

Generic Passages

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"Near the low house on the hill, with oaks on one side and apple trees on the other, my father would stand up, flourish his whip, and bring the bobsled up to the door with a burst of speed. There are no such arrivals any more..."

--Paul Engle

0. Introduction.

In this paper, we examine a body of data which has the potential to shed light simultaneously on the semantics of generic sentences, and on principles responsible for organizing sentences into coherent discourses.¹ The study of the semantics of generics, which has taken place not only in the framework of formal linguistic semantics but also has received much attention in various AI schemes, has to date largely concerned itself with the representations and interpretations assigned to single sentences. And, with some exceptions (most notably that of Roberts, 1987 and 1989), semantically-based work in the formal principles underlying discourse organization has focused on the structure and interpretation of ordinary narrative discourse. In this work, we explore instances of structures in which it is plausible that the notion of genericity applies to entire stretches of discourse. We focus on one particular type of discourse construction we refer to as "generic passages", and propose an account of the representations underlying the interpretations of these structures which makes use of theories of the semantics of genericity, and theories about the basic principles of the discourse organization of narrative. We couch our findings generally within a Discourse Representation Theory (DRT) framework (Kamp, 1981; Heim 1982).

What we will henceforth call "generic passages" come in two basic forms. The first, which will be the main focus of our attention, is exemplified in (1) and (2):

1. a. My grandmother used to bake the most wonderful pies on Saturdays.
 - b. She would go to the orchard on Shady Lane early in the morning.
 - c. She used to pick a basket each of apples and peaches.
 - d. Then she would go into the kitchen and shoo everyone else away.
 - e. About 4:00 an irresistible aroma wafted through the entire house.

2. a. John used to buy his wife Sally special presents for her birthday.
 - b. First, he would drive to the nearest mall.
 - c. Then he carefully surveyed all the jewelry stores.
 - d. Selecting the most appealing one, he would go in and look at earrings.
 - e. After much indecision, he would pick out expensive pair.
 - f. He would pay for them and ask the clerk to wrap them up.
 - g. Then he went home and gave them to Sally.

From an intuitive standpoint, these discourses present a type of recurring event in the first sentence, and then in the subsequent sentences explain in more detail how that event was accomplished. To our knowledge, discourses of this particular type have not received attention in the literature, aside from the remarks of Banfield (1982, 1985).² While examples (1) and (2) are presented in the past tense, as most of our examples will be, similar passages may be constructed in the present and future tenses as well.

We are going to refer to examples such as (1) and (2) as "subordinate" generic passages, which stand in contrast to 'conjunctive' generic passages of the type exemplified in (3) and (4):

3. Kenneth teaches children addition. Then Sarah teaches them subtraction.

4. John used to take a fast taxi to the airport just before his flight left. Then, he would cut in the line for the security check. He would hurry down the hallway to the airplane gate. He would barely get onto the plane before it took off.

Coordinate passages differ from subordinate passages in that the former omit presentation of the overall type of recurring event that is being explained in more detail. As the analysis of subordinate generic passages naturally carries over to the coordinate type, we are going to focus exclusively on the first until later in the paper.

The paper is organized as follows. After reviewing some of the basic properties of generic passages, we then turn to a brief development of the descriptive frameworks we presuppose for representing discourse structure and generics. Then, we present a preliminary analysis of generic passages putting these frameworks together, and review the problems it raises. In the final sections we develop a revised analysis which promises an account of the data presented in this paper. As we will see, our analysis will in many ways be similar to that of Roberts' treatment of modal subordination in discourse (Roberts, 1987, 1989), though differing in certain crucial respects.

1. Some preliminary observations.

In this section we survey, in a preliminary way, some of the basic characteristics of generic passages. A (subordinate) generic passage consists of two basic parts: first, the *summary sentence* which is the first sentence of the discourse (here, 1a and 2a), and then the remainder of the discourse which relates a series of events, which we will call the *episodic sequence* (here, 1b-e; 2 b-g). The episodic sequence typically relates a series of events in a temporal order, and as such is like

a typical narrative. Intuitively, the summary sentence defines the types of situations that the episodic sequence then expands on, giving much more detail about the character of those situations.

