The generic spell

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Foreword

This report is the result of a cooperation between two researchers in the field of semantics of natural language. The first author is working on tense and aspect, the second on the logical semantics of generic sentences. A mutual feeling that these fields are related in many ways made us decide to join our efforts for one month\(^1\). To focus our attention we chose to invest our time in a spell of close reading of the sizable “Introduction to the Generics Book” by M. Krifka, J. Pelletier, G. Carlson, A. ter Meulen, G. Link and G. Chierchia [Krifka et al. 92]. In order to evaluate the contents of the Introduction we included a variety of related literature known to the authors.

The report consists of four parts:

1. A critical evaluation of the pertinent literature, followed by the explicit statement of some criteria to decide about the genericity of a given statement.
   This part is constructed around the GEN operator, a formal device used in [Krifka et al. 92] to analyze generic sentences.

2. A corpus study. This investigation was initiated, rather ambitiously, to find an answer to the question whether generic sentences ever occur in arguments, i.e., whether in ‘real life’ generic sentences ever occur as premises from which conclusions are drawn. This question seemed relevant to the authors because of their uneasiness with the notion of truth–functional semantics for generic sentences. (the fourth section will spell out some of the difficulties as we see them). As, in accord with our expectations, in this limited study we did not find any evidence for the use of generic sentences as premisses in logical arguments, we decided to concentrate on the less ambitious aim of using the corpus to check the criteria presented in the first section.

3. A discussion of Aspect and Genericity. Here the focus of interest of the first author comes to the fore, and the question is asked whether the study of these two topics should be an integrated one, or whether they should lead a separate existence.

4. A discussion of the semantics of generic sentences. In this section some general problems will be discussed. To be fair, in the introduction to the Generics Book,

\(^1\)We are grateful to ERCIM, that through an ERCIM scholarship made it actually possible for the second author, from CWI, to spend one month at INESC.
no attempt is made to hide the unsatisfactory state of the semantics of the subject. But still, there seems to be no doubt about the fact that the logical form of generic sentences does not essentially differ from that of non-generic ones. In this last section, this point will be questioned.

We found the “Introduction to the Generics Book” an admirable overview and condensation of the field for those who are interested in the motivating ideas and examples of the different perspectives of the last twenty to thirty years. On the other hand, during our close reading we sometimes wondered whether we did not take the ideas developed therein too seriously. We were often disturbed by the cavalier attitude taken towards definitions. Not only do the definitions in the “Introduction to the Generics Book” leave a wide latitude for, even incompatible, interpretation — maybe this is inherent to the current state of research — but, worse, the definitions seem often more intended to focus the attention on some relevant notions concerning the concept to be defined than as definitions in the logical or mathematical sense: the definition of a concept is discarded at will if the investigation of new data requires so. Time and again we noticed the use of concepts not licensed by their definition.
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The GEN operator

1.1 Description

The GEN operator is a notational device that has been proposed as a practical way to analyse the logical form of characterizing sentences and generic sentences in general. The operator “may be seen as a quantificational adverb – an adverbial operator that relates one set of conditions (containing one or more variable) to another set (which may share some variables with the first set)”\(^1\). The notational shape of this operator is the following

\[
\text{GEN}[x_1 \ldots x_n; y_1 \ldots y_m] \quad \phi(x_1 \ldots x_n); \quad \psi(x_1 \ldots x_n, y_1 \ldots y_m)
\]

Restrictor \quad Matrix

The variables occurring free in the restrictor, \(x_1, \ldots, x_n\), are bound by the the GEN operator, as are the free occurrences of these variables in the matrix. The variables occurring free only in the matrix, \(y_1, \ldots, y_m\), are – by default – bound by existential closure. So equivalent to the above notation:

\[
\text{GEN}[x_1 \ldots x_n] \quad \phi(x_1 \ldots x_n); \quad \exists y_1 \ldots y_m \psi(x_1 \ldots x_n, y_1 \ldots y_m)
\]

Restrictor \quad Matrix

The formalisation of a characterizing sentence now proceeds by mapping the sentence to, dividing it over, restrictor and matrix. The restrictor receives that part of the sentence, the sentence is a characterization of, the matrix receives the characterizing part. Two examples with their preferred readings (ch 2.3 p 8):

1. “Hurricanes arise in this part of the ocean”

\[
\text{GEN}[x; y](x \text{ is this part of the ocean}); (y \text{ are hurricanes and } y \text{ arise in } x)
\]

‘It is normal for this part of the ocean that hurricanes arise there’

2. “Hurricanes arise in low pressure areas”

\[
\text{GEN}[x; y](x \text{ are hurricanes}); (y \text{ is a low pressure area and } x \text{ arise in } y)
\]

‘It is normal for hurricanes to arise in low pressure areas’

\(^1\)Kripke et al. 92. Here and in the following, unless otherwise stated, when we mention chapter and page number, it is this work we refer to.
As is shown by the interpretations below these examples, the sentence part in the restrictor is subject to 'generic quantification' (normally, in general, typically, etc.). How this quantification is to be taken care of semantically is largely an open problem. Section 4 will discuss some of the problems involved.

1.2 Expressivity of the GEN Operator

In order to get a grasp on the expressive power of the GEN operator, we listed all possible divisions over matrix and restrictor of some simple sentences. This gave us an idea about the number of possible generic readings and highlighted some general restrictions on the set of possible divisions.

We considered a pair of simple sentences with only two possible sources of genericity in terms of syntax (each having one bare plural NP and an episodic verb in the present tense). The first sentence is archetypically generic, since both participants have a generic flavor: a bare plural in subject position, and an episodic verb in the present tense: “Lions roar”.

(1) GEN[x; s](x is lion); (x roars in s)
(2) GEN[x, s; ](x is lion in s); (x roars in s)
(3) GEN[x, s; ](x roars in s); (x is a lion)

For this sentence we get the following informal translations:

(1) It is normal for lions that there are situations in which they roar.
(2) It is normal for lions and for situations where lions are present, that they roar in these situations.
(3) It is normal for entities that roar in situations, and for situations where there are roaring entities, that these entities are lions.

The second sentence differs in that it has a proper name, and also in that the bare plural is in object position: “John smokes cigarettes”.

(1) * GEN[x; y, s](x = john); (y is cigarettes and x in s and x smokes y in s)
(2) GEN[y; x, s](y is cigarettes); (x = john and x in s and x smokes y in s)
(3) * GEN[x, s; y](x in s); (x = john and y is cigarettes and x smokes y in s)
(4) GEN[x, s; y](x = john and x is in s); (y is cigarettes and x smokes y in s)
(5) * GEN[x, y; s](x = john and y is cigarettes); (x in s and x smokes y in s)
(6) GEN[y, s; x](y is cigarettes in s); (x = john and x in s and x smokes y in s)
(7) GEN[x, y, s;](y is cigarettes in s and x smokes y in s); (x = john and x in s)
(8) GEN[x, y, s;](x = john and x in s and y is cigarettes in s); (x smokes y in s)
(9) GEN[x, y, s;](x = john and x in s and x smokes y in s); (y is cigarettes in s)

We can at once discard case 1 because one cannot generalize over one individual (see chap 2, page 17).
We also chose to rule out translations 3 and 5, given the following: When there are individuals referred to by proper names and situations associated to episodic verbs, the use of a variable for the individual, allows for three readings:

(1) GEN[x, s;]( John = x and x in s);(...)
(2) GEN[x, s;](x in s); ( John = x...)
(3) GEN[x, s;]( John = x); (x in s...)

Even though examples of more than one type of translation can be found in the book (see chap. 2 page 28 for the third), we could find no reading where the splitting up over restrictor and matrix of the two clauses connected with the individual would make sense.
Several other questions can also be raised. In the book:

• When there is an episodic verb phrase, and thus an s variable, should the modification “in s” be added to all clauses, also those introduced by noun phrases? It seems to make sense, so we decided to do so, but one can find examples to the contrary in e.g. chap. 2 page 28.

