for non-generic sentences as in the following examples along the lines suggested by Link (1983). To make the argument short, I simply assume a distributive operator on the verb to handle the distributive reading, whereas the bare verb should cover the cumulative reading. x is supposed to be a sum individual consisting of some contextually salient unicorns, **have-a-horn'** is a predicate applying to entities which have exactly one horn, and **have-horns'** is a predicate applying to entities having more than one horn.

21.a) These unicorns have a horn.
x=**these-unicorns'**, DISTR(**have-a-horn'**)(x)

b) These unicorns have horns.
x=**these-unicorns'**, **have-horns'**(x)

(a) says that it holds distributively for x, that x have a horn (and by a proper definition of DISTR, this means that every atomic part of x has a horn). (b) says that it holds cumulatively for x, that x have horns (and this would be true if, e.g., x consists of three unicorns). Given this analysis of distributive and cumulative readings, it becomes trivial to account for the examples (22). Here, **unicorn'** and **unicorns'** are to be interpreted as predicates applying to single unicorns and individuals consisting of several unicorns, respectively.

22.a) A unicorn has a horn.
DEFAULT[x;x]([**unicorn'**(x)],[**have-a-horn'**(x)])

b) Unicorns have horns.
DEFAULT[x;x]([**unicorns'**(x)],[**have-horns'**(x)])

c) Unicorns have a horn.
DEFAULT[x;x]([**unicorns'**(x)],[DISTR(**have-a-horn'**)(x)])

We get reasonable possible interpretations for (22.a,b,c), as shown by the formalizations given above.

The analysis developed here can easily be extended to cover atemporal *when*-clauses, as discussed by Carlson (1979) and Farkas & Sugioka (1983).

23) Lions are ferocious when they have red eyes.
DEFAULT[x;x]([**lions'**(x), **have-red-eyes'**(x)],[**ferocious'**(x)])

Here, the *when*-clause simply adds more restrictions to the antecedent part. Note that an analysis along these lines must assume a fairly free mapping from syntactic form to semantic representation. In section (5.4) of this paper, I will show that there are intonational cues which could be exploited to assemble the parts of the sentence going to antecedent or consequent of the quantifier. But surely, more work needs to be done to determine the possibilities for the mapping relation between syntax and semantics.

2.2. Habituals

It has often been observed that generic sentences and habitual sentences share common characteristics (cf. e.g. Chafe 1970, Lawler 1973), and they have been treated as essentially the same in formal analyses like the ones presented by Dahl (1975) and Carlson (1977).

There are several reasons why habituals and I-generics should be treated along the same line. First, the verbal predicate in I-generic sentences and habitual sentences must be stative. This explains why a progressive predicate (which must be episodic in standard analyses) cannot give rise to a habitual interpretation:

24.a) John smoked. (habitual or non-habitual)
b) John was smoking. (non-habitual only)

Actually, (b) can have a generic reading as well, as pointed out by Chierchia (p.c.). But I think this simply reflects the fact that many stative predicates can occur in the progressive in certain circumstances.

Secondly, it is often the case that explicit markings of habituality (like the English *used to*-construction, the German *pflegt zu*-construction, and the Swahili verbal marker *hu-*) occur in I-generic sentences as well:

25.a) Hans pflegt Zigaretten zu rauchen.
Hans uses cigarettes to smoke

b) Ein Loewe pflegt eine Mähne zu haben.
a lion uses a mane to have

Furthermore, habitual sentences are related to sentences containing quantificational adverbs, just as sentences with adverbial quantification are.

26) John always/often/usually/rarely/never/Ø smokes.

Therefore, habituality should be treated like I-genericity, i.e. as default quantification. This becomes possible if we introduce **occasions**, an idea present in Lawler (1972, 1973), Spears (1974), Newton (1979), Kleiber (1985), Pelletier & Schubert (1987). This could be easily done in frameworks like event semantics or situation semantics, which provide us with space-time locations in the interpretations of sentences.

The semantics of habituals can be captured most easily when we start with a slightly more complex example.

27) John smokes after dinner.
DEFAULT[x,t;x,t]([x=**John'**, **after-dinner'**(t)],[**smoke'**(x,t)])

This says that for every x, x=John, and t, an occasion after dinner, x smokes at t by

default, that is, if there is no explicit reason why he does not smoke (e.g., he may have run out of cigarettes). Note that the prepositional phrase serves to restrict the antecedent (like the *when*-clause discussed above), and secondly, that the verb *smoke* has to be relativized to occasions.

This relativization of dynamic verbs to occasions seems to be necessary in other respects as well. For example, Partee (1973) discussed negations of expressions containing dynamic verbs, which clearly refer to a specific occasion. For example, (27') does not mean that John never turned off the stove, but he didn't turn it off on a specific occasion. Therefore, this sentence has to be formalized not by (a), but by (b), where PRAG should single out a pragmatically salient occasion.

27') John didn't turn off the stove.
a) ¬ **turn-off'(John',the-stove')**
b) ∃t[PRAG(t) & ¬ **turn-off'(John',the-stove'**,t)]

How should we analyze simple habitual sentences? The most natural treatment is, I think, one which follows the pattern of complex habitual sentences. We assume that with simple habitual sentences, the antecedent does not specify the occasions explicitly, but leaves this task to pragmatics (cf. Spears 1974, Newton 1979 and Kleiber 1985 for similar assumptions). These pragmatic restrictions are, however, notoriously difficult to state. I think that our example can best be characterized as: there **are** conditions under which John smokes by default. This yields the following representation:

28) John smokes.
∃P[DEFAULT[x,t;x,t]([x=**John'**, P(t)], [**smoke'**(x,t)])]

Formally, I introduce a predicate variable P, for which I claim that it holds at least for some occasions, and which is bound by an existential quantifier ranging over the whole sentence (note that this existential closure is necessary for the Kamp/Heim treatment anyway).

In order to obtain a uniform analysis, the variable P should be assumed in complex habitual sentences as well, as in (29). In the following, however, I will stick to the simple formalization.

29) John smokes after dinner.
∃P[DEFAULT[x,t;x,t]([x=**John'**, P=**after-dinner'**, P(t)], [**smoke'**(x,t)])]

It is interesting to look at the way **negated** habitual sentences are handled in this approach. I assume that negation can have wide or narrow scope. Then we get the following analyses:

30.a) John doesn't smoke after dinner.
i) ¬ DEFAULT[x,t;x,t]([x=**John'**, **after-dinner'**(t)],[**smoke'**(x,t)])
ii) DEFAULT[x,t;x,t]([x=**John'**, **after-dinner'**(t)],[¬ **smoke'**(x,t)])

b) John doesn't smoke.
i) ¬ ∃P[DEFAULT[x,t;x,t]([x=**John'**, P(t)], [**smoke'**(x,t)])
ii) ∃P[DEFAULT[x,t;x,t]([x=**John'**, P(t)], [¬ **smoke'**(x,t)])

(30.a.i) can be paraphrased as: There is no default that John smokes after dinner, and (30.a.ii) as: There is a default that John doesn't smoke after dinner. This captures the readings of (a) quite well. (30.b.i) can be paraphrased as: there are no conditions P under which there is a default that John smokes. This gives the semantics of negated simple habituals. (30.b.ii) can be paraphrased as: There are conditions under which there is a default that John doesn't smoke. That (30.b) intuitively lacks this reading can be explained by its very weak truth conditions, which make it useless for human communication. For example, there are a lot of conditions, e.g. when John is asleep, under which John doesn't smoke by default.

I leave here the interesting subject of negated habituals to make two remarks on my approach to habituals in general.

The first point is that a semantic characterization of habituality like the one developed here may be considered unsatisfactory, because it relies on a lot of pragmatic considerations. But I think that default quantification simply draws heavily on background knowledge. I think that we cannot be more specific in semantics than just to pinpoint the spots where pragmatics creeps into semantics in cases like this.

Secondly, note that this analysis can explain why habitual predicates are stative. We can analyze non-stative, episodic predicates as predicates which have an occasion argument that is filled by the existential quantifier ranging over the text (the existential closure). They give a report on a specific event or situation, as it were. Look at the following example:

31) (...) John smoked. (...)
$\exists$x,t,...[(...), x=**John'**, **smoke'**(x,t), (...)]

If the predicate lacks an occasion argument filled by an occasion variable which is bound by this existential quantifier, it must be considered as stative. There are two cases in point: either the verbal predicate is inherently independent of occasions, as e.g. *have a mane*, *know French*, or the occasion variable gets bound by some quantifier other than the existential quantifier ranging over the whole text. In both cases, the predication is independent of specific occasions. It seems natural to equate this independence of specific occasions with stativity. But then, it follows that default quantification implies stativity, that is, why I-generic sentences and habitual sentences have stative verbal predicates (see Newton 1979 for a similar explanation why the predicates in those sentences are imperfective in Modern Greek). Of course, stative verbs like *know French* must be interpreted relative to a time - we have past, present and future forms -, but the notion of occasion introduced above should be considered as different from the notion of time).