1.1 Summary sentences. First, consider the role of the summary sentence. A discourse cannot be interpreted as a subordinate generic passage unless it has a summary sentence at the beginning of that discourse segment. Thus we take it that a summary sentence is crucial to this particular discourse organization. The placement of the summary sentence anywhere but in first position does not seem to yield a generic passage. Placement in the middle, as in (5), does not yield a passage that is equivalent to (1); placement at the very end, as in (6), we also judge not to result in an equivalent passage:

5. b. Grandma used to go to the orchard on Shady Lane early in the morning.
 - c. She then used to pick a basket each of apples and peaches.
- a. My grandmother used to bake the most wonderful pies every Saturday.
 - d. Then she would go into the kitchen and shoo everyone else away.
 - e. About 4:00 an irresistible aroma wafted through the entire house.

6. b. Grandma used to go to the orchard on Shady Lane early in the morning.
 - c. She then used to pick a basket each of apples and peaches.
 - d. Then she would go into the kitchen and shoo everyone else away.
 - e. About 4:00 an irresistible aroma wafted through the entire house.
- a. My grandmother used to bake the most wonderful pies every Saturday.

Note that the type of event presented in the summary sentence (e.g. baking pies) may be understood to have a place in the actual order of events as discussed. In the case of (5), we would judge the actual baking of the pies to have actually occurred between steps (d) and (e). Still, to function as a summary sentence, it must be presented in the discourse in first position, rather than in the position

it would be judged to occupy in the order of events. For instance, placement of (a) between (d) and (e) yields a passage in which (a) is no longer the summary sentence.

Another characteristic of the summary sentence is that it must be a *generic* (or habitual) sentence. In (7) and (8), the first sentences are most easily interpreted episodically (i.e. as a report of a specific event that occurred at a certain time and place, rather than as some generalization over events), and so the passages are difficult to interpret in a way parallel to (1 and 2) if naturally interpretable at all.

7. a. My grandmother baked the most wonderful pies last Saturday.
b. She used to go to the orchard on Shady Lane early in the morning.
c. She then used to pick a basket each of apples and peaches.
d. Then she would go into the kitchen and shoed everyone else away.
e. About 4:00 an irresistible aroma wafted through the entire house.

8. a. John bought his wife Sally a special present for her birthday last night.
b. First, he would drive to the nearest mall.
c. Then he used to carefully survey all the jewelry stores.

....

However, if the summary sentence is obviously a generic, as the English phrase "used to" unambiguously indicates, then a generic passage reading once again emerges:

9. a. John used to buy his wife Sally special presents for her birthday.
b. First, he would drive to the nearest mall.
c. Then he used to carefully survey all the jewelry stores.

.....

It is crucial, then, for the initial sentence to be a generic. However, it has to be a generic that is derived from an episodic expression, and not one where the genericity is a part of the lexical content of the main predicate itself, as with the basic stative verbs like 'love' or individual-level adjectives like 'intelligent.' (see Chierchia, 1995) So, for instance, the initial sentence in the following example cannot function as a summary sentence since the verb 'like' is a basic generic:

10. a. *My grandmother used to like pies.*

b. She went to the orchard on Shady Lane early in the morning.

c. She then used to pick a basket each of apples and peaches.

d. Then she would go into the kitchen and shoo everyone else away.

e. About 4:00 an irresistible aroma wafted through the entire house.

Consider the following examples by way of contrast. If something is fragile, it breaks easily, but the word "fragile" does not have an accessible internal structure of the form "breaks easily" (a series of independent tests can verify this claim; for instance, something can break easily with a hammer, but the phrase "fragile with a hammer" has no such meaning). Thus, (12), in contrast to (11), should not be easily read as a generic passage; our judgments sustain this prediction:

11. Our old piano used to break very easily. First, it began to creak. Then a board used to fall off the underside. Finally, some strings popped.

12. ??Our old piano was very fragile. First, it began to creak. Then a board used to fall off the underside. Finally, some strings would pop.

One final fact we are going to point out about the summary sentence is that it is possible for only a portion of the initial sentence to function as the 'summary sentence'. Consider the following examples of sentences that are capable of serving as summary sentences for example (1):

13. a. Grandma was an avid fruit-grower who used to bake the most delicious pies every Saturday....
- b. Sam says his grandma used to bake the world's most wonderful pies every Saturday....
- c. Grandma was an avid pie-baker...