• When there is an episodic verb phrase, and thus an s variable, should s be always in the restrictor? In the book, most examples follow this policy (but see chap. 2 page 19 for an exception); however, example 2 seems to present a plausible generic interpretation “It is normal for cigarettes that there are situations in which John smokes them”. Even though it is not a true generic in our world, compare with “Bees produce honey”, where it seems to be true that “It is normal for honey that there are situations in which bees produce it”. So we decided not to discard case 2.

• The above example is just an illustration of the following question: Verb classification must affect the translation: [Krifka et al. 92] mention that hate cigarettes, in opposition to smoke cigarettes, imposes a kind reading on its object. [Laca 90] also suggests that perception verbs behave in a special way as far as the interpretation of its object position is concerned.

Thus it seems that in addition to a general translation procedure we should have restrictions on the translation imposed by verb classification, for example “the direct object of a verb marked [+X] cannot appear in the restrictor”.

6
• How is the GEN operator related to other quantifiers in the sentence? Nothing is said about the possible use of other quantifiers in restrictor or matrix, nor about the embedding of the GEN quantifier inside other quantifiers (such as “Men hate a woman”, paraphrased by “there is a woman that men (usually) hate”).

• In general, it seems that one is allowed to generalize over the NP or the NP-role expected by the verb (see cases 7 and 9 above). Is this true for all kinds of verbs?

We now give an informal translation in natural language of each the allowed reading of the GEN operator:

(2) It is normal for cigarettes that situations exist in which John smokes them.

(4) It is normal for John (stages of John) that there exist cigarettes that he smokes.

(6) It is normal for situations and cigarettes in those situations, that John smokes cigarettes in those situations.

(7) It is normal for cigarettes that are smoked in situations, to be smoked by John.

(8) It is normal for John and for cigarettes and for situations where both John “and cigarettes are present, that John smokes them.

(9) It is normal for situations where John smokes, that he smokes cigarettes.

1.3 Translations into the GEN operator

The GEN operator is not universally applicable to all generic sentences. A sentence can be generic either because it is characterizing, or because it contains a kind denoting term. In both cases, the GEN operator seems to be naturally applicable only to a restricted class.

Kind predications can be of two kinds: derived kind or proper kind (see [Zwarts 90]). In a derived kind predication, the generic quantification is over the individuals constituting the kind (“lions have manes”), in a proper kind predication, there is no quantification involved over these individuals (“lions are extinct”). Since the GEN operator is a quantifier, it seems only applicable in case of ‘derived kind predication’ (the meaning of “the lion is extinct” cannot be reduced to some quantification over individual lions).

Characterizing sentences can also be of two kinds: habitual and lexical characterizing. Habitual characterizing sentences generalize over situations and have an episodic counterpart in the language (“John smokes”, “John is smoking”). Here we take the logical form of these sentences to always include a situation variable. (See chapter 1.4 rule 2, this report). Lexical-characterizing sentences (“John knows French”, “John is intelligent”) don’t seem to generalize over situations, and lack an episodic counterpart in the language. Again, since the GEN operator has the structure of a quantifier, only the first kind of characterizing sentence is amenable to analysis by the operator. Lexical
characterizing sentences, lacking a quantificational structure, fall outside its scope².

The analysis of the preceding section leads us to propose some rules for achieving a consistent translation procedure of generic sentences in terms of the GEN operator:

1. No sentence–external material is going to be used in the GEN translation. This is in accord with the statement of chap. 2 page 15 as a preferable option. It excludes, for instance, incorporating in the GEN translation of the sentence “turtles live to be very old” information about the fact that only turtles that survive their first day are included in the domain of quantification.

2. If the verb is episodic, it has obligatorily an s variable (chap. 2, page 15).

3. When there is an s variable in the restrictor, all clauses (in restrictor or matrix) are translated with the modification “in s”. If there is a variable s only in the matrix, the same happens to all clauses in the matrix.

4. If there is an individual, no variable is used for it. I.e., we use GEN[s;](John in s);(...) instead of GEN[x, s;](John = x and x in s);(...), for reasons explained on page 7 of Section 1.2. Note that this notation is also used in chap. 2 page 25.

5. If an NP(x) is [+kind] then we have GEN[...x;...]
   “Lions roar” GEN[x, s;](x is a lion in s);(x roars in s)

6. If GEN[...;x;] then NP(x) is [-kind]
   “Mary smokes cigarettes” GEN[x, s;y](Mary in s);(y = cigarettes in s and x smokes y in s)

7. If “a NP(x)” occurs as subject of a stative sentence then we have GEN[...x;...]
   “A lion has manes” GEN[x;](x is a lion);(x has manes)
   This last example shows that occurring in the matrix does not imply [+kind] (according to Krifka et al. indefinite NP’s are never [+kind]).

8. If the sentence has a when-clause, then use the information in the when clause to build the restrictor, and the information in the main clause in the matrix.

²Krifka et al. suggest that these sentences should be considered as quantificational as well. We chose to disregard this analysis, because there is no evidence for situation variables playing a role in these sentences, and because of differences like “John speaks French after dinner” and “*John knows French after dinner”. In fact, a formalization like Krifka’s et. al. seems to create more problems than it solves. on the one hand, it opens the gate to a treatment in terms of the GEN operator of even episodic sentences. For, why don’t we then also consider “John is smoking” to quantify over all situations of ‘taking a puff’. On the other hand, it is hard to distinguish pure lexical–stative sentences like “my flat consists of two rooms”, which would not quantify over situations, from lexical–characterizing sentences like “John knows French” (see Section 3.1).
If neither clause has an episodic predicate nor a plural object, introduce an $s$
variable in the restrictor (see discussion below).

We now discuss two unsatisfactory points regarding the translation criteria implicitly
used in [Krifka et al. 92]:

When-clauses are presented frequently in that work to exemplify habituality. However,
their contribution to this phenomenon is never spelled out.

The examples seem to present when-clauses simply as a linguistic way of dividing
between restrictor and matrix, for instance, When John arrives home, he smokes, or
When cats are tricolored, they are infertile (where the genericity can respectively be
assigned to characterizing sentences and NP-kinds).

However, it seems to us that there are instances where it is the when-clause itself
which forces genericity (habituality): Minette is unhappy when she is hungry seems to be
one such case. Since be unhappy and be hungry are lexical stative predicates and Minette
is an individual, according to the criterion stated in the book\footnote{Namely, a sentence is habitual iff it can be interpreted as having the logical form GEN[...;...](..s..);(...s..) where $s$ is a situation variable, and situation variables come from episodic verbs or at most from dispositional lexical-characterizing verbs. (See previous footnote)}
this sentence can not be
considered habitual. This seems counter-intuitive.

Therefore, we have to let the when-clause itself introduce habituality (which boils
down to the introduction of a variable $s$). Note that the fact that the when-clause is
responsible for genericity has been proposed elsewhere, albeit for different cases (see
[G.Carlson 79]).

We also noted a clash of criteria which merits discussion. [Krifka et al. 92], based on
[Laca 90], suggest that the division in restrictor and matrix is related to the distinction
between ‘universal’ (‘inclusive’, $[+\text{kind}]$) and ‘existential’ (‘non–inclusive’, $[-\text{kind}]$) interpretations of bare plurals, to stress placement, sentence intonation and word order: in
general, the focused part of the sentence is mapped to the matrix. As an instance of the
inclusive/non-inclusive reading:

1. non–inclusive: “John smokes cigars”
   \[
   \text{GEN}[s; y](\text{john in } s); (y \text{ is cigars and john smokes } y \text{ in } s)
   \]

2. inclusive: “John hates cigars”
   \[
   \text{GEN}[y; ](y \text{ is cigars}; (\text{John hates } y)
   \]

Conflicts may arise, however, between different partition criteria: consider “John hates
CIGARS (but not cigarettes)”. Here cigars should be interpreted inclusively and, consequn-
cently, be part of the restrictor, but, because of stress, should be moved to the matrix
(chap. 2 page 5).
1.4 Criteria of genericity

The domain of the GEN operator consists of the class of generic sentences of the language. So it is of central importance to be able to classify sentences of natural language as generic or non-generic.

By careful reading of [Krifka et al. 92] and studying its examples, we managed to formulate a set of linguistic criteria to decide about the genericity of a sentence. We also consulted other sources (e.g., [Laca 90] and [Zwarts 90]), in order to get as extensive a list as possible, but maintained the terminology and assumptions of [Krifka et al. 92].