3. D-Genericity as Reference to Kinds

3.1 Non-taxonomic D-Generic NPs

I will now turn to D-genericity, the other type of genericity we have identified. The basic findings about D-genericity can be recapitulated as follows:

i) Only predicates which are associated with an established kind can yield a D-generic NP.
ii) It is not required that the verbal predicate is stative, or in a special mood, like it is with I-generic NPs.
iii) There are some verbal predicates (kind predicates) which require a D-generic NP in some argument place.

These facts can be most easily explained, of course, if we assume that **D-generic NPs** refer to a special sort of entities, namely **kinds**. This means that D-genericity is basically an NP-oriented phenomenon, unlike I-genericity, which we have found to be sentence-oriented. Observation (iii), which might suggest that D-genericity is verb-oriented, can be explained as a sortal selectional restriction of these predicates, similar to the selectional restriction that the object of the verb *drink* must refer to a liquid.

I will first examine non-taxonomic NPs. In English, these NPs are typically definite

singular NPs like *the lion*, bare plurals like *lions*, bare mass terms like *gold* and, probably somewhat less felicitous, definite plural NPs like *the lions*. In this section, I will try to motivate the forms of D-generic NPs we find in English and other languages.

Kinds should be construed as individual entities, and D-generic NPs consequently as expressions referring to those entities. The subclass of D-generic NPs we consider in this section should furthermore be analyzed as **proper names** (cf. Langford 1949, Carlson 1977, Heyer 1985). One test is that they can be the subject of the so-called *so-called* construction, in contrast to ordinary definite descriptions, a fact Carlson (1977) observed with bare plurals.

31'.a) Big Joe is so called because he is really fat.
b) *This man is so called because he is really fat.
c) The liger is so called because it is the offspring of a lion and a tiger.

There are some lexical expressions which can be analyzed directly as proper names of kinds, for example the English NP (not the noun) *man* and scientific names of kinds, like *homo sapiens*.

32.a) Man lived in Australia for at least 40000 years.
b) Homo sapiens lived in Australia for at least 40000 years.

But normally, nouns have at least two functions: on the one hand, they are related to an individual entity, the kind, and on the other, they are related to every object which belongs to this kind, that is, to every realization of the kind. According to the first function, they should behave like proper names, and according to the second one, they should behave like predicates.

Of course, these two meanings are closely related to each other. An intuitively appealing model is the following: Basically, a common noun denotes a kind. Suppose we have a relation R which holds between kinds and their realizations (cf. Carlson 1977). Then a mass noun like *gold*, which refers to a kind *Au*, also has the set of realizations of this kind, $\lambda x[R(\mathbf{Au}',x)]$, as an extension. The same holds for bare plural nouns like *lions*: they denote a kind, *leo*, and the set of realizations of this kind, $\lambda x[R(\mathbf{leo}',x)]$, the set of all single lions and sum individuals of lions. Singular count nouns and count nouns occuring with a numeral (which I will call "count nouns" in the narrow sense) are semantically more complex. As I argued for in Krifka (1987), they are relations between numbers and entities build on a measure function. Let NU ("natural unit") be a function which maps a kind to a measure function specific for this kind, then the meaning of the count noun *lion(s)* can be represented as $\lambda n \lambda x[R(\mathbf{leo}',x)\ \&\ NU(\mathbf{leo}')(x)=n]$. If the number argument is bound by a numeral, as e.g. in *two lions*, we arrive at predicates like $\lambda x[R(\mathbf{leo}',x)\ \&\ NU(\mathbf{leo}')(x)=2]$, which applies to every sum individual consisting of two lions. Note that the choice of the form *lion* or *lions* is simply a matter of morphological agreement with the determiner, as I showed in Krifka (1987).

How do proper names and nominal predicates differ syntactically? Proper names normally do not require a determiner in English. But note that there are cases where a proper name comes with a definite article, like *the Sudan*, and that the core meaning of the definite article (reference to a familiar entity) is compatible with the meaning of a proper name. Common nouns, on the other hand, come in three classes: mass nouns like *rice* can stand as an NP without determiner, the same holds for bare plural nouns like *lions*, whereas count nouns like *lion(s)* require a determiner.

This explains the possibilities we find for definite kind reference in English. A **mass noun** like *gold* and a **bare plural** like *lions* can be used directly as an NP and therefore does not require a determiner if read as a proper name of a kind. A **singular count noun** like *lion* cannot be used as an NP directly, because it requires some determiner. The natural choice for proper names is the definite article; and in fact, the NP *the lion* can serve as a proper name of a kind. A **plural count noun** like

lions is morphologically identical to a bare plural and cannot be distinguished from them. Finally, it is possible to use both the **definite article and pluralization** to refer to a kind, e.g. in *the lions*, but this sounds a little bit awkward, because either the definite article or pluralization would be enough to meet the syntactic requirements. It gets even worse with the combination of **definite article and mass noun**, e.g. *the gold*; here the noun already is an NP and needs no determiner at all.

33.a) *Lion/The lion/Lions/?The lions is/are extinct.
b) Gold/*The gold is getting more expensive.

Up to now, we have only considered kind-referring NPs in subject position. It is interesting to look at them when they occur in object position, as for example with the verbs *extinguish* and *invent*.

34.a) The settlers extinguished the lion/?the lions/*lions.
b) The Sumerians invented the wheel/?the wheels/*wheels.

In this context, the definiteness of the object NP must be formally marked, if the NP is intended to refer to the kind *leo*. The reason probably is that in postverbal position, bare NPs tend to be interpreted as indefinite, so that there must be a formal indicator if a definite interpretation is intended. I will not go into this case of non-compositionality further at this time.

There are interesting differences between languages in their ways of referring to kinds. For example, in German the combination with the definite article is the preferred means of constructing a proper name referring to a kind, and can be used even with mass nouns, as in *das Gold*.

35.a) *Loewe/Der Loewe/?Loewen/?Die Loewen ist/sind ausgestorben.
b) Gold/Das Gold steigt im Preis.

The reason may be that in German the combination of definite article and proper name is quite common, cf. forms like

36) der Karl 'the Charles'

Concerning plural NPs like *Loewen*: For many speakers, they sound quite fine as D-generic NPs, for others, they sound awkward. There seems to be some register variation going on; e.g. in biological textbooks, we will find *der Loewe ist ausgestorben*, whereas in everyday speech, *Loewen sind ausgestorben* and *die Loewen sind ausgestorben* are more common. Curiously enough, definite plurals with nationality nouns, like *der Türke* 'the Turk', underwent a register shift in the last decades and have now a clearly conservative connotation. The explanation probably is that it is a rather conservative way of thinking to consider peoples as kinds. But I will not go into these interesting register variations further in this article.

Let us have a look at French. In French, there is a requirement that any noun needs a determiner to be an NP. This explains why it is obligatory to use the definite article in this language for D-generic NPs.

37.a) *Lion/Le lion/*Lions/?Les lions sont éteints.
b) *Or/L'or prend de la valeur.

Now, let us look at Chinese. In Chinese, any noun is syntactically an NP. Therefore, no determiner is needed at all, as shown by the following example.

38) Laǒhǔ jué zhǒng le.
tiger vanish CLASS ASP 'the tiger is extinct'

Finally, I want to point out an interesting fact about the type of definite article we find in definite generic NPs. In some German dialects, as well as in Frisian

(Ebert 1971), there are two sorts of definite articles. There is a long form which is used for anaphoric reference, and there is a short form to refer to an entity which is part of the shared knowledge of speaker and hearer. This short form is used with proper names (a) as well as with definite generic NPs (b). The following example is Bavarian:

39.a) Da/*Dea Kare is kema. 'Charles has arrived'
b) Da/*Dea Schnaps is daia. 'Schnaps is expensive'
c) I hab a Bia und an Schnaps bschdait. Dea/*Da Schnaps war daia.
'I have ordered a beer and a schnaps. The schnaps was expensive'

(c) shows that the long form of the article is used to refer anaphorically. I think that this example strongly supports the hypothesis that a generic NP refers to an entity, and that this entity must be well-established in the shared knowledge of speaker and hearer.

3.2 Taxonomic NPs

We will now turn to taxonomic readings. Up to now, we have singled out two meanings of a noun like *lion*, one as a predicate applying to realizations of the kind *leo*, the other as a proper name of the kind *leo* itself. There is a third meaning, namely as predicate with the extension of the sub-species of the kind *leo*, e.g. the Berber lion, the Asian lion, etc. This count noun meaning even occurs with mass nouns like *wine*, as e.g. in *three wines*. NPs interpreted in this way I call **taxonomic**; they were identified e.g. by Galmiche (1985) as formes "pour référer à une sous-espèce". I give some examples for the taxonomic reading:

40.a) The lion is *a cat*.
b) *One lion*, namely the Asian lion, is nearly extinct.
c) *This lion* (the Asian lion) is nearly extinct.
d) *The rice they grow in East Africa* needs little water.
e) The lion and the tiger are *cats*.

