

# The Semantic Composition of English Generic Sentences

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One part of the task in presenting a semantics for a natural language is to show how the meanings of the constituents of a sentence are combined with one another to build up a meaning for the whole sentence. To a certain degree, this part of the task can be worked on without committing oneself too specifically to any particular theory of meaning, and that is what I am going to try to do here. The construction of interest is that of generic sentences. Such sentences are found in all natural languages (though not in all artificial languages), but I will confine my remarks to how English generic sentences are built up from constituent meanings, ever hopeful that what I have to say about English will shed light on similar constructions in a wider range of natural languages. I will begin by giving a series of descriptions of what generic sentences are, working from the most notional and towards the most linguistic, to first stake out the domain of inquiry. I then turn to the semantic composition of such sentences, arguing that they are not uniformly of subject-predicate form, but that a wider variety of internal relations must be recognized. The overall purpose of the following discussion is to provide a set of general considerations that any formal semantic theory incorporating generics must contend with.<sup>1</sup>

1. Generic Sentences. Notionally, a generic sentence is one expressing a regularity, as opposed to an instance from which one infers a regularity. For example, the generalization "The sun rises in the east" expresses a regularity, while "The sun rose this morning in the east" expresses an instance from which, along with other such instances, one infers a regularity.

Epistemologically, a generic sentence is one expressing a truth (or falsehood) the truth value of which cannot, in general, be ascertained solely with reference to any particular localized time. For instance, the present tense sentence "Dogs bark" is true, even though at the present time there may be no dogs barking. Or, take the assertion "Bears hibernate" said in midsummer; to check on it one must wait for winter. In contrast are the specific instances, which in general can be "locally determined". If I say "Jenny is watching TV in the den," this is something I can, at least in principle, check on right now, and other times become irrelevant to the truth or falsity of this assertion. Or if I assert that Bruno is in hibernation, I check on it now; I do not wait until midwinter.

Linguistically, generic sentences have no formal distinguishing features, at least in English and many (though not all) other languages (see Dahl (1985) for an overview). Surface syntax, morphology, and phonology do not distinguish generics from non-generics. They do, however, have some distinguishing semantic features: generic sentences are (i) stative sentences (ii) based on lexically non-stative predicates,<sup>2</sup> and (iii) they are intensional and (by all appearances) non-monotonic. For instance, the aspectual category of "fetch newspapers" is non-stative (a process), yet the sentence "Dogs fetch papers" passes all the standard tests for stativity (see for example Dowty (1979)).

2. A subject-predicate analysis of generics. Let us now turn to another semantic definition of generics, proposed in Carlson (1980a). I will first simply present it, without any attempts at motivation. Then I will discuss some ways in which it is inadequate, and then what a more adequate analysis might look like. What will emerge is a slightly different view of what generics are, and a significantly different view of their semantic composition.

This analysis of generics, undertaken within a model-theoretic (Montague grammar) framework, depends on making some assumptions about the denotations of certain kinds of noun phrases. In particular, a proper name like "John Smith" denotes (the property set of) an individual. Individuals are not to be regarded as extensions proper; rather, individuals are intensional objects. They are the sorts of things that can appear at different times and places (and in different worlds) and still be "the same" even if the instances themselves are distinguishable. These instances are called (following Quine) "stages," spatially and temporally bounded instances of individuals. What I have in mind here corresponds in a general way to what Barwise and Perry (1983) call "located individuals," and more closely to the "stages" of Gabbay and Moravcsik (1979). (The idea is roughly this: take your favorite individuation puzzle, ask what it is that gets individuated in the first place, and you have the extensions proper.)

Another sort of individual, on this account, is kinds; a noun phrase such as "bears" or "rickety railroad cars" denotes, like a proper name, an individual as well, though a kind by virtue of its being able to have multiple simultaneous stages at distinct locations in the same world. Bears, unlike John Smith, can appear simultaneously in the Bronx Zoo and the Denver Zoo; Smith can be in but one of those places at any given time.

Given a basic distinction between stages, conceived of as basic extensional elements, and individuals, conceived of as basic intensional elements subtyped into regular individuals and kinds (at least), one can then differentiate types of predicates, if we take extensions of predicates to be sets of basic elements.<sup>3</sup> Some predicates may have as extensions individuals (subclassified into kinds and regular individuals), and some may take as extensions stages. It seems to be an empirical fact, given this perspective, that no predicates "mix" the intensional and the purely extensional; the denotation of a predicate with regard to appropriate points of reference must either consist entirely of individuals and no stages, or entirely of stages and no individuals.

Even though there are (at least) these two domains of predicates, expressions denoting members of each domain may be formally related to one another. This is at the heart of the view of generics under consideration. The proposal is that we have predicates which denote sets of stages (at points of reference), which can be operated on to yield a predicate that denotes individuals expressed by a formally identical linguistic form. For instance, consider the predicate "fetch my newspaper" (as in "last night Fido fetched my newspaper"). This predicate denotes stages, and this example sentence is true iff among those stages last night is a stage of Fido. But now consider the generic sentence, "Fido fetches my newspaper" (e.g. every morning). There is a semantic operation (corresponding to a null syntactic operation), Gn, which operates on the stage-denoting predicate "fetch my newspaper" to yield a generic predicate "fetch my newspaper" which now denotes (at points of reference) individuals, expressed by the same form. And the generic version is true just in case the individual Fido is to be found in that denotation (or, alternatively, that the meaning of the generic VP is truly predicated of Fido). Given this typing of entities and predicates, we arrive at a tentative definition of a generic sentence: a generic sentence is one in which a predicate (i.e. the meaning of a syntactic VP) is applied to an individual, rather than to a stage of an individual, to yield a sentence meaning (e.g. a proposition). In part, the purpose of this analysis is to provide a unified account of when bare plural NP's ("rabbits," "unhappy students", etc.) and indefinite singular NP's ("a cat", "a friend in need") appear to be interpreted "universally" rather than existentially. If a non-generic property is predicated of them, they have existential interpretations (e.g. "A cat ran across my lawn"), whereas the predication of a generic property gives rise to the apparent "universal" reading ("A cat chases mice") (see Carlson, 1977). Thus, whether subject bare plurals and singular indefinites appear to be interpreted universally or not becomes a diagnostic for whether one has a generic or a nongeneric sentence, with the "universal"

reading indicative of the generic, and the existential indicative of a non-generic.