The references (chapter and page number) refer to [Krifka et al. 92].

1. Criteria for genericity

   (a) If [+kind] or [+char] then [+gen]
   (b) If BP(subj) and [+stat] then [+gen] (ch 4 p 32)\(^4\)
       **Dogs are playful/ Lions without teeth are vegetarian**
   (c) If BM(subj) and [+stat] then [+gen] (ch 4 p 32)
       **Water freezes at 0 degrees centigrade**

2. Criteria for Characterizability

   (a) If ‘When/if/as’ sentence in the present, then [+char]
       **When a man loves a woman, he can see no wrong**
   (b) If a ‘When’ sentence does not specify a particular occasion then [+char]
       **When John drove a car, he got a headache**
   (c) If ‘whenever’ sentence then [+char]
   (d) If the sentence has the adverbs of quantification: usually, always, rarely, often, never, or ‘used to’, then [+char].
       **John always hopes**
   (e) If the predicate
       i. is episodic and it is in the simple present, which is not ‘hot news’/‘reportive’ present.
       **John runs**
       ii. is episodic and it is in the simple past, and the context does not specify a specific time.
       **John ran**
       iii. is of the form ”be a (Agentive) NP”.
       **John is a pipe smoker**

\(^4\)BP: bare plural, BM: bare mass
iv. is of the form "be ADJ" and *"There are NP ADJ".

The potato is digestible, *there are potatoes digestible.
then [+char]

(f) If to a sentence can be added the adverb ‘usually’ without change of meaning,
then the sentence is [+char] (ch1 p 8)

A dog (usually) barks.

(g) If subject is ‘a NP’ and [+stat] then [+char]

A man knows (ch 1 p 13)

(h) If non-dispositional lexical stative predicate, then [-char]

John is thirty years old, John is married

(i) If the sentence is [+episodic] then [-char].

3. Criteria for Kind referentiability

(a) NP in subject position

i. If it is a name of a kind, then [+kind].

The Airolupoda lives in China.

ii. If ‘The NP’ and predicate is dispositional and of the form “is -able”, “is -ible”, then [+kind].

The potato is digestible

iii. If Kind Predicate then [+kind] (ch 1 p 9)

Dinosaurs are extinct / The lion is dying out

iv. If BP/M(subj) and [+char] and sentence is simple (only one NP) then [+kind]

Dogs bark, Gold is valuable (temptative criterion)

v. If definite plural NP then [-kind]

The lions roar

vi. if singular and [+progr] then [-kind]

A man is building a house

vii. If the context is positive and [-char] and NP upward monotone then [-kind] (ch 1 p 14)

Berber lions escaped from the zoo.

Preferred Kind Predicates, ‘be a mammal’, ‘be domesticated’, ‘be protected by law’.
Quantificational Predicates (ch 4 p 1), ‘be widespread’, ‘be common’, ‘be rare’, ‘be abundant’, ‘be scarce’.

By upward monotone we mean that truth is preserved when we substitute the relevant NP by a more encompassing one. E.g. dog/animal, rose/flower, animal/organism, etc. By downward monotone we mean that truth is preserved by substituting a less encompassing NP.
(b) NP in object position

i. If Kind Predicate and “the NP” then [+kind]
   Shockley invented the transistor.

ii. If the context is positive and BP/M(obj) not upward monotone then [+kind] (ch 3 p 10)
   Bill hates eagles.

iii. If the context is positive and BP/M(obj) upward monotone then [-kind] (ch 3 p 10)
    Bill trapped eagles.

iv. If the context is negative and BP/M(obj) downward monotone then [-kind] (temptative criterion)
    Bill didn’t trap eagles.

v. If the Predicate makes sense applied to the indefinite form, then [-kind] (ch 3 p 10)
   Mary smoked cigarettes.

vi. If passivisation changes meaning then BP/M(obj) [-kind] (ch 3 p 10)
    Beavers build dams

These criteria have been tuned on a fairly large set of example generic sentences drawn mostly from [Krifka et al. 92].
A case study based on real text

2.1 Description of the experiment

We used the Lancaster Parsed Corpus, one of the several corpora available from ICAME (the International Computer Archive of Modern English) for research purposes\(^1\). It contains modern British texts from several sources, annotated with syntactic information [Garside et al.]. We selected five kinds of text, after their classification: A– Press: reportage; B– Press: editorial; J– Learned & scientific writings; P– Romance & love story; R– Humour.

We tried then to find instances of real text use of generics, by automatically selecting the following kinds of English expressions:

- Bare plurals (all instances not following “of” nor alone as a sentence (generally a news title), and without postmodification)
- “The Noun” NPs (all instances not alone as a sentence)
- Simple present sentences, excluding the mental or reportive verbs of the following list: think, say, write, want, know, hope, seem, suppose.

The number of occurrences of these three phenomena is displayed in Table 2.1.

Some remarks are in order here. Firstly, we disregarded the NP occurrences (bare plurals or “the NP”) which were not inside a clause, that is, which stood alone as titles. We also disregarded question tags as far as present tense is concerned. Secondly, a slightly more complicated procedure had to be followed to count the instances of present tense. Even though every clause may have a present tensed verb, we counted as one the instances of pairs of present tenses “dependent” on a main one, like in “when-clauses”, or “everything rel-clause, main clauses”, since they are also counted as one instance of a generic sentence (and not two).

Then, for each sentence we checked manually whether it was generic or not, and if so, we noted this fact.

It should be emphasized that, in order to decide whether a sentence was generic or not we had to resort to our intuitions, or better, to a set of subjective criteria that we

\(^1\)Norwegian Computing Centre for the Humanities, Harald Harfangsg. 31, 5007 Bergen, Norway, e-mail: icame@hd.uib.no.
will try to describe briefly here. Nonetheless, in many cases we felt it hard to decide. This we took to mean that the phenomenon of characterizability and/or kind denoting terms is not clearcut even at a subjective level. Incidentally, this is a common problem for corpus researchers: On a totally unrelated experiment, [Hindle/Rooth 93] deemed 78 (out of 880 cases) so problematic that were left unclassified.

### 2.1.1 Subjective criteria

It is hard to pin down what makes one read/understand a sentence as generic. Below we list our reasons for deciding on genericity, inspired again by Krikfa et al.

- They express a characterizing property.
- Knowledge of the world, and beliefs about the world, are expressed by them.
- They abstract away from particular events and facts.
- Generic sentences express regularities which were not randomly caused.
- Generic sentences express essential properties, as opposed to ephemeral/accidental ones.
- Habituals are generalizations over situations.
- (inspired by prototype theory) Generic sentences are about the most typical representatives of a concept.
- (inspired by non-monotonic theories) Generic sentences are truths with exceptions, that is, the conclusions based on them can be retracted with further evidence.

An important source of intuition was the translation into our own native languages. For instance, if an English simple past sentence could be translated into Portuguese Imperfeito, which basically conveys habituality, then the sentence was considered (possibly) habitual.

As far as deciding whether an NP was Kind denoting or not, we resorted mainly to the explicit criteria of [Krikfa et al. 92], especially the ones employing monotonicity.
2.2 Description of the results

2.2.1 Definite Noun Phrases

The most striking observation was that no instance of an unmodified definite singular noun phrase was found to be used generically (i.e. kind denoting). However, while analysing the other files, we did come across some definite singular NPs (with adjectives) which we considered kind denoting:

- Eichmann continues to reveal the extraordinary watertight divisions of the German mind.

- and as men are the products of their times, the national character contains at least an element imposed upon it by the inanimate environment.

However, and contrarily to what [Krifka et al. 92] and [Zwarts 90] assume, they do not seem to be particularly “well-established” kinds, that could be stored in the lexicon as such.

Another interesting fact we came across were cases like “the pill”, or “the bomb”, where the meaning of the definite NP cristallized into a kind term (according to us) but where the instances of that kind are not lexicalizable by the plural noun, given that there are several pills (and “the pill” refers to contraception pills) and several bombs (while “the bomb” refers to atomic bombs).

- the bomb means military stalemate, he said.