We see that taxonomic NPs need not be indefinite, but show the whole range of syntactic behaviour we observe with count nouns in general.

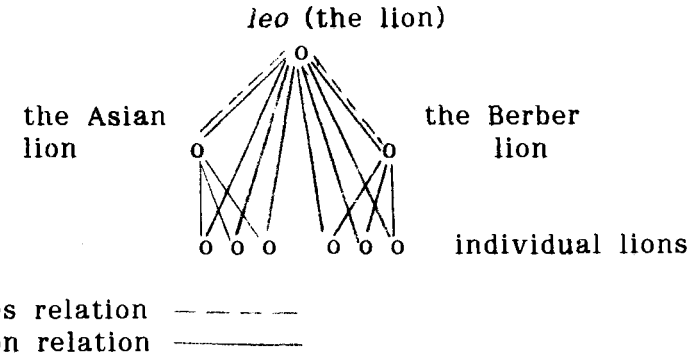
How can we account for the taxonomic interpretation of count nouns in a formal way? Remember that for the non-taxonomic interpretation, we assumed a mapping NU ("Natural Unit") from kinds to measure functions which count individual realizations of the kinds. For the taxonomic interpretation, we have to assume another measure function which counts subspecies of the kind. Let SS be a function which maps kinds to such measure functions. Then we arrive at the following interpretations for the count noun *lion(s)*:

40') *lion(s)* a) $\lambda n \lambda x[R(\mathbf{leo'},x)\ \&\ NU(\mathbf{leo'})(x)=n]$ (non-taxonomic)
b) $\lambda n \lambda x[R(\mathbf{leo'},x)\ \&\ SS(\mathbf{leo'})(x)=n]$ (taxonomic)

It seems natural to assume that a subspecies is a realization of its superspecies. Then the two readings differ just in their second conjunct: Whereas NU introduces a measure function applying to concrete lions, SS introduces a measure function applying to subspecies of the kind *leo*.

Of course, the taxonomic readings should be analyzed in terms of taxonomic hierarchies. Basically, these hierarchies can be considered as lattice structures (e.g. Kay 1971, Pelletier & Schubert 1983). The two predicational meanings of a noun like *lion*, the taxonomic meaning and the realization meaning, are related to each other; if k' is a subspecies of k, and s' is a specimen of kind k', then s' is also a specimen of k.

41)



There are some NPs which can only be interpreted as predicates referring to kinds. An example is *halogen* (cf. Burton-Roberts 1977):

42.a) Chlorine is a halogen.
b) ?There was halogen in the air.

And there are constructions which single out the taxonomic meaning, namely numerative constructions with special numeratives, e.g. *type*, or special nominal derivations, e.g. nouns with the suffix *-art* in German:

43.a) This type of lion is extinct.
b) Diese Loewenart ist ausgestorben.

The notion of taxonomic hierarchy can be exploited to cover the **type-token ambiguity** as well. For example, *this book* in (44) can be analyzed as referring to a subspecies of the kind *book*, e.g. to Joyce's *Ulysses*:

44) This book sells well.

If type-token ambiguities are to be handled as subspecies-object ambiguities, then it should be clear that taxonomic NPs are a much more pervasive phenomenon in natural language than it was thought before, and surely a subject which should be treated more thoroughly.

There is an interesting case which supports an analysis of nouns along these lines, as well as the separation of I-genericity and D-genericity. If the subspecies meaning of a noun is a predicate, we should be able to construct I-generic sentences with them, that is, **double generic sentences** which are I-generic and D-generic at the same time. Consider the following case:

45) A bird flies.

This sentence clearly has two readings, according to the interpretation of *bird* as referring to individual birds or to subspecies.

3.3 The Meaning of D-Generic Sentences

We have analyzed D-generic NPs as expressions referring to kinds. In this section, we will examine the ontology of kinds, and its influence on the meaning of D-generic sentences.

Let us start with analyzing the notion of a kind more thoroughly. Imagine a cage in a zoo with two lions, and a father pointing at them and saying to his children:

46.a) This is the lion.

I think it is clear that *the lion* should be analyzed as kind-referring NP. Note, for

example, that (46.a) can be continued with the generic sentence

46.b) It lives in Africa.

where *it* should clearly be analyzed as referring to the kind *leo* and as co-referent with *the lion* in (46.a). But on the other hand, the father pointed at two concrete animals, which surely do not make up the whole kind *leo*.

How can we solve this problem? One way could be to analyze *the lion* not only as an expression referring to a kind, but also as a predicate applying to all single lions and sums of lions as well. The D-generic NP *the lion* could either be analyzed as ambiguous between those two readings, or as an unambiguous predicate with an extension comprising the kind *leo* and any single or multiple realization oft it. Both assumptions would explain why (46.a) is possible: the entity pointed at are two lions, and therefore in the extension of *the lion*. But it would be hard to explain why (46.b) is a possible continuation, because *it* clearly refers to the kind *leo*, and not to some concrete lions.

Another, more promising way is to seek an explanation not in language, but in ontology, that is, not in a wider meaning of D-generic NPs, but in the ontology of kinds. In this approach, an NP like *the lion* should refer to a kind, *leo*, but the ontology of kinds allows sentences like (46.a) to be true. The basic ontological difference between objects and kinds can be captured as follows: For any time t, an object has at most one location at t, whereas a kind may have more than one location at t (cf. Langford 1949 and Zemach's (1970) distinction between between "objects" and "types"). A kind, then, is to be analyzed as identical with all its realizations and sums of realizations. For example, the kind *leo* is identical with any single lion or any sums of lions. In this way, we can explain why (46.a) is correct, and why the anaphoric relation between *it* in (46.b) and *the lion* in (46.a) is possible.

Of course, the ontology of objects and kinds sketched above needs more elaboration. An important aspect is that the identity relation has to be relativized to different criteria of identity. Otherwise, we could prove that, e.g., any two lions are the same, because they are identical to the kind *leo*, and identity is a transitive and commutative relation. Actually, it is quite easy to define the identity relation we need. Let us assume two sorts of individual entities, kinds and objects, and Carlson's two-place relation R. Then we can define a relation EQU as follows: $\forall x,y[EQU(x,y) \leftrightarrow [x=y] \vee R(x,y)]$ Here, "=" should denote ordinary equality.

At this point, it is interesting to consider the relation between kinds and the extension of nominal predicates again. In section (3.1), I showed how the meaning of nominal predicates can be construed from the representation of a kind. If we assume the EQU relation as basic, then we can get rid of the R relation; for example, we could represent the predicate *gold* as $\lambda x[EQU(\mathbf{Au'},x) \;\&\; \neg x=\mathbf{Au'}]$. But we still have to make explicit that the predicate *gold* is related to some criterion of identity which allows us to say, for example, that the quantity of stuff I found yesterday and the quantity of stuff in my pocket is the same gold. It is well known that criteria of identity are dependent on the kind; for example, the stuff I found and the stuff in my pocket may be the same quantity of gold, but different rings. To capture this dependency, I propose a relation ID which maps a kind to entities with the criteria of identity specific for the kind. Then we get representations like the following ones:

46'.a) *gold* $\lambda x[EQU(\mathbf{Au'},x) \;\&\; ID(\mathbf{Au'},x)]$

b) *lion(s)* $\lambda n\lambda x[EQU(\mathbf{leo'},x) \;\&\; ID(\mathbf{leo'},x) \;\&\; NU(\mathbf{leo'})(x)=n]$

There are ways to handle entities with different criteria of identity; cf. for example Gupta (1980). Basically, the variable x in (46') can be considered as a sort of predicate variable applying to more basic entities, possibly temporal stages in the sense of Carlson (1977). Then the formula ID(**Au'**,x) says that x is an equivalence class for the kind *Au*, e.g. that all stages s for which x(s) holds are stages of the

same quantity of gold. Note that the notion of a stage, in contrast with Carlson's work, would play a modest role in such a theory: it just helps to give an formalization of criteria of identity.

Let us come back to D-generic sentences. If the ontology of kinds given above is correct, then the following two sentences should both be appropriate to describe a situation which consists of a man wearing a hat going across a street into a pub. They exemplify just different modes of speaking, which I will call **object-oriented** and **kind-oriented**, respectively.

47.a) A man wearing a hat went across a street into a pub.
b) Man wearing the hat went across the street into the pub.

But clearly, the kind-oriented mode of speaking in (47.b) sounds rather odd. The reason why we normally employ the object-oriented mode is that it usually is more informative, as it provides us with quantitative information and with criteria of identity which help us to keep track of the same object by anaphoric devices. For example, in (47.a) it is expressed that one man, one hat, one street and one pub are involved in the reported event, and it is possible to refer to the same objects later, e.g. in *He found out that it was closed.* In (47.b), however, it is unclear how many men, hats, streets and pubs are involved, and it would be impossible to refer explicitly to the same objects in following sentences. This explains why we mostly speak in the object-oriented mode in the first place.