The definition of a generic sentence under this analysis is profoundly tied up with the view that all such sentences have a subject-predicate form; the subject of the sentence provides the key ingredient for the generic--the individual--and the generic predicate denoted by the VP is predicated of the denotation of the subject NP.

3. Some difficulties. This analysis, though, suffers some difficulties. The first, something of a minor embarrassment, is that such a definition makes all sentences generics once the details of the proposed analysis are fully presented. Though there are various ways out of this little dilemma, but we won't consider them here as the discussion would be narrow and unenlightening. And in any case there are much stronger reasons to think this particular view is in need of even more major repair. To these more important matters I now turn.

3.1 Locatives. Let us consider an example from Gary Milsark's dissertation (Milsark, 1974):

(1) Hurricanes arise in this part of the Pacific.

This sentence has at least two salient interpretations. The first is factually false--that hurricanes in general have a common origin in a certain part of the Pacific. On this reading we are talking about "all" hurricanes. This is the generic reading predicted by the subject-predicate analysis of generics.

But there is another salient reading for this sentence, one that says nothing about "all" hurricanes, but only tells us that from time to time a hurricane occurs in these parts. This reading is accurately paraphrased as (2a) or (2b):

- (2) a. There arise hurricanes in this part of the Pacific.  
b. In this part of the Pacific arise hurricanes.

But is this reading in fact a generic reading of (1)? By all tests, it appears to be. Consider whether it expresses a regularity (it does); whether it is epistemologically determinate with regard to the present moment (it is not); whether it is stative (it is); whether it is based on a nongeneric (it is; there is an eventive reading, more salient in the past tense--"Hurricanes arose in that part of the Pacific" (so all boats avoided the area)). It is also intensional; consider substituting the phrase "where I am pointing my

finger" for the phrase "this part of the Pacific." The intersubstitution is not automatically licensed even if where I am pointing is the part of the Pacific I am talking about. (3) has a different possible reading, in which I am possessed of power over the forces of nature:

(3) Hurricanes arise where I am pointing my finger.

So, it appears that this latter reading of (1) is indeed a generic reading, in spite of the fact that the subject NP has a clear existential interpretation of the same sort it would have in non-generic sentences such as (4a) (equivalent to (4b)):

- (4) a. Hurricanes slammed against the Texas coast last week.  
b. (=) Some hurricanes slammed against the Texas coast last week.

Note that addition of "some" to (1) on the reading of interest yields an accurate paraphrase, in the same way (4b) paraphrases (4a):

(5) Some hurricanes arise in the part of the Pacific.

If the subject NP is interpreted "universally" in a generic sentence, though, this substitution very clearly fails to provide a paraphrase:

- (6) a. Hurricanes have high winds  
b. (≠) Some hurricanes have high winds.

There are many similar generic sentences in which the subject NP is interpreted existentially, alongside another generic reading in which the subject NP is interpreted "universally". All the following, with locative phrases following the verb, have these two generic interpretations:

- (7) a. Flowers grow out behind the old shed.  
b. A guard stands in front of the queen's palace.  
c. Unfriendly tribesmen dwell just over those hills.  
d. Productive farmland lies to the south of Des Moines.  
e. A statue of Shakespeare sits near the hall window.

As Dowty (1979) points out, such sentences as those in (7) are best construed as generics; yet they all have "existential" subjects (e.g. in (7b) no general characteristic of guards is being presented). One may at first sight think these lack the epistemic independence of the present; but this is not so. One can say (7a) in midwinter when there are no flowers, or continue (7b) by noting that there is no guard there now, or (7c) can be said even if no

inhabitants are there now, or note in (7e) that the statue has been moved in order to vacuum the area it normally occupies (note that one could have a different statue every day). Only the immobility of farmland prevents similar things from being said about (7d).

Thus, we find our first set of apparent counterexamples to the claim that generic sentences necessarily have a generic property predicated of the denotation of the subject. Here were examples of sentences which are evidently generic, but which do not distinguish the subject of the sentence.

3.2 Transitives. Consider the following example, suggested to me by Barbara Partee:

(8) A computer computes the daily weather forecast.

Again, there are a couple of salient generic readings for this sentence. One is quite implausible, attributing a weather-forecasting function to "all" computers. The other, the same as the more salient reading of (9), tells us how the daily weather forecast gets figured out:

(9) The daily weather forecast is computed by a computer.

Again, the predicational analysis of generics fails to account for this reading of (8). In (10) are more examples of generic sentences like (8):

- (10) a. Robots build the new cars.
- b. Cows give the milk that feeds this colony.
- c. Vicious dogs protect Ft. Knox's gold.
- d. Slaves work Lower Slobbovia's salt mines.
- e. An oriental rug covers the dining room floor.