In other words, these noun phrases are kind denoting terms which are no longer directly related to the individuals described by the same word.

2.2.2 Bare plurals

As far as bare plurals are concerned, the results are displayed in Table 2.2. We decided to include whether a sentence was intuitively felt to be generic, due to the presence of the

<table>
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<th>Kind of text</th>
<th>BPs</th>
<th>Kind</th>
<th>Cont.Dep.</th>
<th>Generic</th>
<th>Problems</th>
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<td>1 - 1 (subj)</td>
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</tr>
<tr>
<td>R</td>
<td>26</td>
<td>11 (subj: 4)</td>
<td>1</td>
<td>4 (subj:4)</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2.2: Description of bare plurals as far as genericity is concerned: Context Dependent (Cont. Dep.) means that the decision could not be made at the level of the sentence
kind-denoting bare plural, because, in our opinion, some sentences did not seem generic even though they referred to a kind. (No other sources of genericity were included in Table 2.2, i.e., if the sentence in which the bare plural occurred had already a generic flavor due to other factors, it was not counted.)

One interesting result was the relationship between genericity and kind-denoting NP in subject position. On one hand, not all subject NP-kinds made the sentence generic from our subjective point of view: we found 3 instances of kind subjects which did not render the sentence generic\(^2\) and 11 which did. On the other hand, most other NP kinds did not give the sentence a generic flavor: out of 27, only 5 had that consequence.

In the following problematic cases, we were not able to decide whether the bare plurals were kind-denoting or not:

- Things are different now.
- Mr. Gaitskell said that a member of an alliance could not deny facilities to nations to which it was allied.
- Yet hardly anything is done to bring talks nearer.
- The means of setting talks going are clear enough provided that the Soviet government wishes to talk at all.
- That is the principal reason why he never speaks with notes; he could n’t read them if he had them.
- The selection of the parameters to be tried as predictors was one of the most important parts of the investigation.
- We had hoped for sons to carry on our name.
- Jones is very good at inventing slogans\(^3\).

2.2.3 Present tense.

As far as present sentences are concerned, the results stand on Table 2.3.

It is interesting to note that for the task of recognizing characterizing sentences no problems were found (that is, none were left undecided).

\(^2\)Namely, the sentences
- up and down the country husbands will be saying they would never behave like that.
- airlines must surely get back to the principles of careful husbandry, and demand economic progression in the new vehicles they order.
- far from being extravagant, expenditure on NHS has been less than consumers would probably have chosen to spend in a free market.

\(^3\)See section 3.3, this report, concerning this sentence
<table>
<thead>
<tr>
<th>Kind of text</th>
<th>Pres</th>
<th>Generic</th>
<th>Cont. Dep.</th>
<th>% gen</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>77</td>
<td>10</td>
<td>5</td>
<td>13-19%</td>
</tr>
<tr>
<td>B</td>
<td>80</td>
<td>19</td>
<td>3</td>
<td>24-28%</td>
</tr>
<tr>
<td>J</td>
<td>81</td>
<td>29</td>
<td>5</td>
<td>36-42%</td>
</tr>
<tr>
<td>P</td>
<td>90</td>
<td>19</td>
<td>1</td>
<td>21-23%</td>
</tr>
<tr>
<td>R</td>
<td>63</td>
<td>27</td>
<td>0</td>
<td>43-44%</td>
</tr>
</tbody>
</table>

Table 2.3: Description of present tense sentences as far as genericity is concerned

We show in Table 2.4 the distribution of the (formal) factors that account for our decisions. The elements marked by $^2$ correspond to definite singular NP which is kind denoting in object position, while those marked by $^3$ refer to the use of the adjective predominant, or of the verb predominate.

Finally, the elements marked $^4$ constitute so far a disagreement between the two authors, even though we agreed about the genericity of the sentences in which they occur: for the second author the cause is simply the present tense, while for the first the form of the NP (marked in the table) also seems to play a role.

It is interesting to note that in most cases it was something other than the present tense itself that made us choose the generic reading. A more thorough study of linguistic clues to genericity could thus be done by considering separately each of the factors we mention in Table 2.4, and check whether they can be responsible for genericity on their own or just in connection with the present tense.
<table>
<thead>
<tr>
<th>Factor</th>
<th>A</th>
<th>B</th>
<th>J</th>
<th>P</th>
<th>R</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>sentence connectives</td>
<td>when</td>
<td>2</td>
<td></td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>as</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>once</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>if</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>after</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>the instant</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>everything</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>what ... is</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>rel. clause</td>
<td></td>
<td>1</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
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<td></td>
<td>whatever</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>17</td>
</tr>
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<td>tense</td>
<td>pres</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>arguments</td>
<td>BP subj.</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>a NP</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>kind-name subject</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>object kind</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>the NP (sing) subject</td>
<td></td>
<td>2</td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>subject any</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>most/the maj. of NP</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>few NP</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>no NP</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>kind-name PP</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>BP PP</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>one</td>
<td></td>
<td>3</td>
<td></td>
<td>3</td>
<td>53</td>
</tr>
<tr>
<td>adverbials</td>
<td>always</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>usually</td>
<td>1</td>
<td></td>
<td>3</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>never</td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>rarely</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>lexical clues</td>
<td>tend</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>predomin.</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>vary</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>other</td>
<td>definition</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Table 2.4: Description of the several factors that made us decide that a present tense sentence was generic
2.3 Some assessment of the objective criteria for genericity

We had planned to do a thorough assessment of the criteria presented in Part 2, but, due to lack of time, this task will have to await another occasion. Anyway, there were some things worth noting even without an extensive test:

- Not all kind denoting NPs imply generic sentences: as was described above, in subject position we found three exceptions (cf. footnote 2), while in other positions only in 18% of the cases they did imply genericity, according to our judgement.
- Bare plurals with a stative predicate do not always imply a characterizing sentence (as opposed to Crit. 1.b), as the following sentences show:
  - he could prove a blot on the handicap - as connections hope.
  - results did not differ from those obtained by the more convenient method of heating the dissolved chromates in 2 N hydrochloric acid for fifteen minutes.
- The verb invent can also be used with an object which does not denote a kind, as can be seen in the following sentence:
  - Jones is very good at inventing slogans.
- Some bare plurals which seemed to denote a kind are given a \([\neg Kind]\) classification by criterion 3.b.iii. (negative context, downward monotone).
  - it is not, therefore, possible to lower fares appreciably and so widen the market with these aircraft.

2.4 Discussion

2.4.1 Kind of text

As could have been foreseen, the kind of text has some influence on the existence and type of genericity found.

So, scientific texts had the highest percentage of generic sentences while narrative texts had the lowest. Humorous writings also fared well in terms of the number of generic sentences.

Even though this study was based on too small a quantity of data to be representative, it is interesting to note that, from one kind of text to another, there was a wide variation of factors accounting for genericity. Thus, one important factor for genericity in humorous text was the use of kind name subjects, while most occurrences of genericity in news (reportage) were due to habitual statements, marked often simply by the present tense.
As far as kind denoting bare plurals are concerned, press reportages use them most rarely (10% of the occurrences), while humour texts tend to use them very often (almost half of the time).

2.4.2 The discoursive purpose of generics

As one would expect, also the use that generics are actually put in discourse varies drastically according to kind of text.

In scientific writings, they are used to convey information about the science in question, and in most cases they are to be read with universal force.

In narrative text (romance and love story) they are used mostly in the first person (direct speech) to convey feelings or to describe habits.

In humour, generic statements can be used to make generalizations that, because of their nature (exaggeration or implausibility) induce one to laughter; they can also be used to describe invented kinds which have prototypical properties of those being made fun of.

In press editorials, generic sentences are used to make predictions and can be used rhetorically to stress one’s opinions by presenting it as laws (definitions); they are also used to describe characteristics of a (usually political) situation or of a politician or actor.

Finally, in ordinary news they are generally used to describe regularities in time.

So the question we wanted to elucidate is still unanswered: what is the purpose of generics, in actual use? Our research gave no evidence for their use in reasoning chains (as is commonly assumed in Artificial Intelligence circles). We can only conclude that they are used to provide definitions, or describe vague temporal patterns.