But when do we employ the kind-oriented mode of speaking? I will discuss the cases I am aware of, but there may be some more.

48.a) Man set foot on the Moon in 1969. **(avantgarde interpretation)**
b) Be quiet - the lion is roaming about! **(representative object)**
c) Frenchmen eat horsemeat. **(distinguishing property)**
The Frenchman eats horsemeat.
d) Germans bought 83000 BMWs last year. **(collective property)**
The German bought 83000 BMWs last year.
e) The dodo is extinct. **(kind predicate)**
f) The lion is ferocious. **(characteristic property)**

a) If some exceptional object has a property, we can employ the kind-oriented mode because the property is felt to be relevant not only to the object, but also to the kind this object belongs to. I call this the **avantgarde interpretation**. Note that not any old exceptional property object gives rise to this interpretation, because it is not necessarily felt to be relevant to the kind. This can be seen by the following examples:

49.a) Man learned to solve cubic equations in the 16th century.
b) ?Man jumped over 8.90 meters in 1968.
c) *Man ate 128 pretzels in one hour in 1976.

b) If the object is only interesting as a representative of a kind, then the kind-oriented mode is employed as well. I call this **representative object** interpretation. This is the interpretation we have to assume for our initial example (46.a).

c) Another case where the kind-oriented mode of speaking is called for is when it is a **distinguishing property**, that is, a property that holds of some realizations of the kind and thus distinguishes this kind from other, closely realted kinds. Note that this reading should not be treated in terms of I-genericity, since no default quantification is involved here (e.g., there is no default rule that a Frenchman eats horsemeat). But how can we show that D-generic sentences with distinguishing property interpretation are different from I-generic sentences? Note that with I-generic readings bare plurals and indefinite singulars can be exchanged *salva veritate*, whereas D-generic NPs in the distinguishing property interpretation cannot be exchanged *salva veritate* with indefinite singular NPs:

50.a) Lions are ferocious.
b) A lion is ferocious. (meaning of a = meaning of b)
51.a) Frenchmen eat horsemeat.
b) A Frenchman eats horsemeat. (meaning of b stronger than a)

Note that the following famous example (cf. Carlson 1977) can be explained similarly as D-generic sentence with distinguishing property interpretation, as (a,b) in the most plausible interpretation differ in meaning from (c):

52.a) Dutchmen are good sailors.
b) The Dutchman is a good sailor.
c) A Dutchman is a good sailor. (stronger than a and b)

d) The kind-oriented mode is allowed when a predicate applies to the sum of all existing realizations of the kind. I call this the **collective property** interpretation; it was alluded to in Carlson's example *Linguists have 30000 books in print.*

One could argue by these examples that the proper way to analyze kinds is the mereological one, that is, to analyze a kind as the sum of its realizations. But I think we should carefully distinguish those entities, as not every predicate which holds for the sum of the realizations of a kind holds for the kind itself, and vice versa. For example, it may be true that the sum of the existing lions have a weight of 100000 tons, but a generic sentence like

53) 'The lion has (or: Lions have) a weight of 100000 tons

is simply nonsense. It remains to be investigated under which conditions the collective property interpretation is available.

e) **Kind predicates** can only be applied to kinds in the first place. But note that they are related to properties of realizations of the kind. For example, in order to show that the dodo is extinct, one has to show that there have been realizations of this kind in the past, and that there are no present realizations of this kind now. This reduction of kind predicates to predicates about objects can be handled by meaning postulates for kind predicates.

f) Finally, if the realizations of a kind have a characteristic property, then this property can be "projected" to the kind itself. I call this **characteristic property** interpretation. In these cases, both D-genericity and I-genericity are involved. For example, D-generic sentences with the characteristic property interpretation can have all the overt quantifiers we have found as alternatives to the I-generic construction:

54.a) A lion always/mostly/usually/seldom/never has a mane.
b) The lion always/mostly/usually/seldom/never has a mane.

Surely, we have intuitively the same kind of default rule in *the lion is ferocious* as in *a lion is ferocious*. Therefore, this sentence should be analyzed as a sentence which contains both the DEFAULT quantifier and a D-generic NP.

How can we capture this sort of double genericity formally? According to the ontology of kinds sketched above, the predicate *a lion* and the kind-referring NP *the lion* are semantically rather similar. Of course, *a lion* denotes a set, and *the lion* denotes a kind individual. But every element in the extension of *a lion* is equal to the kind individual denoted by *the lion* (according to the extended equality relation introduced above). This suggests the following formalization:

55) The lion has a mane.
DEFAULT[x;x,y]([x=**leo'**],[**mane'**(y), **has'**(x,y)])

Although the variable x in the antecedent part is bound to a specific individual, the kind *leo*, there are many possible instantiations for it - namely any single lion and any sum of lions. That is, the antecedent part has the same meaning as the expression **lions'**(x), assuming that **lions'** applies to single and multiple lions. But then the formalization of (55) is quite plausible. The only refinement necessary is the inclusion of a distributivity operator in the consequent, because x can be instantiated by a sum of lions as well. As it is often the case, this distributivity operator is implicit, but it can be made explicit, as in German *Der Löwe hat je vier Reißzähne* 'the lion has four fangs each'.

In the examples considerd so far, we mostly analyzed kind-referring NPs in subject position. But they can occur in other syntactic positions as well, e.g. in object position. The range of meanings, however, seems to be limited in these cases. At least the following readings are clearly available:

56.a)	The settlers extinguished *the dodo.*	(kind predicates)
	The Sumerians invented *the wheel.*	
b)	In Tanzania, they filmed *the lion.*	(representative object)
c)	Dogs chase *cats.*	
	The dog chases *the cat.*	(characteristic predicate)

The characteristic predicate reading typically shows up when the subject is also a kind-referring NP. Normally, the object NP should be clearly marked as definite when reference to a single kind is intended, but it could be that *cats* in (c) can be interpreted as referring to a kind as well. I will not go into these problems here.

My treatment of the interpretations of sentences containing D-generic NPs (or, equivalently, circumstances to license the kind-oriented mode of speaking) differs from approaches like the ones of Bacon (1973) and Heyer (1985), who assume different interpretations of the D-generic NP itself to handle the interpretations of the sentences. For example, according to Heyer the D-generic NP *the lion* can refer either to the kind *leo* (in the kind predicate and avantgarde interpretation, his "absolute generic reference"), or to a typical representative of this kind (in the characteristic property interpretation, his "personal generic reference"). But pushing the difference to the referent of the D-generic NP seems to be incorrect, as it is the verbal predicate which is decisive for the interpretation of the sentence. For example, one and the same NP can serve both roles in sentences with conjoined verbal predicates, as in *The dodo lived on Mauritius and became extinct in the 18th century.*

4. GENERICITY RECLASSIFIED

It might be worthwile to look at genericity again after we worked through all this re-classification. Basically, we found that D-genericity can be analyzed as reference to kinds, whereas I-genericity can be analyzed as default quantification.

It was not quite easy to separate these two notions. The reason is that there is considerable overlap in form as well as in meaning. Consider first the overlap in form. Three of the five types of D-generic NPs can be analyzed as indefinite NPs as well (namely bare mass terms, bare plurals and indefinite taxonomic NPs) and can therefore be interpreted as I-generic NPs in appropriate contexts.

Formal overlap of D-generic NPs and I-genericity

57)	definite singular NPs	X	kind-referring NPs
	definite plural NPs	X	
	bare singulars	X	X
	bare plurals	X	X
	indefinite taxonomic NPs	X	X indefinite NPs
	other NPs with indefinite determiners		X (possibly I-generic)

Concerning the semantic overlap, we have seen that at least one quite common interpretation of D-generic sentences, the characteristic predicate interpretation, must be analyzed as habitual interpretation, similarly to I-generic sentences.

Semantic overlap of D-generic NPs and default quantification

58)	avantgarde	X	
	representative object	X	interpretations of sentences
	distinguishing property	X	with kind-referring NPs
	collective property	X	
	kind predicate	X	
	characteristic property	X	X
	I-generic sentences		X default quantification
	habitual sentences		X

Given this overlap in form and meaning, I think it comes as no surprise that a rather uniform notion of "genericity" has been favoured for such a long time. But as I have argued, I think we should abandon this notion in favour of two other, related notions, namely **kind reference** and **default quantification**.

5. SOME RELATED PHENOMENA

In this final chapter, I want to extend the analysis of I-genericity and habituativity given above in various ways.

5.1 I-Genericity and Downward Entailment: The Case of *any*

The relation of *any* and the so-called indefinite generic article is a much-discussed topic (see e.g. Burton-Roberts 1976). In this section, I will show that the distribution of *any* can be explained in our theory of I-genericity.

As I have mentioned above, there is an important distinction between I-generic sentences and sentences including nominal quantification, noted by Dahl (1975) and, more explicitly, by Croft (1986). In contrast to nominal quantification, I-genericity cannot be restricted to a given set of individuals:

59) There were lions and tigers in the circus ring.
 a) Every lion/all lions/each lion/most lions/many lions/no lion had a mane.
 b) *Lions had a mane.