Each has a generic reading in which the subject NP is apparently interpreted existentially, contrary to the predictions of the Carlson (1980a) analysis.

3.3 Adverbials. Let us set these examples aside, and move on to another set of examples in which generic sentences have existentially interpreted subjects. Stump (1981, 1985) and Farkas and Sugioka (1983) note that the Carlson (1980a) analysis is also unable to deal adequately with certain adverbial constructions.

Consider example (11):

(11) A cat runs across my lawn every day.

There is an implausible "universal" reading in which it is a general characteristic of cats that they run across my lawn. But there is also a much more plausible reading, one where daily some cat or other crosses my lawn; this, too, is a generic interpretation of the sentence. In general, adverbials such as time and conditional adverbials (though not manner adverbials), allow for generic sentences with existentially-interpreted subjects. The following have such generic readings, alongside the usual "universal" readings:

- (12) a. Mice squeak loudly if you pound on this wall.  
 b. Fire engines come when you dial 911 and ask for help.  
 c. A little red light comes on when you push this button.  
 d. People mutter in disgust every time Bert appears on the news.  
 e. Once in a while, volcanoes erupt and cause much damage.

A related difficulty for the subject-predicate analysis is also discussed by Stump, and Farkas and Sugioka. They note that some predicates, such as "widespread" and "rare" are not associated with a generic "type-lifting" operator Gn, being basic predicates that apply to kinds of things. Now one account of the source of the generic nature of such examples as (13a) is that the adverbial clause combines with the non-generic interpretation of the VP to form a non-generic predicate; this predicate is then operated on by the generic operator to form a generic predicate, which is then predicated of the subject. Thus, an analysis of (13a) would, schematically, be as in (13b) (the adverbial is taken to be a mapping from predicates to predicates):

- (13) a. John vanishes when there is work to do.  
 b. **John**( [Gn[Nongen([vanishes])[when there is work to do] ] ] )

But example (14) allows for no such analysis, as there is no opportunity for placing a Gn operator in the predicate of the sentence:

- (14) Small fish are widespread when big fish are rare.

Yet (14) can clearly be understood generically.

3.4 Dummy subjects. Another difficulty with the subject-predicate analysis of generics, perhaps the most obvious, is that some sentences lack denoting subjects but can be generic nonetheless. The clearest examples are cases of 'it' with weather verbs; these can participate in generic sentences:

- (15) a. It rains 30" a year here.

- b. It snows in Florida once every decade or so.
- c. It gets foggy if there's an easterly wind and cool temperatures.
- d. It is hottest when summer high pressure stagnates overhead.

In order to rescue the subject-predicate analysis of generics from examples like (15) one must posit some individual as the denotation of "it". If this were the only difficulty the subject-predicate analysis faced, something to this effect might be worth the effort (see e.g. Bolinger (1970) for one such discussion), but on top of the other difficulties the examples of (15) merely seem to make matters worse.

4. A sentential-operator analysis. We continue to assume that generics are systematically related to their nongeneric counterparts, and that the former are to be derived from the latter, rather than the other way around. But the evidence presented above suggests that a predicational analysis, in which a generic predicate is applied to the denotation of the subject, is either too restrictive an analysis or else simply wrong. One reasonable alternative would be to hypothesize that generic propositions are derived from nongeneric propositions, rather than generic predicates being derived from nongeneric predicates. In practical terms this means postulating in the semantics (and perhaps the syntax) an operator, GN, which applies to sentence denotations (e.g. propositions) to derive other sentence denotations (e.g. other propositions). So, for instance, the analysis of "Dogs bark" would not be as in (16a), but instead as in (16b):

- (16) a. [**dogs'**([Gn(**[bark']**)])] (where the "bark" portion is a nongeneric VP)  
 b. [GN(**[dogs bark']**)] (where the "dogs bark" portion is a nongeneric S)

Such an analysis (actually, a program for an analysis) has the immediate advantage of being able to meet the objections to the predicational analysis evaluated above, at least in principle.

However, the sentential-operation analysis, even presented at this level of generality, raises some immediate and pressing questions. One problem it does not appear to cast much light on is the relationship between the existential and universal readings of bare plurals (and mass terms) on the one hand, and the generic or nongeneric nature of the sentence, on the other. Whereas the predicate analysis makes some incorrect predictions, the sentential analysis simply makes no predictions at all. This is not a step in the right direction.

There are stronger empirical reasons for doubting the sentential-operator analysis. Probably the biggest puzzle is why there are no generic sentences consisting solely of a subject and an intransitive verb as a predicate, in which the subject is interpreted existentially instead of universally. That is, alongside the ambiguity of the subject in (17a-20a) there is no corresponding ambiguity in the examples in (17b-20b):

- (17) a. Slaves work Lower Slobbovia's salt mines.  
b. Slaves work.
- (18) a. Mice squeak when you pound on this wall.  
b. Mice squeak.
- (19) a. Flowers grow out behind the old shed.  
b. Flowers grow.
- (20) a. A robot cooks my morning coffee.  
b. A robot cooks.

It is as if there must be something else in the sentence besides just a subject and a simple predicate in order to have a generic with an existentially-interpreted subject bare plural or indefinite singular.

Nor does the sentential analysis suggest a natural means of dealing with the difficulty of interpreting empty subjects predicated of simple intransitives. The examples of (21b-23b), in contrast to examples (21a-23a), appear to be thoroughly vapid generalizations, leaving one hunting for some kind of natural interpretation.

- (21) a. It rains hard here.  
b. (??)It rains.
- (22) a. It snows in Florida once every decade or so.  
b. (??) It snows.
- (23) a. It gets foggy when there is an easterly wind and cool temperatures.  
b. (??)It gets foggy.