2.4.3 Other problems

It struck us that that, in intensional contexts (i.e., in cases where NPs are functional or intensional (do not merely have a referential/extensional use)), our intuitions were not clear at all as whether one could decide for kind/non-kind readings of the NP. One of the problems was that the criterion for inclusiveness did not make sense (see the problematic cases listed above).
Aspect and genericity

This section presents some reflections on aspect raised by the study of genericity. First, we motivate shortly why we mention aspect in this report at all, by summarizing what is said in [Krifka et al. 92] on the subject. We then discuss whether the same linguistic subsystem is used for both genericity and tense and aspect, and how the study of genericity could shed some light in tense and aspect proper, and vice versa. We conclude by sketching an integrated analysis of the two phenomena.

3.1 Review of aspect in Krifka et al.’s book

Krifka et al. contend that sentences can be subdivided into generic and particular ones, and that generic sentences have a stative flavor (Chap 1, page 18). In addition, they use the aspectual class of the predicates to subclassify generic sentences (more precisely, characterizing sentences), proposing the following classification of sentences:

episodic Episodic sentences refer to a specific location in space and time, and are thus particular, i.e., non-generic. E.g. *I entered the room.*

They seem to overlap with events in [Bach 86]'s or [Moens 87]'s terminology. Notice however that, following [Cooper 86] and [Link 87]¹, statives which are located in space are also included in this class and are called “episodic statives”. E.g. *Simba is in the cage or She stands in the doorway* are considered to be particular sentences. (Incidently, most progressive sentences also seem to belong to the “episodic stative” kind².)

habitual Habitual sentences are built from an episodic predicate, but have a stative flavor, and represent a habit, a frequent pattern. E.g. *John smokes.*

Habituals have thus always an episodic counterpart, therefore have to be rendered by grammatical means, like simple tenses and plural complements (*He builds houses, he smokes, he made shoes.*)

¹In fact, [Link 87, Note 6] defines states by not being located in space (or, alternatively, events by being located in space) by which criterion episodic statives are not even statives.

²But see what [Moens 87, page 60] calls habitual progressives, after Sag, or the discussion in Krifka et al, chap 1 pages 17-18.
For Krifka et. al. they are dispositional, in the sense that they represent a property that is either assigned by observing past behavior (Mary smokes) or by predicting future one (This machine crushes oranges).³

**lexical-characterizing** Lexical characterizing sentences are stative sentences which are built from a stative predicate, and therefore do not have an episodic counterpart. They can be further subdivided in

**dispositional** in some sense generic, representing a property that is either assigned by observing past behavior or by predicting future one: know French, like John, be intelligent.

**non-dispositional** representing a property which is assigned by a fixed event in the past: be married, be male, be a member of the Communist party.

Summing up, the distinction between the two kinds of characterizing/generic sentences is cast in terms of an aspectual difference; furthermore, one of the consequences of genericity for sentences involving episodic predicates is the change of aspect of the whole sentence (given the claim that generic sentences are stative). The following table depicts the classification:

<table>
<thead>
<tr>
<th></th>
<th>episodic predicate</th>
<th>stative predicate</th>
<th>episodic stative predicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>generic</td>
<td>habitual</td>
<td>lexical-char.</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>dispositional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not generic</td>
<td>episodic</td>
<td>lexical-char.</td>
<td>episodic</td>
</tr>
<tr>
<td></td>
<td>non-dispositional</td>
<td></td>
<td>stative</td>
</tr>
</tbody>
</table>

Aspect is thus essential in this field, and this also from a practical point of view (witness our criteria for genericity in Section 1.4 where we make extensive use of stative-ness/eventness). We thus conclude that a sound and decidable aspectual classification is a precondition for concrete genericity studies.

### 3.2 The same linguistic subsystem (tense/aspect) for particular/generic sentences?

Is the same grammatical subsystem used for both tense and aspect and genericity? The answer seems to be definitely yes. Let us look at some arguments that support this claim:

**Lexical aspect.** We have already seen that lexical aspect is one factor that is present in the definition of genericity.

³Past and future here are meant with respect to reference time, not to speech time.
Tenses. The use of particular tenses and aspects strongly licenses the interpretation of a sentence/text as generic or particular. For example, simple present in English and Imperfeito in Portuguese tend to select a generic reading, while progressive in both languages tends to enforce a particular one. In this case, we may wonder whether we have generic tenses and particular tenses, or, on the contrary, whether tenses have a generic/particular dimension along with a purely temporal one. For English at least, one has to decide for the second hypothesis, since all tenses can be given a temporal use.

Temporal clauses. When-clauses (and as-clauses) are used both for (temporally) anchoring particular sentences in discourse and for creating rule-like habitual or generic statements (see discussion in Part 1). This has been acknowledged in the literature by referring to “temporal when” and “atemporal when” (see [G.Carlson 79]). These two uses of “when” cannot, however, be characterized by morphosyntactic different contexts, since it is possible to construct sentences which are ambiguous between the two interpretations:

*The subdits rose when the king entered the room.* (used to, or at that particular time)

*When he makes coffee, you pretend to vomit.* (a regular habit, or an order)

The role of arguments. The influence of the arguments of a verb in a clause (or better, of the whole structure of the clause) is pertinent for the two conceptual domains: On one hand, the influence of plurality for the aspectual classification of a sentence is well-known since [Verkuyl 72]:

(1) *John built dams. We pedaled over bridges.* (activity or state (if generic))

(2) *John built the/a dam. We pedaled over the/a bridge.* (accomplishments)

On the other hand, the kind of plurality at stake can also help to decide whether a sentence is generic or not, as could be seen in Section 1.4.

(3) *Dodos did not fly.* (generic)

(4) *The dodos did not fly.* (particular)

Notice that, in addition, decisions as to kind denotation of (bare plural) arguments can have an impact in the aspectual classification of the sentence, showing that the two problems of genericity and aspectual classification of a sentence are intertwined.

(5) *M.P.’s protest at embassy.* (accomplishment or state (habitual))

(6) *optimists win.* (achievement or state (habitual))

Finally, temporal phrases may also have a say in the genericity of a sentence.

(7) *John killed ants for an hour.* (activity)
(8) *John made shoes* during the war. (state (habitual))

Sentence (7) without the temporal phrase could be generic (adding “for a living” would disambiguate it), but not with the for-adverbial. Sentence (8), on the contrary, without the temporal phrase is more easily read as an activity or accomplishment.

**Quantification.** One interesting explanation of the analogies between the verbal and the nominal domains proposes that the distinction between definite and indefinite quantification is at work in both cases (see [L. Carlson 81]).

In fact, if one maps situations onto objects, one finds that events are countable, processes are mass, and states are abstract (see e.g. [Bach 86]). And, by viewing the influence of objects as participants in situations, we can see that countable, mass or abstract terms, in connection with aspect-neutral verbs, produce events, processes or states (see [Krifka 91]): *He saw a horse / He saw horses/people/furniture / He saw beauty.*

We have already seen that sentential quantification plays a role in genericity/habituality: actually, adverbs like *usually, often* and even *always or never* usually render a sentence generic.

Given the paralell above, one could hypothesize that also explicit nominal quantification has a role in the determination of the aspectual value of the whole sentence. In this report (see Part 2), we have also wondered whether quantifiers like *most, few* and *no* could be responsible for generic readings⁴. Let us look at an example:

- *Most men starve in the desert.*
- *In this room, most men are drinking tea.*
- *Most men voted 'yes'*. 

These three sentences have the same quantified subject NP. It appears, however, that the first sentence is generic (and thus stative), the second is particular (at least in its preferred interpretation) and represents an activity, while the third is particular and eventive, where “most men” refers to a contextually determined set of men.

One interesting observation is that for particular sentences the quantification can either attach to the noun or to the sentence without significant change of meaning, while for generic sentences it cannot.

- ≠ *Men mostly starve in the desert.*
- = *In this room, men are mostly drinking tea.*
- = *Men voted mostly 'yes'.*

Summing up, it is the same kind of factors that are at play in both particular and generic sentences. There does not seem to be (at least for English) a separate grammatical system to convey habituality or genericity. These notions seem thus to be ‘covert’ categories in Whorf’s sense [Whorf].