In (a), the range of individuals quantified over is restricted to the contextually salient ones, whereas an I-generic sentence like (b) cannot be restricted in this way. There is, however, a quantifier which cannot be restricted either, namely *any*:

60) Any lion has a mane.

It is evident that (60) has the characteristic property of I-generic sentences; for example, it needs a stative, non-accidental predicate (cf. **Any lion is roaring*), and the range of quantification cannot be restricted to the contextually salient individuals (cf. Vendler 1967 and Perlmutter 1970 for the genericity of sentences like 60).

How can we account for the fact that an NP like *any lion* can be the subject of an I-generic sentence? Our analysis of I-genericity requires that it is basically an indefinite NP insofar as it has no quantificational force of its own. Traditional wisdom says that it is a negative polarity item, and therefore occurs in the scope of downward-entailing operators according to the theory of Ladusaw (1979). This insight can be combined with our theory of I-genericity as default quantification if we can

show that the antecedent of the default quantifier is a downward-entailing context.

Let us begin with the first claim, that *any lion* is semantically similar to an indefinite NP. I cannot go into the involved question concerning the analysis of *any* here, but simply note that Ladusaw (1979) offers arguments for an analysis of *any* as an existential quantifier (specifically, an existential quantifier with narrow scope), and against another common analysis, namely as a universal quantifer with wide scope. In Ladusaw's analysis, an NP like *any lion* resembles an ordinary indefinite NP like *a lion* in the Generalized Quantifiers framework. This resemblance should carry over to an analysis of indefinite NPs in the Kamp/Heim framework, where indefinite NPs have no quantificational force of their own. The narrow scope condition can be recast as a condition saying that the variable of an *any*-NP must not be bound by the existential quantifier ranging over the whole text.

The second claim, that the antecedent of the default quantifier is downward-entailing, clearly is incorrect in the general case. Although the antecedent may be strengthened in many cases (cf. 61), there are some cases where we arrive at wrong conclusions (cf. 62):

61) A lion has four legs.
A male lion is a lion.
-> A male lion has four legs.

62) A lion has four legs.
A three-legged lion is a lion.
$\not\rightarrow$ A three-legged lion has four legs.

The reason why we cannot draw the conclusion in (62) is that this specific strengthening of the antecedent restricts it to cases where the default rule is not applicable anymore. In the example at hand, the consequent, that x has four legs, is not consistent with the positive information given in the antecedent, which says that x is three-legged. (We meet similar problems with conditional sentences in general, cf. Heim 1987). Therefore we have to exclude those strengthenings of the antecedent which bear influence on the consistency of the consequent. But if we keep this restriction in mind, the antecedent of the DEFAULT quantifier is in fact downward entailing. And this explains why it licenses *any*-NPs.

The downward-entailment property explains furthermore why sentences with indefinite generic NPs conjoined by *or* can have an interpretation equivalent to single generic sentences conjoined by *and*:

62') A lion or a horse have a mane.
<=> A lion has a mane and a horse has a mane.

According to our theory, these sentences have roughly the following interpretation:

62") DEFAULT[x;x,y]([**lion'**(x) v **horse'**(x)],[**mane'**(y) & **has'**(x,y)])
<=> DEFAULT[x;x,y]([**lion'**(x)],[**mane'**(y) & **has'**(x,y)]) &
DEFAULT[x;x,y]([**horse'**(x)],[**mane'**(y) & **has'**(x,y)])

This inference is standard if we replace DEFAULT with universal quantification. But it is clear that it should hold with DEFAULT as well: If an x which is a lion or a horse has a mane by default, than this default holds for an x which is a lion and for an x which is a horse separately as well.

Note that (62') can have an interpretation with wide scope *or* as well. If we look at sentences with NPs conjoined by *and*, we only find this wide scope reading acceptable (cf. *A lion and a horse have a mane*). The reason for this is clear: otherwise we would end up with an antecedent like [**lion'**(x) & **horse'**(x)], which does not hold for any x. But if *and* is interpreted as construing a sum individual, then we end up with an acceptable sentence, as e.g. in *A lion and a tiger hate each other.*

Let us come back to *any*. There is an interesting meaning difference between I-generic sentences with *any*-NPs and ordinary indefinite NPs:

63.a) A lion has a mane.
b) Any lion has a mane.

(63.b) is interpreted as more strictly than (a); in fact, (a) can be considered as true, whereas (b) is clearly false. This difference can be explained by the assumption of Vendler (1967) that *any*-NPs convey the meaning that nothing hinges upon the particular choice of a referent. The DEFAULT quantifier lacks this property; in fact, whether the consequent applies or not often depends on the selected referent. Therefore sentences like (63.a) do allow exceptions, whereas sentences like (63.b) do not.

Burton-Roberts (1976) notes some differences in acceptability between *a*-NPs and *any*-NPs *in generic sentences; one of her examples is A beaver /*Any beaver is an amphibious rodent*. The reason why the *any*-sentence sounds odd seems to be that the predicate expresses a necessary, nearly definitional property which holds for every beaver. But then the "strengthening" of *a beaver* to *any beaver* does not make much sense, because the default rule held without exception in the first place. This explanation can be made more precise if we assume that a sentence with an *any*-NP is more complex than the corresponding sentence with an *a*-NP, and that the simpler expression is used if the more complex one does not differ from it in meaning.

Nunberg & Pan (1975) try to capture the difference between *a*-NPs and *any*-NPs by assuming that the extension of the *a*-NP is restricted to individuals which are typical representatives, whereas the *any*-NP is to be understood more widely, including all the untypical cases as well. But then we cannot explain why sentences like **this is any lion*, pointing to a specific lion which possibly is not very typical for its species, are bad.

5.2 Set Predication

There is a class of predicates, usually considered as kind predicates, which can be applied to indefinite NPs and to kind-referring NPs as well. Examples are *be rare*, *be common*, *be widespread*.

65.a) The lion is rare.
b) The lions are rare.
c) A lion (with three legs) is rare.
d) Lions (with three legs) are rare.
e) Gold (which is hammered flat) is rare.
f) One cat (namely the lion) is rare.

Obviously, this distribution pattern cuts across the patterns we have observed in section (1.2), and we have to account for it in some way.

I think that *be rare* should not be analyzed as a kind predicate, like *be extinct*, because it can be combined with a singular indefinite NP (cf. 59.c), and it need not be applied to a well-established kind. On the other hand, the examples above cannot be analyzed as I-generic sentences either. They do not express some default rule which holds for individual lions, and they are not related to sentences with overt adverbial quantification, cf.

66) *A lion (with three legs) is always/mostly/often/usually/never rare.

They do not allow *any*-NPs, cf. **Any lion is rare*. And finally, a predicate like *be rare* cannot apply to an individual lion in the first place.

It is possible, however, to analyze predicates like *be rare* as semantically complex applying to the denotation of nominal predicates, i.e., indefinite NPs. A possible analysis along these lines is the following one. Note that I do not claim that the specific analysis of *rare* is the ultimate one; I only claim that we should seek for some analysis of this sort.

67) A lion with three legs is rare.
rare'(λx[**lion'**(x) & **has-three-legs'**(x)])
with the following meaning postulate for **rare'**:
rare'(P) => there are few locations l for which it holds that there is an x at l with P(x).

Let us call predicates like *be rare* **set predicates**, because they apply not to a kind, but to a set of objects.

But how could we handle sentences like (65.a), which clearly are predication to a kind? According to the ontology of kinds sketched in section (5.3) above, there is a close resemblance between the denotations of the predicates *a lion* or *lions* and the ontological structure of the referent of the kind-denoting NP *the lion*. All we need is to represent the kind by its singleton set, triggered by some type-shifting rule.

68) The lion is rare.
rare'(λx[x=**leo'**])

According to the meaning postulate in (67), this amounts to

69) there are few locations l for which it holds that there is an x at l with x=**leo'**

We also have set predicates which require a set-type object NP. A case in point is the verb *love* in a special reading. The verb *love* can either be a relation between two individuals (cf. 70.a,b), where the object can denote a kind as well (cf. c). Or it can denote a relation between an individual and a set, meaning that the individual loves to have an element of the set (cf. d).

70.a) John loves Mary.
b) John loves a woman.
c) John loves the IBM PC.
d) John loves a hot shower. (= John loves to have a hot shower).

5.3 Do We Need Complex Model Structures?

In the classic formal treatment of genericity developed by Carlson (1977), every bare plural NP is analyzed as referring to a kind. As generic NPs can be quite complex (e.g. *lions with three legs*), and as there seems to be no principled limit for their complexity, one has to assume quite a lot of individuals. Nothing less than a distinct individual for every possible noun denotation would do. Furthermore, Carlson's analysis can be extended to cover sentences like the following one, which can be analyzed as predications to the kind of jogging (cf. Chierchia 1982).

71.a) Jogging is healthy.
b) To jog is healthy.