The representation of the summary sentence must only contain a generic somewhere within it from which the type of situation expanded on by the episodic sequence can be recovered. There is no algorithm for recovering a *unique* episodic from an arbitrary generic sentence; for the remainder of this paper we will be setting aside the question of how to derive the summary event.

1.2. The episodic sequence.

1.2.1 Temporal relations. We now move from consideration of the summary sentence to the remainder of the generic passage, which we call the episodic sequence. The episodic sequence in a generic passages is a sequence of episodic events, not unlike a typical narrative. The use of adverbs such as 'then', 'next', 'after that', and so forth, clearly signals temporal relationships between particular events.

14. a. My grandmother used to bake the most wonderful pies on Saturdays.
- b. *First*, she went to the orchard on Shady Lane early in the morning.
- c. She used to *then* pick a basket each of apples and peaches.
- d. *Next*, she would go into the kitchen and shoo everyone else away.
- e. *After that*, about 4:00, an irresistible aroma wafted through the entire house.

The episodic sequence forms a coherent unit that depends on the preservation of the temporal relations among the events in the sequence. At first sight, the episodic sequence would seem to form a narrative of the type studied extensively in Kamp and Rohrer (1983), Partee (1984), Hinrichs (1986), and elsewhere. In fact, the episodic sequence is best understood as an ordinary narrative of this sort, but in the sections below we will point out the differences between the episodic sequence in generic passages and ordinary narratives that must also be accounted for.

Anticipating further discussion below, we point out that the episodic sequence involves temporal relations among *events*. Consider, by way of contrast, the example in (15). Here, a generic state (15d) intuitively "breaks" the temporal flow of the episodic sequence:

15. a. My grandmother used to bake the most wonderful pies every Saturday.
 - b. She used to go to the orchard on Shady Lane early in the morning.
 - c. She then used to pick a basket each of apples and peaches.
- d. My grandmother was an active woman who loved physical exertion.
 - e. Then she would go into the kitchen and shooed everyone else away.
 - f. About 4:00 an irresistible aroma wafted through the entire house.

Note that the 'then' in (15e) is read as meaning that the event expressed in (15e) immediately follows the event in (15c), and not (15d), which we will say does not form a *part* of the episodic sequence itself. Examples like (15d), which do not semantically participate in the temporal relations of the episodic sequence, but which syntactically appear within the sequence of sentences presented in discourse, we will call "intrusive".

1.2.2 Intensionality. It's fairly clear that the episodic sequence is entirely within an intensional context. Any NP position within the episodic sequence of a generic passage is an intensional

position (here, for simplicity of exposition, we shift to a consideration of present tense generic passages in order to prevent the past tense from introducing reference shifts). Now, let us assume that the linguist currently the editor of *LI Squibs* is Peter, the current copy of *LI* is the December '95 copy, and that the current holder of the (hypothetical) Nobel prize for Linguistics is Mary. The following passages are not equivalent:

16. Mike makes vicious and stupid remarks at linguistics conferences. First, he accuses the editor of *LI squibs* of doing a dreadful job of reviewing. Then he berates the articles in the current copy of *LI*. Finally he heaps scorn on the current holder of the Nobel prize for Linguistics, and storms from the room in a huff.

17. Mike makes vicious and stupid remarks at linguistics conferences. First, he accuses Peter of doing a dreadful job of reviewing. Then he berates the articles in the December '95 copy of *LI*. Finally he heaps scorn on Mary, and storms from the room in a huff.

The lack of equivalence between these is indicative of a global intensionality in the episodic sequence that any adequate analysis needs to take into account. The summary sentence, too, is going to show evidence of intensionality, being a generic in its own right. Consider, for instance, a brief narrative like (18):

18. Sam takes guests to the most expensive restaurant in Chicago. First, he pretentiously makes reservations under some fabricated French name. Next, he calls a limousine instead of a cab like anyone else would. Upon arrival, he overtips the maitre d' and pretends to know him. Finally, he orders the most expensive food and wine for everyone.

Suppose now that the restaurant considered the most expensive restaurant in Chicago varies monthly, but now it is Chuck's Place. Is the entire episodic sequence then about Chuck's Place, or

can the identity of the particular restaurant vary? It seems to us that it can vary, and that the identity of the particular restaurant is not fixed in the episodic sequence once and for all. This line of reasoning leads to the conclusion that the entire generic passage falls within an intensional context.