The (b) examples appear to be in need of something else in order to make them understandable generics . Of course, as non-generics, these are quite natural:

- (24) a. It rained.  
b. It snowed.  
c. It is getting foggy.

So one cannot offer as a reason for the vapidness of the (b) versions the lack of a nongeneric base from which to derive a generic.

5. A relational analysis. We can summarize these observations as follows. Generic sentences require two elements to be related to one another in order to have a complete generic interpretation. The first element is a nongenerically interpreted matrix sentence or predicate containing the sentence main verb; then "something else" is required to complete the generic interpretation. In example (1) it is the locative phrase (or, perhaps, just the NP in the PP); in example (8) it is the direct object; in example (11) it is the time adverbial; and in an example like "Cats meow" it is the subject. Subjects, it turns out, appear to be the favored "something else", but this by no means exhausts the possibilities. For want of better terminology, I will call this "something else" "the related constituent"(and sentences in which the subject plays the related constituent are "standard generics").<sup>4</sup>

What is wrong, then, with the vapid generalizations of (21b-23b) is that there is no related constituent in the sentence to support a generic interpretation (assuming 'it' to be nondenoting); why the examples of (17b-20b) have only "universal" readings for their subjects is that the subject is the only candidate within the sentence to supply the related constituent necessary for a generic interpretation. But before we explore this relational account further, we need to mention one other source of "related constituents."

Some element understood as a part of the discourse, and not a part of the syntactic representation of the sentence itself, can also condition a generic reading--it appears that the discourse itself may supply the related constituent necessary to complete the interpretation. For instance, example (25), suggested to me by Emmon Bach, has no natural generic reading if understood in isolation:

- (25) John builds a cabin.

The only available reading seems to be a present-tense "announcer's" sense. Yet, if one understands a previous discourse in which the topic of conversation is how John works off his frustrations, or what he does every time he wants to make a little extra money, then it can clearly be

understood as a generic. The key element in making (25) a generic, then, is contributed by the discourse in which it is embedded. Below are some more examples:

- (26) a. (Topic: What happens in the event of a fire). An alarm sounds.
- b. (Topic: What happens in a recession). People get laid off.
- c. (Topic: Late-summer small-town events). A circus arrives in town.
- d. (Topic: Winter weather around these parts). Oh, it does snow, you know.

One might reasonably question whether examples like those in (25) and (26) have generic meanings; perhaps they are non-generics that contribute to a generic proposition upon being integrated into a discourse. What few facts bear on this question (assuming it's a coherent one in the first place) favor treating them as generics rather than non-generics. For instance, the unequivocal marker of a generic in English--the "used to" construction"--is quite natural under these same circumstances. For instance, (27) sounds quite natural in appropriate discourse:

(27) (What Aristotle did when frustrated.) Aristotle used to write a book.  
(cf: 'A. used to write a book' without supporting context)

So, I assume that something has been integrated from discourse into the "local" interpretation of the sentence in such cases as (25-6). (The questionnaire of Dahl (1985) elicits similar generic markers in such contexts in a variety of languages.) I have little to say about these contextually-interpreted generics apart from noting them and the way they lend support to a relational treatment of generics. I strongly suspect there is a direct connection between the discourse elements required here, and those necessary to account for many interpretations of pronouns in discourse (e.g. the cases of "modal subordination" noted in Roberts (1986) and references cited). The "conversational background" postulated by Kratzer (1977) to appropriately interpret modals and used by Stump (1981, 1985) to interpret free adjuncts and absolutes may also provide a very promising point of departure.

6. What do generics relate? In this section we will explore the question of what sorts of things can be generically related to one another (the further question of the precise nature of this relation lies beyond the scope of the present work). From a syntactic perspective, NP's and certain sorts of adverbials can be related to predicates on the one hand, and propositions (or perhaps predicates as well) on the other. I am not going to be concerned

about how to deal with the disjunction predicate or proposition--there are notions available such as 'situation type' (Barwise and Perry, 1983) which seem capable of unifying the two. Instead, I would like to focus on the related constituent, making the point that intensionality of the related constituent is a crucial ingredient in the interpretation of generic sentences.

Consider the interpretation of the NP "the daily weather forecast" in example (8), repeated here:

(8) A computer computes the daily weather forecast.

In this context, "the daily weather forecast" requires an intensional interpretation, where its meaning cannot be taken as rigidly referring to the present weather forecast, e.g. the one appearing in today's copy of the Times predicting light rain and highs in the upper thirties. In non-generic sentences like (28), though, the present example of the forecast can be understood as the reference of the NP:

- (28) a. Today, the daily weather forecast calls for snow.  
b. John got all depressed today after he read the daily weather forecast.  
c. The daily weather forecast appears on p. 7 of today's Times.

Here we find a clear connection between intensionality and genericness, with only the intensional reading co-occurring with the generic interpretation.

Now consider the interpretation of the adverbial in (11), repeated here, recalling the reading of interest:

(11) A cat runs across my lawn every day.

A phrase like "every day" is, as many have observed, ambiguous between a reading which quantifies over some (normally contextually-defined) finite set of elements, or else it may have an "unbounded" reading. In (11) and other such examples, only the latter "unbounded" reading appears.

Consider, for instance, what occurs when there is an overt restriction of the range of quantification to a finite set, e.g.:

- (29) a. A cat runs across my lawn every day this week and last.  
b. A cat runs across my lawn every day from last Monday to next  
Friday.