⁴In fact, *all, most, few* and *no* seem to be the nominal counterparts of the sentential *always, usually, rarely* and *never*, which are widely mentioned as inducing genericity.
3.3 Can the study of genericity also contribute for the study of tense and aspect?

Already in the former section some examples were given where tense and aspect research could gain from genericity information, such as the use of kind-denoting criteria for bare plurals to decide on the aspectual class of the whole sentence.

But the insight from generic studies can go further than that. For example, genericity may furnish, by analogy, a new view of states:

When a sentence is considered generic/dispositional, [Krifka et al. 92] give it a translation/interpretation of some (GEN) quantification over times (or situations, depending on whether one is using a temporally-based or event-based framework). The important detail here is that a generic sentence is not given a temporal location at all (apart from a possible encompassing period that may be furnished in the text, e.g. *she used to smoke when she was a student*, or by the general context). We basically agree with such a choice, as opposed to treatments such as [Ramsay 92]'s which try to capture habituality with an extensional “more than once” interpretation.\(^5\)

We propose to extend this view to some other kinds of states (see section 3.5). Namely, to specify the semantics of a state without giving it a temporal location, except if it is given independently by the co-text. This has to do with our intuition that basically (permanent) states are independent of time, while events are not, since they presuppose time to be actualized.\(^6\)

The conventional view of states (see e.g. [L.Carlson 81,Bennett/Partee 78]) attributes them the property of being true at moments of time (extensible homogeneously to intervals), in opposition to the other aspectual classes. Notice that this property, albeit not defining, still holds in our characterization.

Another interesting question is whether there is any connection between the departing aspectual class and an habitual sentence: While there does not seem to be any preferred aspectual class when the sentence merely exemplifies a kind-denoting NP, (which incidently goes against Krifka et al. claims that generic sentences are stative — only characterizing sentences are):

*The rat reached Australia in 1770. The panda is dying out.* (achievements)

Mary hates *cigars*. *The weed* was an important factor in last year’s economic disaster. (states)

*Man* visited the moon in 1969. (accomplishment)

*German teenagers* watch six hours of TV daily. (activity)

\(^5\)[Ramsay 92, page 229] reads: “habituals simply posit the existence of some set of events of the specified kind”.

\(^6\)We share this opinion with [Bach 81, page 71]: “states have an atemporal and abstract quality”, and further “the atemporality of states” is mentioned.
characterizing sentences tend to originate either from stative predicates (see section 3.1) or from activity predicates (in which case they are habitual).

In fact, by going through the set of habitual examples used in [Krifka et al. 92], one is struck by the fact that most have a process in the main verb when the sentence is habitual. The only sentences (8 out of 50) we were able to find that did not contain a (lexical) process expression were:

(9) Typhoons arise in this part of the Pacific.
(10) John sells vacuum cleaners.
(11) A bird lays eggs. / A duck lays whitish eggs.
(12) An Anopheles mosquito carries malaria.
(13) Whales give birth to live young.
(14) This machine crushes oranges.
(15) Bob jumps 8.90 meters.

and this number can still be reduced by noting that ‘sell vacuum cleaners’, ‘lay eggs’, ‘crush oranges’ and ‘give birth to live’ can be considered activity verb phrases, given the bare plural object. We are thus left with only 3 non-process sentences, which, incidentally, are among the most problematic to handle.

This seems to suggest that activities are more inherently read as habitual than other aspectual classes, implying that possibly events (i.e., things other than states and activities) have to be forced, by some pluralization, to be activities before they can have an habitual interpretation, in an approach like [Moens 87]’s aspectual coercion.

In fact, it has frequently been remarked that activities tend to be interpreted, in the single tenses, as habituals, requiring the progressive so that they work as supposed to by the definition of activity.

He works at INESC.
He runs to school.
He dances.
? He kills ants.

That is, an activity only behaves as such when it is used in the progressive. When the progressive is not present, it either has a generic flavor or is unacceptable (given our world knowledge that ant-killing is not a profession or hobby).
3.4 What have tense and aspect researchers had to say about genericity?

In this section we look at the treatments of habituality that can be found in the tense and aspect literature, and also to the closely related aspects that have been claimed to give yet another interpretation of a sentence.

[L. Carlson 81] analyses habituality as a second semantic interpretation, brought about by aspectral rules of interpretation that reduce the truth of a sentence on the relevant secondary sense to the truth of the same sentence in its basic primary sense in periods related in a systematic way to the period of evaluation. [page 42]

Interestingly, he proposes a distinction which is generally neglected by most scholars: the distinction between iterative interpretation, habitual interpretation and dispositional interpretation. As far as the distinction between the two last is concerned, he mentions that “a habit may or may not involve a disposition, but a disposition need not be manifested in a habit”. He classifies both iteratives and habituals as activities, but seems to view dispositions as states (or maybe dynamic states?).

In [Moen 87], iteration is seen as a process (activity). In his aspectral network, Moens considers four kinds of states in English: consequent, progressive, habitual and lexical. The first two are obtained by grammatical processes, perfect and progressive being the means to reach a consequent state and a progressive state respectively. For transitions resulting in an habitual statement, he says “English has no explicit markers and thus can be made freely” [page 51] (however, by inspection of his aspectral network, habitual states are always made out from points7, which may originate in turn from a culmination (achievement), a culminated process (accomplishment) or a process (activity)). It is neither clear which (if any) grammatical markers are necessary for these previous transitions, nor whether a state could be “moved around” the aspectral network ending up as an habitual. The only arrows from states are those that make them into a process8, brought about, for instance, by for or until:

John was ill for a few days.
He believed in Santa Claus for quite a number of years.
I was quite ill before I took the antipyre.

7Points, in Moens’s terminology, are punctual non-resultative events, such as those denoted by tap, wink, etc.
8Incidently, states that express inalienable properties are said to resist this transition (page 52):
? I was quite tall until I met Harry.
? The copteryx was a mammal for several centuries.
Also, according to Moens, habitual states can be turned into a process (activity), which can then combine with the progressive auxiliary, denoting “habits in progress” [page 62]:

*Max was running a mile in less than 4 minutes until he bought a new watch.*

*I was walking to work last winter.*

(Moens seems to imply that it is the progressive that forces the aforementioned translation. In both examples, however, a large enough interval is being explicitly introduced into the picture, which prevents a ‘normal’ interpretation of the progressive. In our view, such sentences would be equally acceptable with simple tenses, and we think the transition from habituels to processes is due to the intervals mentioned: “last winter” and “until”, to which the progressive only adds a temporary flavor, as is a well known phenomenon with other kinds of states.)

Moens is purportedly not clear about habituels: “I use the rather vague term ‘habituals’ to include what are sometimes called frequentative, dispositional, normal or customary states” [page 99]. Still, he argues that the most reliable criterion to decide on stativity (namely, the accessibility test with punctual temporal expressions) makes habituels stative:

*When I last saw Harry, he took two lumps of sugar in his tea.*

*When I met Richard, he sold 2 cars a day.*

while iterated processes behave rather differently, since they do not overlap with the time described by the adverbial:

*When I came in, Tina played the sonata several times.*

[Monnesland 84] presents a study of what he calls the ‘frequentative habitual’ (sentences describing repeated events that are not limited) and the way this phenomenon interacts with Slavonic aspect. In his overview, iteration is shown to be different from the imperfective/perfective dichotomy, and is modelled as modification of the sentence versus modification of the verb phrase. He presents an interesting list of phenomena related to, but distinct from, the frequentative habitual:

- Limited repetition: *He read this letter five times.*
- Genericity: *Beavers build dams.*
- Distribution: *She closed all the windows one after another.*
- Exemplification: *It happens that I go out in the street,* ...
- Prediction: *He’ll talk for hours if you give him the chance.*
- Habitual: frequentative habitual implies repetition: *John drinks a glass of brandy every morning;* stative habitual does not: *I used to know him.*

and mentions (page 56) the difficulty of deciding, particularly in cases involving *often, regularly,* etc., whether the sentence is generic or frequentative habitual.
3.5 A specific proposal

Given the insight that can be gained from looking at one discipline after studying the other, the natural conclusion for us is that the two phenomena should be considered together.