This leads us to think about representing every possible predicate, nominal ones as well as verbal ones, by an individual in the basic domain of the model structure.

Of course, this approach presents problems if we assume standard models. Chierchia (1982) and Turner (1983) showed possible ways to overcome them by drawing on a syntactical restricted representation language developed by Cocchiarella and using

Scott Domains as model structures, respectively.

In the analysis of genericity developed here, however, we actually need only "few" individuals to represent kinds. This is because we need them just to represent the denotation of D-generic NPs, and as we have seen, we cannot construct D-generic NPs from any predicate whatsoever, but only from predicates which are related to a well-established kind (cf. 67.a,b). All the cases which seem to show that we need "many" individuals can be treated either as I-generic sentences (cf. c) or as sentences involving set predication (cf. d), and we do not need kind individuals to handle them.

72.a) *The lion with three legs is extinct.
b) *Lions with three legs are extinct.
b) Lions with three legs are severely handicapped.
c) Lions with three legs are rare.

If the treatment developed here is basically correct and can be extended to cover sentences with subjects like *jogging, to jog*, then we need not introduce complex model structures in order to model the semantics of genericity. In the case of common nouns, I have sketched a theory which assumes kinds to be primitive, and nominal predicates to be derivative constructions. Take the simple example *gold*. We have a kind *Au* and a derived nominal predicate $\lambda x[R(\mathbf{Au'},x)]$ or $\lambda x[EQU(\mathbf{Au'},x)\ \&\ ID(\mathbf{Au'},x)]$ (cf. section 3.3) applying to realizations of this kind, that is, quantities of gold. The complex predicate *gold which is hammered flat* can be represented by the application of a predicate modfier like $\lambda P\lambda x[P(x)\ \&\ \mathbf{hammered\text{-}flat'}(x)]$ to the nominal predicate, that is, by $\lambda x[R(\mathbf{Au'},x)\ \&\ \mathbf{hammered\text{-}flat'}(x)]$ or $\lambda x[EQU(\mathbf{Au'},x)\ \&\ ID(\mathbf{Au'},x)\ \&\ \mathbf{hammered\text{-}flat'}(x)]$. But there is no need for a kind individual which has as its realizations just the quantities of gold which are hammered flat, a possibility the theories of Carlson and Chierchia do allow for.

It seems possible to carry over this approach to verb meanings as well. Take jogging as an example. We can assume a kind *jog* which has events of jogging as its realizations. Then we can construct an event predicate, $\lambda e[R(\mathbf{jog'},e)]$. The complex predicate *jog half a mile* then can be represented as $\lambda e[R(\mathbf{jog'},e)\ \&\ \mathbf{half\text{-}a\text{-}mile'}(e)]$, and there need not be any kind which corresponds to this set.

Of course, language users are rather free to assume even rather strange kinds, and therefore one could argue that it is wise to presuppose a complex model structure in the first place. But this would be against the spirit of much of the rest of linguistics, e.g. in syntax, where we try to restrict the power our theories as far as possible. And it would blur an important semantic distinction, namely that of well-established kinds and predicates which are arbitrarily construed.

Here, I just want to mention that it is not sufficient to assume just kinds as individual correspondents of some nouns. For example, we have not only the kind *homo sapiens* corresponding to the count noun *man*, but also an individual which we denote with *mankind*. That there are subtle differences between those individuals can be seen in the following example:

72'.a) Man set foot on the Moon in 1969
b) ?Mankind set foot on the Moon in 1969.

The referent of *mankind* probably is the sum individual of all men, and (b) sounds odd because only a very small part of this individual actually set foot on the Moon in 1969.

Another type of quasi-generic individual can be assumed for NPs which contain adjectives like *typical* or *average*, as in

72".a) The typical German spends Christmas with his family.
b) The average German earns DM 32000 a year.

These sentences can be explained most easily if we assume that their subjects refer to hypothetical individuals which have exactly those properties which are supposed to be typical or common for the individuals denoted by the head noun. Then any attribution of a property to this individual entails an attribution of this property to elements in the extension of the nominal predicate.

The meaning of sentences like (72") is close to D-generic sentences in the characteristic property interpretation. This may be a reason why certain authors, for example Heyer (1985), reconstruct definite generic NPs in this interpretation as referring to a typical representative of a kind. But we have presented arguments why a uniform analysis of D-generic NPs for all interpretations is necessary. Furthermore, note that we can identify a concrete individual with the typical representative of a kind, as e.g. in *Fritz is the typical German*, whereas the identification with the kind itself is licensed only in very special contexts, viz. ??*Fritz is the German* (referring with *the German* to the kind).

A historical remark may be in order at this place. Heyer (1987) has shown that generic sentences were a central topic in the tradition of ontological Realism; they have been considered even as more basic than sentences involving concrete entities. With the rise of Conceptualism/Nominalism, however, generic sentences were considered to be a secondary phenomenon, giving evidence of the inconsistencies of natural language. For example, Frege (1892) only alludes to generic sentences like *Das Pferd ist ein vierbeiniges Tier* 'the horse is a for-legged animal" and *Der Türke belagerte Wien* 'the Turk besieged Vienna', but fails to give a uniform treatment, and Russell and Quine only consider quantification over objects. Modern theories, as Carlson (1977), Chierchia (1982) and Heyer's own theory can be considered as a complete return to ontological Realism, insofar as they assume kinds and properties in the domain of individuals. In the theory of genericity developed here, we distinguish between two sorts of genericity. A Realist theory is called for only for D-generic NPs, whereas I-generic sentences can be reconstructed in the Nominalist way as a special sort of quantification over individuals. This is not simply a compromise, but is suggested by a careful examination of the linguistic phenomena.

5.4 Accentuation, Theme/Rheme-Structuring, and Quantifiers

Although it has never been an important topic in the discussion, it is obvious that I-generic sentences differ from non-generic sentences in accentuational features:

73.a) A lion | is a ferocious 'beast.
b) A 'lion is in the cage.

An I-generic sentence like (a) has two parts, which may be identified as **theme** and **rheme**. There is an optional pause between them, the rheme bears the main stress, and the theme bears secondary stress. Sentences with normal indefinite subjects like (b) do not have an optional pause, the subject bears the main stress, and there is a tendency to use the *there*-construction. They can be considered as wholly rhematic. That I-generic NPs are thematic becomes very clear in languageas like French which have a special construction for thematic indefinite constituents (a), whereas the common construction for rhematic indefinite constituents (b) cannot be interpreted as generic:

74.a) Des garçons, ça ne pleurent pas. 'Boys do not cry.'
b) Il y a des garçons qui pleurent.

Note that the sentence pattern of I-generic sentences is common to all sentences with quantificational structure:

75.a) Every lion | is a ferocious 'beast.
b) If Pedro has a donkey | he 'beats it.

This observation can be explained if we associate the Kamp/Heim notion of quantifiers with the theme/rheme distinction developed in the Prague school. This can be done quite naturally: The antecedent of a quantificational operator forms the background against which the consequent is evaluated; and the relation of theme to rheme can be thought of in exactly the same way. Now, it is well-known that the theme/rheme-structuring bears influence on intonation. Basically, the rheme contains the main stress, and theme and rheme are separated by an optional pause. But this describes exactly our findings concerning the accentual patterns of quantificational sentences.

Of course, our assumption only holds for sentences which do not have a narrow (contrastive) focus. For example, it is possible to utter the following sentences with stress on *lion*, without changing the interpretation, but implying some element contrasting with *lion*.

76.a) Every 'lion is a fercocious beast.
b) A 'lion is a ferocious beast.

To handle these cases, we have to assume a second layer of intonational rules which governs phenomena like contrastive focus. I will not go into these complications here, but simply restrict my examples to non-contrastive interpretations.

Let us examine some more examples to see whether the observed relation between intonation and quantifier structure can be maintained.

We came across some instances where it was convenient to assume that the antecedent part of the quantifier gets enriched by some more material, e.g. by (atemporal or temporal) when-clauses. As the when-clause is part of the antecedent, it should be unstressed. It is exactly this that we find:

77.a) Lions are 'dangerous | when they are hungry.
DEFAULT[x,t;x,t]([**lions'**(x), **hungry'**(x,t)],[**dangerous'**(x,t)])
b) Lions are 'dangerous | when they have red eyes.
DEFAULT[x;x]([**lions'**(x), **have-red-eyes'**(x)],[**dangerous'**(x)])

A second example which our analysis accounts for are the ambiguities discussed by Carlson (1986). Carlson observed that sentences like *flowers grow out behind the old shed* have two meanings. These meanings can be rendered easily in our analysis, and furthermore, they are clearly favored with the stress patterns predicted by our association of quantifier structure to theme/rheme structure.