One can perhaps interpret these as stage directions, but one clearly cannot interpret (29) in the same straightforward generic way that one can understand (11) (in languages in which the simple present is routinely used nongenerically, such examples as (11) are judged ambiguous). Similarly, substitution of other quantifiers with bounded readings, such as numerals, yields the same results in the English simple present.

- (30) a. A cat runs across my lawn (on) four days.  
b. A cat runs across my lawn several times.

The examples of (30) have the same difficulties as the examples of (29), on their more salient reading. ((30a) clearly has other acceptable generic readings we will comment on below.)

So why regard the "unbounded" reading of "every day" as intensional, rather than simply quantifying over all possible days? There are several reasons. First, it is simply not quantificationally unbounded at all in the interpretation of (11). (11) can clearly be regarded as true even if there are some days no cat has, or will, run across my lawn. For instance, (11) is perfectly compatible with the occurrence of cats dashing across my lawn having begun only last month, and its present truth certainly does not require that this go on forever. Rather, it is a generalization that presently holds. So it really cannot be a matter of simply quantifying over all days, real or possible.

Secondly, even if there is a restriction of days you are talking about to an unlimited number, it seems to help very little; (31) seems as bad as (29) and (30), and certainly (31b) is no paraphrase of (11):

- (31) a. A cat runs across my lawn (on) an unlimited number of days.  
b. A cat runs across my lawn every day of an infinite number of days.

Rather, the phrase "every day" in (11) is "unbounded" in some other sense, rather than quantifying over an unlimited number of instances. The beginnings of a satisfactory analysis would treat the meaning of the phrase in (11) as a function from contexts to all days in that context, and it is this meaning that is related in the generic interpretation of (11).<sup>5</sup>

Why can't such a "bounded" interpretation be found for the adverbial phrase "every day"? The answer is, put simply, that a day is not an intensional entity, whereas a part of an individual appears to be. A day, in this view, is an extension; it is a unique, unrepeatable token, in no sense able to appear

and reappear as a whole at different times, nor appear as a whole in different locations at the same time.

There is of course a sense in which "day" is intensional. If by "Monday" I mean a recurring period of time (the first or second day of the week, depending on how you count) rather than a certain particular day, it is intensional. There are just seven days in this sense. Now, reconsider (11), repeated below:

(11) A cat runs across my lawn every day.

Now, there seems to be a reading of this on which (11) is equivalent to a conjunction of generic propositions, "A cat runs across my lawn (on) Sunday,....," "A cat runs across my lawn (on) Saturday", with each day-name interpreted intensionally. The reading that is missing, though, is the one where some bounded set of token days is quantified over (e.g. equivalent to a conjunction of propositions "A cat ran across my lawn yesterday, and ....., and the day before that...".)

In support, consider a case with the NP "every day" as the subject of a standard generic. Note, in (32), that the name of the day must be interpreted intensionally as the subject of a generic (I revert to the generic past "used to" construction to force an unambiguously generic interpretation):

(32) Sunday used to go by too quickly.

In (32) one cannot mean, for instance, last Sunday, but instead one means Sundays in general. In similar fashion, consider (33a) in contrast to (33b):

(33) a. Every Sunday used to go by too quickly.  
b. ??Every Sunday in the past month used to go by too quickly.

The reason (33b) seems strange is that it means that if x was a Sunday in the past month, x used to go by too quickly; this is the 'bounded' interpretation. But since x here does not take as values intensional entities (token days are not intensional), it cannot be the subject of a standard generic. (33a), on the other hand, is quite natural, though only on an unbounded intensional reading.

Turning to the clausal adverbials, a reasonably clear "bounded/unbounded" distinction is found there as well, and here, too, it is quite easy to understand the distinction as extensional/intensional. A temporal when

clause can have two interpretations; on the one hand it can point to a single instance, as in:

(34) John jumped when the fire alarm went off.

On the other hand, it can mean, roughly, "whenever", the interpretation most salient in (35):

(35) John eats when he gets hungry.

Some languages formally distinguish these two senses of "when" clauses (e.g. Scandinavian languages). In (34) a single token occurrence or instance is designated by the adverbial, whereas in (35) one could regard the adverbial as some function that picks out, with respect to a context, instances of John's being hungry. It is this latter, intensional reading that is the only one possible in the (generic) interpretation of (12c) repeated below--with the subject understood existentially:

(12) c. A little red light comes on when you push this button.

Other clausal adverbials work in similar fashion. It is significant that those adverbials which do not exhibit this same ambiguity in the simple present (e.g. "because, although, since" clauses, and examples of E. Williams (1975) 'level IV' adverbials, do not allow for generic readings in such cases. For example, (35a) is strange, while (36b), in the past tense and hence more readily interpretable as a nongeneric, seems quite natural:

(36) a. ??A little red light comes on because you push this button.  
b. A little red light came on because you pushed this button.

(One must take care not to confuse two distinct notions: that when (etc.) clauses are interpreted either extensionally or intensionally, and that the clauses themselves can be interpreted generically). See ter Meulen (1985) for an insightful discussion of conditionals and generics in a situation semantics framework.

Similarly, one finds apparently variable interpretation of gerunds and infinitives, discussed in Chierchia (1984). As subjects of nongeneric sentences, these are interpreted as designating token occurrences, as in (37):

(37) a. Riding on the merry-go-round is making Bill sick.  
b. Repairing Janet's bike took several hours.  
c. Getting a hand stuck in the snow-blower cost Bob two fingers.