We thus propose to study generic and particular sentences on a par. As far as we know, this has not been attempted, as evidenced in the fact that one can find fine-grained classifications of sentences particular to one side of the spectrum. We have seen that [Moens 87]'s aspectual classification for particular sentences merges all states under the same label, "stative", while [Krippa et al. 92]'s merges all events (including processes) under the same label "episodic".

Let us sketch a treatment of tense, aspect and generic sentences presented in a form akin to [Moens 87]'s aspectual network. First of all, we depart from the following aspectual classes for English, most of which have been described in more detail elsewhere [Santos 92]:

- temporary states (location in time and space required)
  - to be hungry, in love, in Paris

- permanent states (location greater than a point)
  - to build a house, write a book, crush an orange

- dynamic states (location in time and space punctual)
  - to live in Paris, stand, hang

- activities
  - to run, work

- indefinite plural events/series
  - to crush oranges

- accomplishments (location greater than a point)
  - to build a house, write a book, crush an orange

- achievements (location in time and space punctual)
  - recognize, win

- acquisitions
  - to remember, know

- points
  - to tap, wink, cough

The novelty compared to previous proposals is the existence of two different kinds of states. That states do not constitute a single entity is an idea which is by no means new (most of the previous sections were concerned with proposals which actually divide states into several categories). The particular distinction we chose to make is however not so common, even though it has frequently been noted that there are transient/temporary states and permanent ones (see footnote 8, for instance, or the ser/estar distinction in Portuguese, also mentioned in Krippa et al. 92).

We will try to show that both simple present and the progressive result in a state, but of a different kind. We agree with [Vlach 81] and [Moens 87], among others, that the progressive has a stative character (turning its input into a temporary state), while
we lump together habitual states (brought about by the simple present) and permanent states.

Due to lack of time and space, we will only consider three grammatical factors, namely the progressive, the present tense and for-adverbials. Their import is summarized in Figure 3.5.

The progressive makes a temporary state out of accomplishments, activities, dynamic states and series. Cf. he is building a house; he is running; he is living in Paris; he is building houses. Another aspect of the grammatical operator "progressive" is that it makes a series out of points. Cf. he is coughing, or he is knocking at the door.

To substantiate our claim that the (first) use of the progressive results in temporary states, we note that

- both the sentences involving the (present) progressive and those which are lexically temporary states are read as involving an implicit NOW,
- in the past, both accept punctual temporal adverbials
- both do not accept the progressive, except with some coercion of the (lexical) states into points, which then get turned into a series by the second use of the progressive: cf. I'm being hungry.

The present tense, on the other hand, creates a permanent state, when applied to activities, dynamic states and series. Cf. He dances; he lives in Paris; he coughs. Note that, exactly like permanent states,

- only scope/durative adverbials are allowed (no punctual ones)
the sentences do not need any temporal anchoring, that is, they are quite easily read as properties essentially independent of time or location.

Finally, for-adverbials seem to transform activities and temporary states into accomplishments. Cf. *to be in Paris for two years; to run for two hours*. Note that the simple present still turns these into permanent states, and the progressive into temporary states (if from activities).

English past simple, in our analysis, turns accomplishments into achievements, which can be seen in the above cases as well. Cf. *he built a house; he was in Paris for two years; he ran for two hours*.

Summing up, this brief section shows that one can handle the import of grammatical operators for aspect without artificially separating tense and genericity. In fact, we were able to find some parallels among generic and non-generic phenomena, and to give an uniform treatment of the grammatical operators involved in both areas.
Truth Conditional Semantics for Generics

Assigning a formal semantics to generic sentences of a natural language proceeds in two stages. First a translation is required of the sentences into a logical form, a formula in some logical language. In the present case this logical form consists of a formula of first-order logic to which the GEN operator is added. Second this logical form has to be interpreted in some (class of) model(s): a semantics has to be assigned to this logical form.

In our opinion, both stages differ in an essential way from their counterparts for non-generic sentences. The central problem is here the all pervasive importance of ‘normality’. This notion does not only figure as a theoretical concept in the semantics for the logical form, it also enters as an essential component in the translation from sentence to logical form.

4.1 From Sentence to Logical Form

In section 1.2 we have seen that the translation of a natural language sentence into the GEN formalism can result in a variety of divisions of components over restrictor and matrix, a variety of logical forms. The main question is then: what linguistic cues can we use to get to a ‘preferred’, an ‘intended’ logical form? In general the answer seems to be: there are no such cues.

Consider again the hurricane examples

1. “Hurricanes arise in this part of the ocean”
   \[ \text{GEN}[x; y] (x \text{ is this part of the ocean}; (y \text{ are hurricanes and } y \text{ arise in } x) \]
   ‘It is normal for this part of the ocean that hurricanes arise there’

2. “Hurricanes arise in low pressure areas”
   \[ \text{GEN}[x; y] (x \text{ are hurricanes}; (y \text{ is a low pressure area and } x \text{ arise in } y) \]
   ‘It is normal for hurricanes to arise in low pressure areas’

These sentences are ambiguous, because different divisions over restrictor and matrix are possible. The preferred readings in both cases seem only preferred because they give
us logical forms that seem to fit the way things are in the actual world. There are no linguistic clues preventing the following analysis.

\[ \text{GEN}[x; y](y \text{ are hurricanes}); (x \text{ is this part of the ocean and } y \text{ arise at } x) \]

'It is normal for hurricanes that they arise in this part of the ocean'

This is a reading which makes the sentence false, but, again, there seems to be no other reason than exactly the fact that this second reading is false to prefer the first reading. Contrary to the case of non-generic sentences, 'the world' enters in the determination of the logical form of a generic sentence.

What is 'normal' in the world determines the division between restrictor and matrix.

\[
\begin{align*}
\text{Sentence} & \quad \Rightarrow \quad \text{Logical Form} \\
& \quad \uparrow \\
& \quad \text{Normality}
\end{align*}
\]

The main problem of the role of 'normality' in the translation is the fact that the (logical) internal structure of the sentence gives no clues about the correct logical form. In the translation procedure, the sentence can be seen as a (logically) unstructured object.

### 4.2 Interpreting the Logical Form

The result of the above translation 'procedure' is a logical form GEN(\(\phi, \psi\)) that fits the framework of Conditional Logic, or Generalized Quantifier Theory. In [Krifka et al. 92] several semantics for the GEN operator are discussed.

First, the GEN operator may be spelled out as relevant quantification, second, the notion of prototypical entities might be employed. Third, GEN can be seen as a statement of a stereotype. Fourth, Gen might be analyzed as a modal operator, to be interpreted in a possible world semantics. Fifth, Gen might be analyzed as combining with a sentence to express a constraint in Situation Semantics. And sixth, GEN might be analyzed in such a way as to indicate a non-monotonic inference rule.

All these semantics face the task to explain the universal force of generic expressions without actually resorting to universal quantification.

In dealing with semantics of generic sentences one is prone to confuse two facts: the specification of truth conditions and truth in the 'real world'. Consider the sentences "Lions have manes" and "Lions are male". Both sentences are generic, both express generalizations about lions, or the kind 'lion'. The first is a 'true' statement, the second a 'false' one. Now, when we are doing model theoretical semantics, it is not our task to
explain why the first sentence is true in the real world (itrw) and the second sentence false itrw. After all, a world where, normally, lions are male is not a logical impossibility. This much is obvious, as semanticists it is our task to specify truth-conditions, and if this can be done for generic sentences at all, then it can be done for the first as well as for the second sentence. The confusion about the task of semantics is evident in Krifka’s et al. treatment of Declerck’s Relevant Quantification. Declerck [Declerck 91] analyzes generic quantification in terms of universal quantification and a monadic relation R restricting the domain of quantification to the ‘relevant’ individuals. So the sentence

Whales give birth to live young

is analyzed as

\[ \forall x [\text{whale}(x) \land R(x) \rightarrow \text{gives birth to live young}(x)] \]

Of course, this is problematic. For the appropriate relation R must come out of the blue. Consider “lions have manes” and “lions suckle their young”. In the first case the relevant set has to be the set of male lions, in the second case the set of female lions. Then how do we analyze the (true) generic “Lions have manes and suckle their young”? However, every semantics that has been suggested faces this problem, so we want to focus on a different point, namely, the objection of [Krifka et al. 92] to this semantics

“One obvious problem with this approach is that this principle, as it stands, can easily justify all kinds of generic sentences... since it is easy to find restrictions which would make any quantification come true. For example, the analysis could make

(79) Whales are sick

be a true generic, since we can take R to be the predicate sick, hence to restrict the quantification to sick whales.”(ch 2 p 32)

The problem here seems not so much that we can trivialize this proposal when no restrictions on possible relations R are imposed, but that it is not true that whales are sick, so we should not allow relations R that force this to be true (after all, this semantics can be trivialized also for true generics).