78 a) Flowers | grow out behind the old 'shed.
DEFAULT[x,t;x,t]([**flowers'**(x), P(t)], [**grow-out-behind-the-old-shed'**(x,t)])
b) 'Flowers grow out | behind the old shed.
DEFAULT[x;x]([**behind-the-old-shed'**(t),P(t)],[**flowers'**(x), **grow-out'**(x,t)])

Carlson furthermore observed that with simple habituals, there is only one reading (the first one). This can be explained with a plausible additional principle, namely that the antecedent must be specified by at least one lexical item (otherwise, the sentence would have rather weak truth conditions, e.g. that there are flowers growing somewhere by default).

79) Flowers grow.
a) DEFAULT[x,t;x,t]([**flowers'**(x), P(t)], [**grow'**(x,t)])
b) *DEFAULT[x;x,t]([P(t)], [**flowers'**(x), **grow'**(x,t)])
(not allowed; antecedent must be explicitly specified)

Carlson showed in his 1986 paper that genericity/habituality is a relational phenomenon, but did not give a formal treatment. In my analysis, habitual sentences

get a formally relational analysis by the DEFAULT-quantifier.

As a third example, I want to discuss a distinction which was made by Lawler (1972, 1973) and Dahl (1975). They pointed out that examples like the following can have two readings, which they named "existential" and "universal".

80) John drinks beer.

As a universal habitual sentence, (80) means that beer is the favorite (alcoholic) beverage John drinks; as an existential habitual sentence, it means that John does not object to drinking beer. Actually, there is a third reading present, meaning that John has the habit of drinking beer, without excluding the possibility that he has the habit of drinking wine as well.

Lawler assumes two different generic operators to handle cases like this one; if there is a third reading, we would need even three operators. But I think this assumption is not necessary, a point which was made already by Spears (1974) for Lawler's distinction. First of all, note that the three readings are associated with different intonation patterns:

81.a) John drinks 'beer. (universal generic reading)
b) John 'drinks beer. (existential generic reading)
c) John 'drinks 'beer. (habitual reading)

From these intonation patterns, we should expect that in (a), only *beer* is in the antecedent, in (b), only *drinks*, and in (c), both *drinks* and *beer*. Surprisingly enough, this gives us the intended readings.

82.a) DEFAULT[x,y,t;y|([x=**John'**, P(t), **drink'**(x,y,t)],[**beer'**(y)])
b) DEFAULT[x,y,t;x,y,t|([x=**John'**, **beer'**(y), P(t)],[**drink'**(x,y,t)])
c) DEFAULT[x,t;x,y,t]([x=**John'**, P(t)],[**beer'**(y), **drink'**(x,y,t)])

(a) can be paraphrased as: On any pragmatically specified occasion where John drinks something, it is beer by default. (b) says that if there is an occasion where there is some beer available, John drinks it by default. Although this interpretation may seem too strong at first sight, remember that the DEFAULT quantifier weakens it considerably, because there could be reasons why he doesn't drink bear, e.g. because he decided to drink wine on an occasion where wine is also available and there are rules saying that John does not object to drinking wine and does not drink more than one beverage at one occasion. Finally, (c) is a habitual sentence of the type we have encountered earlier.

As a further interesting example, let us consider another sentence of Lawler (1972):

82'.a) Delmer 'walks to school.

This sentence can be paraphrased, according to Lawler and avoiding the complications of the DEFAULT operator, as: "on all occasions when Delmer goes to school, he walks". Clearly, *walk* must be considered as part of the consequent, and this explains why it gets the main sentence accent in the reading of (82'.a) we are interested in. But in order to carry out this analysis, we have to assume that the meaning of *walk* can be dissociated into two components, the concept of moving and the concept of using one's feet, because the first component is part of the antecedent and only the second one is part of the consequent. Actually, it is the second component which attracts the sentence accent. This can be seen in languages which do not have a simple concept of *walk*, as e.g. German; in these languages, it is the second component which is accentuated:

82'.b) Delmer geht zu 'Fuß zur Schule.

In the formalization of English, I assume a complex representation of *walk*, namely **on-foot'(go')**. Then (82'.a) gets the following interpretation:

82'.c) DEFAULT[X,t;X]([(X(**go'**))(**Delmer'**, **to-School'**, t)],[X=**on-foot'**])

If this analysis is basically correct, it means that the assignment of semantic material to the antecedent and to the consequent is extremeley free. It not only cuts accross syntactic borders, but even breaks open the semantic representation of words. This could be considered as problematic, because syntax and semantics seem to be rather detached from each other. But note that the accent structure restricts the possible representations considerably. This simply means that semantic interpretation has to take into account not only the syntactic structure, but also the accentual structure of an expression.

As another example, let us consider relative clauses in I-generic sentences. It is well known that expressions containing restrictive and non-restrictive relative clauses differ in their accentual structure, a fact reflected in English punctuation. Basically, a non-restrictive relative clause is a predication of its own on a well-established discourse referent, whereas a restrictive relative clause is only part of a predication and serves to single out a discourse referent. Now, I-generic sentences can have only restrictive relative clauses except if the relative clause itself is to be considered as generic, a fact discussed in Burton-Roberts (1976) and attributed to Smith (1961):

83'.a) A whale which is ill ¦ yields no blubber.
b) *A whale, which is ill, yields no blubber.
c) A whale, which is a mammal, suckles its young.
d) *A whale which is a mammal ¦ suckles its young.

It is sound to assume that restrictive relative clauses are part of the antecedent. One reason for this is that there is no optional pause between the indefinite NP and the relative clause. Non-restrictive relative clauses, on the other hand, can be analysed as parts of the consequent; a reason for this assumption is that they are separated from the indefinite NP by an optional pause and contain a rhematic constituent. But then, the distribution pattern of (83') is predicted.

83'.a') DEFAULT[x;x]([λPλx[P(x) & **ill'**(x)](**whale'**)(x)],[**yield-no-blubber'**(x)])
= DEFAULT[x;x]([**whale'**(x) & **ill'**(x)],[**yield-no-blubber'**(x)])
b') DEFAULT[x;x]([**whale'**(x)],[**ill'**(x), **yield-no-blubber'**(x)])
c') DEFAULT[x;x]([**whale'**(x)],[**mammal'**(x), **suckles-its-youngs'**(x)])
d') DEFAULT[x;x]([λPλx[P(x) & **mammal'**(x)](**whale'**)(x)],
[**suckles-its-youngs'**(x)])

First, (a) is o.k. because the relative clause can be applied to the predicate in the antecedent. (b) is bad because the relative clause must be part of the consequent, and thus a generic statement about whales is made which is obviously false, namely that a whale is ill by default. (c), on the other hand, makes a statement about whales which is obviously true, and therefore is o.k. (d), finally, is out because the information of the relative clause does not restrict the antecedent in any way and therefore fails to meet the basic pragmatic requirements for restrictive relative clauses.

Finally, there is this well-known example which once was designed to prove that the passive transformation does not preserve meaning:

83".a) Beavers ¦ build 'dams.
b) Dams ¦ are built by 'beavers.

Clearly, these two sentences have a different accentual structure. And it is this difference which accounts for their meaning difference in meaning. We get the following interpretations according to our theory:

83".a') DEFAULT[x;x,y,t]([**beavers'**(x)],[**dams'**(y) & **build'**(x,y,t)])
b') DEFAULT[x;x,y,t]([**dams'**(x)],[**beavers'**(y) & **built-by'**(x,y,t)])

The first sentence expresses a default rule for beavers, and the second one, for dams. This is an intuitive correct account for the meaning difference of (83".a,b). Clearly, then, these examples do not prove that passive does not preserve meaning, because their theme/rheme-structuring has not been kept constant. It indicates, however, that passive often is employed, together with intonation, to mark the theme/rheme-structuring of the sentence.

5.5 Generic Anaphora

I will now discuss shortly generic anaphora. Consider the following examples:

83.a) John killed a spider$_i$ because they$_i$ are ugly.
b) John didn't keep a spider$_i$ because they$_i$ are ugly.

The natural reading of the second clause of (83.a,b) is that generally, spiders are ugly. *They* should be analyzed as referring to a kind; for example, it allows for the interpretations typical for kind-referring NPs, as in *John killed a spider because they once frightend his girlfriend.* Generic anaphora of this sort can be explained if we assume that an NP with a common noun in any case introduces the kind the common noun is related to (an idea developed recently by Frey and Kamp).

In the examples we considered so far, the generic pronoun is plural. But it can also be singular, as in (84.a). If the antecedent is plural, however, the pronoun must be plural as well, as in (b):

84.a) John shot a lion$_i$, although it$_i$ is protected.
b) John shot lions$_i$, although they$_i$ are / *it$_i$ is protected.

This can be explained by three interacting principles. The first one is syntactic: If the antecedent is plural, i.e. has a marked agreement feature, then the pronoun must bear the same feature. The second one is that reference to a kind is possible with plural NPs (cf. the use of bare plurals as kind-referring terms). The third principle says that in cases where a singular pronoun could refer to both the individual entity and the kind, a plural pronoun is chosen to refer to the kind. But if it is clear for other reasons that the pronoun refers to the kind, e.g. because it is an argument of a kind predicate as in (84.a), then singular pronouns are also allowed. The third principle, then, serves to disambiguate between different readings.