In each case some particular token occurrence is understood as being designated by the subject of the sentence. In generic sentences, though, the interpretation takes on a more general quality, and does not attribute generic properties to token occurrences; instead, properties themselves seem designated:

- (38) a. Riding on a merry-go-round makes Bill sick.  
b. Repairing Janet's bike takes several hours.  
c. Getting a hand stuck in the snow-blower requires very little concentration.

This is the same pattern as the adverbials.

Before moving on to consideration of nonadverbial NP's, let us summarize momentarily. In each of the examples discussed so far, it was argued that in generic sentences the related constituent had to be interpreted intensionally. While extensional interpretations are available for each related constituent so far examined, they cannot function in the capacity of a related constituent if so interpreted. The reason proposed is that the meanings of gerunds and infinitives, of adverbial clauses and of adverbials like 'every day' at points of reference pick out pure extensions (token occurrences, token periods of time), and those extensions are not the kinds of things that can be generically related to something else.

When we turn to consideration of argument NP's, much the same pattern can be observed in certain instances. Consider examples of purely intensional NP's that arguably have no standard extensions, like the average American family (the one with 1.8 kids, for instance). Such NP's are impeccable as subjects of generics:

- (39) a. The average American family eats at MacDonald's twice a week.  
b. The average American family spends 17.3% of its income on food.  
c. The average American family watches television after dinner.

But these are highly questionable as subjects of nongenerics:

- (40) a. ?The average American family joined me for breakfast this morning.  
b. ?The average American family moved in next door.  
c. ?The average American family is sitting over there in the corner.<sup>6</sup>

So again, it is intensionality that seems essential for the related constituent in generics.

Consider bare plural and unmodified singular indefinite subjects of generics and episodics. Once we isolate them as the crucial elements in the generic, there is a clear relationship between genericness and intensionality. The "existential" reading of bare plural and singular indefinites corresponds to a pure extension (i.e. a stage) and thus cannot be the related element of a generic; but the "universal" reading corresponds to the "unbounded" or intensional reading here, and as such is suited to participating in the generic relation.

If we examine generics where the direct object is the related constituent, we can make a similar argument for a wider range of NP's. Some of the examples of object generics above require an intensional reading of the definite direct object, as in:

- (41) a. A computer computes the daily weather forecast.
- b. Cows give the milk that feeds this colony.
- c. Robots assemble the new cars.
- d. A master craftsman builds the houses in this subdivision.

The related nongeneric sentences, though, do not require such an intensional interpretation of the direct object NP.

When we examine still a wider range of NP's in generic sentences, though, the ingredient of intensionality appears no longer essential. If intensionality is so important in generic sentences, then it is natural to ask why this is not readily apparent from the examination of standard generics and the interpretations of their subjects. I think the reason is quite simple. If one holds that individuals are not intensional constructs, then many examples of what I have been calling 'generic' sentences appear to have extensional subjects.

- (42) a. John votes for Socialists.
- b. Mary smokes.
- c. The mayor of Cleveland drives a Ford.

However, if you make the (possibly non-standard) assumption that individuals are intensional constructs, and do not in and of themselves constitute extensional entities, the analysis can be maintained.

In order to sustain this general line of analysis, though, it is necessary to recognize two 'levels' of intensional analysis in the interpretation of certain NP's, such as universally quantified NP's. Consider the case of (43), adapted from Dahl (1975).

- (43) a. Every friend of John's votes for Socialists.  
b. Every friend of John's smokes.

On the intensional ("unbounded") reading of the subject NP, the sentence expresses a requirement for anyone who might be a friend of John's, and it applies to all John's potential friends as well as his present ones. This is the reading we fully expect if intensionality is a requirement for genericness. But then there is another reading, the "bounded" reading, in which it describes a (possibly accidental) common characteristic of all John's present friends (or some contextually-circumscribed subset of them). Consider a case where John has three friends, a, b, and c, and each votes for Socialists. This condition alone is sufficient to assert the bounded sense of (43). This condition, however, is not sufficient to assert the intensional or unbounded sense of (43), because voting for Socialists might simply be a sampling accident, and does not apply to John's potential friends. Even so, the interpretation is equivalent to the conjunction of three generic sentences, each asserting that x votes for Socialists, with x assigned a, b, and c as values.

Thus, one can establish that one generic interpretation of (43) has the so-called "bounded" reading of the subject NP as the designated element of the generic ((43b) assures us of this). However, the reason a generic reading is possible here is that each of John's friends, a, b, and c, is individually an intensional entity.<sup>7</sup>

Let me briefly outline what I would take to be the 'logical form' of the two generic readings of (43b). The "bounded" sense involves predicating the generic predicate 'smokes' of each of John's (present) friends in turn; this is the standard (restricted) quantificational analysis in (44).

(44)  $\forall x$ : **friend of John's** (x) [ [Gn(**smokes**)](x) ]

The "unbounded" generic reading, on the other hand, ascribes the generic property of smoking to the meaning of the NP "every friend of John's:"

(45) [Gn(**smokes**)](  $\forall x$ : **friend of John's** (x) )

These two readings are possible because there are two "levels" of intensionality in NP's such as these: the meaning of the NP itself, and the individuals quantified over at given points of reference. On the other hand, adverbials, gerunds and infinitives, and NP's like "every day" (on the token reading of "day") and proper names, in the examples above, exhibit but one "level" of intensionality, so similar bounded/unbounded ambiguities in the generic reading do not appear.

In some instances, the nature of the predicate of the sentence precludes the individual-level ("bounded") intensional reading of the generic. For instance, the object-generics of (41) above have only the reading where the generic property is related to the "unbounded" readings of the object NP's--where the NP meaning is the related constituent. But this does not hold for all object generics. Consider the examples of (46).