But what is the problem here? Indeed, any generic can be justified in this way, just as any particular sentence “Mary swam across the atlantic ocean”, “John held his breath for ten months” can be true on the right model. A semantic analysis of these sentences should result in a class of models verifying the sentences; whether these models fit the real world is not our concern. Even if we find a way to restrict the R relation so as to exclude triviality, still it must be possible to make “any quantification come true”, for even “whales are sick” can be a true generic in some model.

It is important to emphasize this point, because the above restriction on quantification occurs in every proposal, most notably in the Modal Semantics and that in terms of Situation Theory. Given the right ‘ordering source’, we can make “whales are sick” true in the modal set–up, and given the right ‘background’ situation the same generic can be
made true in the situation theoretical framework.

There remains however the problem of preservation of truth by logical reasoning. A sound reasoning pattern allowing us to infer B from A will guarantee the truth of B if A is true irw. So a pattern like: from “Lions have manes” and “if a lion has a mane then it is male”, conclude “Lions are male”, should not be allowed\(^1\).

The fact that a proper semantics should be able to deal with true as well as with untrue generic statements constitutes a major problem for an interpretation of generics in a non-monotonic framework. In a data base we will not add a statement like “birds have rubber wings”, we try to prevent adding untrue statements to the base. The problem of false generics does not occur. For instance, in default logic, “Lions have manes” is interpreted as: if we have a lion and it is consistent to assume it has manes, then conclude it has manes. So far, so good. But if it is consistent to assume that this lion has manes, then it is consistent to assume it is male, so “Lions are male” is also accounted for. Default Logic cannot distinguish between the two. In data base logic this does not constitute a problem because we just don’t add a statement like “lions are male” to our base, but a semantics of natural language will have to deal with untrue generics.

Generics and Conditional Logic

It is our opinion that treating generic sentences as some species of conditional sentence is misleading in a fundamental way. In standard Conditional Logic the antecedent “sets the stage for the consequent” [v. Benthem 1986]. In Conditional Logic with an ordering relation\(^2\) the stage for the consequent is set by antecedent and consequent and care has to be taken to avoid vacuous forms of the kind “if the antecedent holds and the consequent holds then the consequent holds”. We will illustrate this problem with an example from Counterfactual Logic.

Imagine the following situation: we are on our way to an appointment, arrive at a traffic crossing, the lights are green so we drive on. In this situation we utter the following counterfactual

If the traffic lights had been red, then \(\phi\)

where \(\phi\) will be filled in below. In the Lewis semantics counterfactuals are interpreted in a possible world model in which the worlds are ordered according to their degree of similarity to the actual world. To determine the truth value of the above counterfactual in such a model, one considers the world closest to the actual one on which the antecedent ‘the traffic light is red’ holds; if on these worlds \(\phi\) is true, then the counterfactual is true

\(^1\)Most non-monotonic logics allow this however: if \(\phi(x)\) is non-monotonically derivable and \(\forall x (\phi(x) \rightarrow \psi(x))\) holds classically, then \(\psi(x)\) is derivable. This shows that extensional treatments in terms of majorities or probabilities are impotent here.

\(^2\)A preferential/normality ordering in models for Minimal Entailment, an ordering source in Modal Logic, a similarity ordering in Counterfactual Logic. Note that this includes all cumulative non-monotonic logics.
in this model (at the actual world).
Now, let's fill in $\phi$

1. $\phi = \text{"we would have been in violation of the traffic regulations"}$
   
   This instantiation would certainly make the counterfactual true, spoken in a car that is passing the crossing. Had we stopped in this situation, the counterfactual would have been false.
   
   This counterfactual presupposes a model where the worlds in which the traffic lights are red and nothing else is changed (we still traverse the crossing) are closer to the actual worlds, then those in which the lights are red and we stop.

2. $\phi = \text{"we would have missed our appointment"}$

   This instantiation makes the counterfactual true (given that we are already pressed for time) if a red light would have made us stop, a not unreasonable assumption.
   
   This second counterfactual presupposes a model where the worlds in which the traffic lights are red and we behave as civilized people should, is closer to the actual world, than those worlds in which the only change from the actual world is the state of the traffic light.

In other words, the second counterfactual presupposes the converse of the ordering the first counterfactual requires: note however that the counterfactuals have the same antecedent.

This example entails that the logical form of a counterfactual in natural language must consist of a formula in some logical language, plus an ordering relation for some model: a natural language counterfactual supplies us with part of a model. We cannot interpret in a previously given model, nor can we say that the model is determined, the stage is set, by the antecedent of the counterfactual (given the fact that the above examples involve the same antecedent).

So we have to represent a natural language counterfactual by a pair $(\phi, R)$ where $\phi$ is a formula in some logical language and $R$ an ordering relation. This dual structure explains why logical principles valid for formal counterfactuals do not go through for their natural language counterparts. For instance, Lewis' logic for counterfactuals allows for conjunction of consequents: if $A$ counterfactually implies $B$ and counterfactually implies $C$ then it counterfactually implies $B$ and $C$. But even though both the example counterfactuals are true, still we cannot conclude "if the traffic lights had been red, then we would have been in violation of the traffic regulations and we would have been late for our appointment" (because the ordering relations in the logical forms are not identical).

Furthermore, this logical form cannot be constructed compositionally, for the relation $R$ in $(\phi, R)$ seems only determined on the level of the entire sentence (neither "the traffic light is red" nor "we are late for the appointment" on its own determine a similarity ordering, only the compound does).

In Natural Language counterfactuals the antecedent plus the consequent set the stage for
the consequent. Of course, from a truth functional point of view, triviality lurks around the corner. If the consequent is allowed a say in the determination of the ordering along which it is to be evaluated, this must be independent of the actual truth of the counterfactual: antecedent–consequent combinations must be possible that determine a relation which renders the counterfactual false.

What has been argued for here in the case of counterfactuals in natural language holds in even more acute form for conditional interpretations of generic sentences and the ‘minimal entailment’ interpretations of non–monotonic logic. ‘Normality quantification’ applies to the variables in the restrictor of a GEN formula. The dimension along which this normality is measured, however, derives from the natural language sentence from which the formula is computed.

In conclusion: to get from a generic sentence to a logical formula with the GEN operator we need the concept of normality, “how things are in general”. Moreover, this GEN formula cannot yet be seen as the logical form of the (disambiguated) sentence: not everything pertinent to the truth of the sentence is expressed in the formula. In terms of conditional logic it is best to see a generic sentence as supplying us with a logical formula and a normality ordering.

\[\text{\footnotesize\textsuperscript{3}Here trivial orderings abound: if } z \text{ is a bird, then } x \text{ flies. The consequent \textit{‘}x \textit{flies\textquoteright} forces the antecedent to be evaluated with respect to birds that are \textit{‘}normal with respect to flying\textquoteright. How does this differ from evaluating with respect to birds that fly? For instance, is it possible that } z \text{ is normal with respect to flying, but still } x \text{ cannot fly?}\]
Future work

We merely list here some possible research items that we had no time to pursue.

- A deeper study of the relationship between the two sources of genericity (nominal and sentential).

- Stage level/individual level: [G.Carlson 77]'s distinction and its import both for tense and aspect and for generics.

- The link between structured entities in the nominal domain (groups, sums) and kind denoting NPs.

- The link between thematic roles and GEN (instead of syntactic arguments, like subject and object).

- Is characterizing a property of sentences rather than of predicates, or can one distinguish between genericity as applying to sentences and characterizability applying to predicates?
Bibliography