Another case of generic anaphora are indefinite pronouns like *some* and *one* (or German *welch-*), as exemplified in

85.a) John saw a spider$_i$, and Mary saw one$_i$, too.
b) John bought milk$_i$, and Mary bought some$_i$, too.

86.a) Otto sah eine Spinne$_i$, und Anna sah auch eine$_i$.
b) Otto kaufte Milch$_i$, und Anna kaufte auch welche$_i$.

Indefinite pronouns can be analyzed as **referring** to a kind which is introduced in the preceding context, and as **introducing** a realization of this kind. Thus, they share properties of definite and indefinite expressions.

There are cases in which indefinite generic NPs can be antecedents of anaphora as well:

87) A lion$_i$ is a ferocious beast. It$_i$ has huge claws.

It is clear how this example can be interpreted along the lines that we argued for above: Take a lion, and it will be a ferocious beast by default. Moreover, this lion will have huge claws by default as well. This means that the second sentence has to be interpreted against the background introduced by the first. That is, in interpreting the second sentence, one must be able to "look into" the first one. Although this procedure may be problematic from a technical point of view, it seems to be the right one to handle sentences like (87).

5.6 Generic and Episodic Interpretation of Bare NPs

The analysis of genericity I have argued for above contrasts with the standard theory developed in Carlson (1977). Basically, in this theory bare NPs always denote a kind, whereas in my theory, they can either denote a kind (in their D-generic use) or be interpreted as predicates (in I-generic uses or in episodic sentences). In this section, I will discuss the distinction between bare NPs interpreted generically (be it D- or I-) and bare NPs interpreted in episodic sentences, which is blurred by the standard theory.

A rather straightforward test to see if the standard theory is on the right track is provided by examples like the following ones, as discussed by Schubert & Pelletier (1987):

88.a) Snow is white and is falling right now throughout Alberta.
b) Dogs are mammals and are barking right now in front of my window.

Schubert & Pelletier think that examples like these are o.k. My impression is that they are actually rather bad. That they are accepted by some speakers can be explained if we assume that these speakers apply the kind-oriented mode of speaking (cf. section 3.3). In this case, both conjuncts of the examples in (88) would be predicated to a kind.

The main reason why Carlson developed his theory in the first place was to explain why the interpretation of bare NPs as generic or non-generic depends heavily on the verbal predicate. According to him, bare plurals always refer to kinds, and episodic verbal predicates reduce a proposition about a kind to a proposition about a realization of a kind. Carlson's analysis captures the assumptions that

i) the interpretation of bare NPs depends on the verbal predicate,
ii) bare NPs typically have narrow scope when interpreted non-generically,
iii) anaphorical links are always possible between generic and non-generic interpretations.

It has turned out, however, that Carlson's claims with respect to (ii) and (iii) are not well founded.

For claim (iii), Carlson's theory falsely predicts that the following sentence can get a decent interpretation.

89) John ate apples$_i$, and Mary ate them$_i$, too.

According to Carlson's theory, the binding of *them* by *apples* should be perfectly possible in a normal reading of this sentence, because both NPs refer to the same entity, a kind, and the verbal predicate *ate* serves to single out realizations of this kind which are possibly different from each other. But note that (89) actually sounds rather strange. There could be a reasonable interpretation in the kind-oriented mode of speaking, i.e. if both sentences are interpreted as involving the kind *apples* and have the representative object reading. I think it is again this

reading which is available for speakers who do not find (89) so bad.

For claim (ii), Carlson's theory fails to give the right coreference conditions in cases like the following:

90) John saw apples$_i$ on the plate, and Mary saw them$_i$, too.

In the most natural reading, *apples* and *them* refer to the same objects. According to Carlson, they refer to the same kind, and it is only the predicate *saw* which introduces objects. But as the existential quantifier has necessarily narrow scope (because it is introduced internally in the lexical semantics of the verb), there is no means to express that *apples* and *them* should involve the same apples. (A similar point was made by Kratzer 1980).

Furthermore, there are languages which do distinguish between generic and non-generic bare NPs. For example, in Finnish a generic bare NP is in the nominative case, whereas a non-generic bare NP is in the partitive case:

90'.a) Maito on makeaa. 'Milk (NOM) is sweet.'
b) Maitoa kaatui pöydälle. 'Milk (PART) was spilled over the table'

I have suggested an alternative theory which assumes that generic bare NPs are analyzed either as indefinites in the scope of a default quantifier, or as proper names of kinds, and that non-generic bare NPs are indefinites which are not in the scope of a default quantifier.

As bare NPs are analyzed similarly to other indefinites, they should exhibit the same scope behavior as other indefinite NPs. This explains why wide scope bare NPs are possible. But certainly, bare NPs are more often interpreted with narrow scope than indefinite NPs with a determiner. One reason probably is that a specific, i.e. wide-scope, reading of indefinites is the more favored, the richer the descriptive content of the NP is. As bare NPs have a poorer descriptive content than other indefinite NPs, simply because the number or quantity of the entities they refer to is left unspecified, this explains why they tend to be interpreted as non-specific, i.e. with narrow scope.

But why does the nature of the verb have this strong impact on the interpretation of a sentence as being generic or non-generic? I think we need to explain two things:

i) Why do I-generic sentences always have stative predicates?
ii) Why do stative verbs not allow for bare NPs as subjects in non-generic sentences?

Problem (i) we have already solved above (cf. section 2.2). We showed that, as I-generic sentences quantify over occasions, they cannot be episodic, but have to be stative.

Problem (ii) should be associated with the research on accented subjects (e.g. Fuchs 1980, Gussenhoven 1983). It is well-known that certain verbs allow for accented, non-contrastive subjects, whereas others do not.

91.a) 'John has arrived from Ireland.
b) A 'man has arrived from Ireland.

92.a) *'John lives in Ireland. (only possible when
b) 'A 'man lives in Ireland. contrastive)

Note that the following sentences, which differ in intonation, are o.k.

93.a) John ¦ lives in 'Ireland.
b) A man ¦ lives in 'Ireland.

Sentences like (91) are called **thetic**, and sentences like (93) are called **categorical**, a terminologiy developed by Brentano and Marty in the late 19th century and revived by Kuroda (1973); see also Ulrich (1982) and Sasse (1987) for a survey of this distinction in a number of languages.

Although it is still unclear what exactly determines whether a verb can occur in thetic sentences or not (I will not go into the different solutions proposed in the literature), it seems at least clear that stative verbs are hardly ever found in thetic sentences. Of course, this holds only if we exclude sentences expressing the current location of an object, like *John is in the room*, which are sometimes called stative as well.

We can now recast problem (ii) and ask why bare NPs hardly occur as subjects of categorical non-generic sentences, although they are acceptable as subjects of thetic sentences, as shown in the following examples:

94.a) 'Paintings arrived from Ireland.
b) 'Whisky arrived from Ireland.
95.a) ?? Paintings { are in Ireland. (in non-generic
b) ?? Whisky { is in Ireland. interpretation)

An explanation of this fact can be given if we consider the different functions of the verbal predicate in thetic sentences and categorical sentences. The main function of the verbal predicate in thetic sentences is to introduce a new entity into discourse. This assumption can be corroborated by the fact that these verbs normally describe manners by which an entity comes into being, dissappears, and generally attracts the consciousness of participants. These verbs have, loosely speaking, a built-in existential quantifier for their subject referents, and I call them therefore **existential verbs**. On the other hand, the verbal predicate in categorical sentences simply is predicated to the subject referent and has no existential quantifier built into it. Therefore, it must apply to entities which are already given at the current discourse state, that is, to entitites which have been introduced earlier in the discourse or which are part of the shared knowledge of speaker and hearer. In most cases, they are in fact introduced earlier in discourse. But it is possible that in one and the same sentence, an NP introduces an entity and a categorical verbal predicate is applied to it. (93.b) is an example at hand.

Now it seems that if an entity has to be introduced into the discourse by an NP alone, without the help of an existential verb, the NP should be considerably complex to do this job properly. It should contain a determiner, that is, it should not be a bare NP. But clearly, this is only a preference rule, as bare NPs can in principle introduce discourse referents by their own, for example in the language of newspapers:

96) *CIA officials* yesterday denied any involvement in the affair. *They* maintained that (...)

Thus, we have an explanation why a bare NP and a stative verbal predicate cannot combine (except, of course, with I-generic sentences): The stative verbal predicate does not have the existential force to introduce a new entitiy into discourse, and the bare NP does have it only in a marginally.

Why is it that bare NPs and indefinite NPs with determiners differ in this respect? Two possible reasons come into mind. First, the determiner of the indefinite NP could be associated with some "introducing" force, like an existential quantifier. Bare NPs would lack this introducing force because they lack a determiner, and would therefore need the introducing force of a thetic predicate. Secondly, it could be the case that an indefinite NP which introduces a new entity by its own has to be semantically specific enough; and we have seen that bare NPs lack specificity when compared with indefinite NPs with determiner.

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