- (46) a. Vicious dogs protect Ft. Knox's gold.
- b. Slaves work Lower Slobbovia's salt mines.
- c. An oriental rug covers the dining room floor.

In each example of (46) an intensional reading is of course possible, but alongside we also find possibility of the "bounded" individual reading. What makes for the difference between the examples of (41) and (46)? Plainly, it is aspectual. The examples of (41) all contain verbs which are accomplishments, in Vendler's terminology (Vendler, 1967). These verbs, in the generic, do not readily take direct objects which denote single individuals, as the following examples attest:

- (47) a. John builds a cabin.
- b. A cow gives this quart of milk.
- c. A computer computes today's weather forecast (the one before us)
- d. Vincent paints a picture.

Each example in (47) requires some context if it is to be interpreted generically. (See H. Verkuyl (1985) for an analysis which deals with examples like (47).) From a cross-linguistic point of view, the examples of (41) are very much in line with the fact that one finds a consistent formal association between generic interpretations and imperfective aspect (as opposed to perfective aspect). It is quite common for imperfects, as opposed to perfects, to be the preferred if not the sole vehicle for expressing genericness (Carlson, 1980; Dahl, 1985; see also Declerck (1985)).

Let us now examine the example of (48):

(48) A master craftsman builds every house in this area.

This does have a clear generic reading (the preferred one being the one intended--with the subject NP interpreted existentially apparently within the scope of the universal in the object NP). Now let us suppose that there are, at present, three houses in the area: the Smiths', the Does', and the Nelsons'. Yet, it does not seem that (48) entails the generic sentence (49):

(49) A master craftsman builds the Smith's house.

Note further that (48) makes it sound like there are going to be more houses built in this area. Consider a case where the entire area has been developed--a completed house on each lot, with no more space for houses; under those circumstances (48) would be decidedly odd, making it sound as if more houses are planned. The point is that (48) is not to be analyzed as bounded universal quantification over individual houses, suggested by the representation in (50):

(50)  $\forall x$ : **house in this area** (x) [Gn( $\lambda y$  [**a master craftsman builds** y]) (x)]

This would entail the generic sentence (49), which (48) does not (in contrast, see (44) above). In contrast to (44) and the examples of the locatives in (7) (which are uniformly states and not accomplishments), the aspect of the predicate in (48) rules out the possibility of a "bounded" generic reading ascribing a generic predicate to individuals. Thus, anything along the lines of (50) is not appropriate. The "logical form" of (51) or perhaps (52) would appear much more promising:

(51) Gn( $\lambda y$ [**a master craftsman builds** y])( $\forall x$ :**house in this area** (x))

(52) Gn( $\lambda P$ [**a master craftsman builds** P])( $\forall x$ :**house in this area** (x))  
(where  $P$  is a variable over NP meanings)

In constructing a semantics for (51) or (52), one needs to keep in mind that (48) does in fact entail something or other about individual houses; setting aside an important qualification, (48) entails the non-generic sentence (53):

(53) A master craftsman built the Smiths' house.

(The qualification is that the generalization expressed in (48) had to be "in force" at the time the Smiths' house was built; it is not a contradiction to say that a master craftsman now builds every house in this subdivision, but

that Smiths' house, which is in this subdivision, was built before that policy took effect).

So, although many NP's have two "levels" of intensionality available for serving as the related constituents of generics, at least two factors may come into play to eliminate one of those possibilities. The common noun portion of the NP may not be of the appropriate sort (the token interpretation of "every day"), or the aspect of the predicate in the sentence may rule out the "bounded" individual reading.

6. Summary and Conclusions. Precisely how to implement these observations into a formal semantic theory remains well outside the scope of this paper. Nor have we even attempted to consider the entire range of "logical forms" that generic sentences might take on, concentrating on a only few of the variants without trying to map out the whole territory (see footnote 3). Nevertheless, we can draw some reasonable conclusions from this discussion about the shape any detailed analysis would have to take.

First, generics are not of uniform subject-predicate form; rather, a wider array of intensional elements may come into play instead of just the grammatical subject of the sentence, and even there the subject NP may combine to form a generic in two distinct ways; elements from discourse and possibly other facets of context may also be brought into play. This suggests quite strongly that generic interpretation is not associated with any single syntactic rule of the language, but at best with a range of such rules. And if the semantic theory is a strongly typed theory and closely associated with the syntax, it would appear that a range of types would enter into the generic relation, and not a single one.

Second, we have cause to hold that the meaning of a generic sentence stems fundamentally from a relation between intensional elements: any generic operator would have to be dyadic. It does not relate purely extensional elements to one another or to intensional elements, but only intensions to intensions. This entails that individuals be regarded as intensional, and that such NP's as "every friend of John's" be analyzed as having two levels of intensionality associated with it, one for the "unbounded" reading, and the other for the "bounded" reading. Such NP's as "every day," on the other hand, may have but one level of intensionality, depending on how "day" is interpreted.

And third, the generic relation would not appear to be a predicational one. The fact that adverbials can play the same type of role in generic interpretation as argument NP's suggests that the relation between matrix

(S, VP) and related element (eg. adverbials, NP, perhaps PP's) is not that of predication (i.e. being in the extension of a property), and that we should seek another relation that can hold for NP's and adverbials like "every day" and "when you pound on this wall" indifferently. In other words, if we assume that the extension of a property is a set of individuals, we cannot hold that a generic sentence involves predicating a generic property of an individual--not unless we are prepared to define "individual" so broadly as to virtually void the term of content, to include adverbials, NP-meanings, denotations of infinitives, etc. Precisely what this relation consists of if it is not predication, though, remains an open question.

### Footnotes

1. For an excellent overview and critique of formal theories of generics, see Schubert and Pelletier (1986).
2. This property is not essential as generics may be based on stative nongenerics; here, though, I deal with those based on nonstative predicates.
3. Terminology here should be clarified. The extension of an expression may consist of intensional elements at a given point of reference, and is an abbreviated way of talking about the denotation of an expression with respect to (wrt) given points of reference; on the other hand, if a construct is (ontologically) extensional or a pure extension, it cannot be an intensional construct as well.
4. Extending the list further typically requires dealing with more complex constructions in which make sure judgment of meaning difficult; complexity also makes increasingly difficult to factor out the discourse factors. So, for instance, in (i) an indirect object NP is the focus of our attention. The sentence seems to have a generic reading, but is this due to the NP itself, or is it due to the contextual interpolation of an implicit time adverbial? Are the subject and object NP's interpreted existentially? Is the indirect object interpreted intensionally?
  - i. A familiar person gives every child a present.While factors such as these do not make investigation impossible, it becomes difficult to consider a wide variety of such examples.
5. John Barwise pointed out the interest of such an analysis to me, but I do not know if he would endorse it. See Croft (1986) for further relevant discussion.

6. The example "The average American family watched the president on TV last night" does not seem so bad, though a nongeneric; whether such examples show the presumed analysis incorrect remains uncertain.

7. One might ask whether it is fair to call such examples as (19) 'generic'; terminologically, it is customary to distinguish such examples from those in which kinds or less controversially intensional NP's function as subjects by applying the label "habitual" to the former and "generic" to the latter only. I prefer to emphasize the similarities between "habituals" and "generics" by applying the same label; I am not particularly satisfied with the terminological imperialism inherent in my use of "generic" in its presently broad sense, but there is no appropriate alternative from either linguistics or philosophy for me to draw on. As for the substance of the distinction, in Carlson (1980 pp.97-8) I offer evidence that the two should be classed together. Furthermore, while numerous languages morphologically distinguish what I am calling "generics" here from nongenerics, few if any distinguish habituals from "generics" in the narrower (and more common) sense (see Dahl, 1985, and Carlson, 1980b). See Smith (1975) for a detailed lament over terminology, and for a wealth of data on generics.

### References

- Barwise, Jon, and John Perry (1983). Situations and Attitudes. Cambridge: MIT Press.
- Bolinger, Dwight (1970). 'The lexical value of "it",' Working Papers in Linguistics, University of Hawaii, pp. 57-76.
- Carlson, Greg N. (1977). 'A unified analysis of the English bare plural,' Linguistics and Philosophy 1:3, 413-56.
- \_\_\_\_\_ (1980a). Reference to Kinds in English. New York: Garland Publishing.
- \_\_\_\_\_ (1980b). 'Nomic morphemes,' paper presented at the Fourth Groningen Round Table, Groningen, the Netherlands.
- Chierchia, Gennaro (1984). 'Topics in the syntax and semantics of infinitives and gerunds,' unpublished University of Massachusetts Ph.D. dissertation.
- Croft, William (1986). "Universal quantifiers and generic expressions," Stanford University ms.
- Dahl, Osten (1975). 'On generics,' in E. Keenan (ed.) Formal Semantics of Natural Language. Cambridge: Cambridge University Press, 99-111.
- \_\_\_\_\_ (1985). Tense and aspect systems. Oxford: Basil Blackwell.

- Declerck, Renaat (1985). 'The manifold interpretations of generic sentences,' Catholic University of Leuven ms.
- Dowty, David (1979). Word meaning and Montague grammar. Dordrecht: D. Reidel Publishing.
- Farkas, Donka, and Yoko Sugioka (1983). "Restrictive if/when clauses," Linguistics and Philosophy 6:2, 225-58.
- Moravcsik, Julius and Dov Gabbay (1973). 'Sameness and individuation,' Journal of Philosophy 70, 513-26.
- Kratzer, Angelika (1977). "What 'must' and 'can' must and can mean," Linguistics and Philosophy 1:3, 337-55.
- ter Meulen, Alice (1985). "Generic information, conditional contexts, and constraints," in E. Traugott et al (eds), On Conditionals. Cambridge: Ambridge University Press.
- Milsark, Gary (1974). 'Existential sentences in English,' Unpublished M.I.T. Ph.D. dissertation.
- Roberts, Craige (1986). 'Modal subordination, anaphora, and distributivity,' unpublished University of Massachusetts Ph.D. dissertation.
- Schubert, Lenart, and F. Jeffry Pelletier (1986). "Problems in the representation of the logical form of generics, plurals, and mass nouns," in E. LePore (ed.) New Approaches to Semantics. New York: Academic Press.
- Smith, N.V. (1975). "On generics," Transactions of the Philological Society 1975, 27-48.
- Stump, Gregory (1981). "The formal semantics and pragmatics of free adjuncts and absolutes in English." Unpublished Ohio State University Ph.D. dissertation.
- \_\_\_\_\_ (1985). The semantic variability of absolute constructions. Dordrecht: D. Reidel Publishing.
- Vendler, Zeno (1967). Linguistics in philosophy. Ithaca: Cornell University Press.
- Verkuyl, H. J. (1985). "Nondurative closure of events," in J.A.G. Groenendijk et al (eds), Information, interpretation, and inference. Proceedings of the Fifth Amsterdam Colloquium. Dordrecht.
- Williams, Edwin (1975). 'Small clauses in English,' in J. Kimball (ed.) Syntax and Semantics Vol. 4, 249-74.