1.2.3. Generic markers. Another difference between the episodic sequence in a generic passage and an ordinary narrative is the possible presence of generic markers. Formally, generic and episodic sentences in English and many other languages are not systematically differentiated in terms of their forms (but see Dahl, 1985, 1995, for a detailed discussion). In English, many sentences, such as those in (19), are ambiguous out of context between an episodic and a generic interpretation:

19. a. Sam will write with his left hand.
b. Max ate lunch at Rooney's cafe.
c. If *Alice washes her car on the weekend*, then we will all be happy.

In each case, there is a way of interpreting the sentence as a general statement, or as a specific statement about a specific event occurring at a unique time and place. Certain markers, though, can disambiguate or clearly favor one or the other. Point-time adverbs, for instance, generally disambiguate in favor of an episodic reading:

20. a. Sam will write with his left hand *in a few moments*.
b. Max ate lunch at Rooney's cafe *yesterday*.
c. If Alice washes her car *at 3:00 tomorrow*, then we will all be happy.

In general, the English simple present tense favors a generic reading:

21. Max eats lunch at Rooney's cafe.

(An episodic reading of (21), which is not salient, would be the "reportive" use of the present tense.)

Future tense generics are usually a little hard to construct naturally because they usually have the flavor of a prediction. Past tense generics are far more common, and past tense sentences out of context are quite often potentially ambiguous between a generic and an episodic reading. The feature of past tense generics of special interest is that English, like so many other languages, has an expressly formal indication of past genericity: the 'used to' construction. The sentences of (22) appear no longer ambiguous between an episodic and a generic reading:

- 22.a. Max *used to* eat lunch at Rooney's cafe.
- b. Mary *used to* write with her left hand.
- c. My neighbor *used to* wash her car on the weekend.

Another formal indicator of genericity is the modal 'would' (which may also indicate contrafactuality, but this reading is easily distinguished). We assume that 'would' is the morphological past tense of the present form 'will' which marks dispositional sentences in the present; however, the form 'will' doubles as a future marker, whereas 'would' does not, aside from sequence-of-tense contexts.

- 23. a. Max *would* eat lunch at Rooney's cafe.
- b. Mary *would* write with her left hand.
- c. My neighbor *would* wash her car on the weekend.

Thus, 'would' and 'used to' disambiguate sentences that might otherwise have both generic and episodic readings (why 'would' in these cases may sound incomplete, in contrast to 'used to', is discussed in section 6.4 below).

As previous examples of generic passages attest, 'used to' and 'would' occur quite naturally in the episodic sequence, whereas they may not occur in ordinary narratives preserving the temporal relations among events. It appears that, style aside, grammar allows for 'would' and 'used to' to appear, mixed and matched, alongside of simple past tenses, in the episodic sequence. Consider, by way of example, the following:

24. a. My grandmother *used to* bake the most wonderful pies every Saturday.

b. She *went* to the orchard on Shady Lane early in the morning.

c. She then *used to* pick a basket each of apples and peaches.

d. Then she *would* go into the kitchen and shoo everyone else away.

e. About 4:00 an irresistible aroma *wafted* through the entire house.

25. a. My grandmother baked the most wonderful pies every Saturday.

b. She *used to* go to the orchard on Shady Lane early in the morning.

c. She then *would* pick a basket each of apples and peaches.

d. Then she *went* into the kitchen and shooed everyone else away.

e. About 4:00 an irresistible aroma *would* waft through the entire house.

We also note that facts from languages other than English fall very much into line. For instance, in Romance languages, the imperfective aspect either may or must be used in the episodic sequence, though with perfective meaning, the imperfective being a marker of genericity. In Lithuanian, which has a frequentitive marker (a type of generic), the frequentitive is permitted in the episodic sequence as well as other aspects.³ While our knowledge of how generic passages work in other languages is by no means broad, it is certainly no accidental fact of English that unequivocally generic morphology may appear within the episodic sequence of generic passages.

1.1.3. *Frequency adverbs*. As examples like (26) clearly show, sentences in the episodic sequence may occur with frequency adverbs in them.

26. a. My grandmother used to bake the most wonderful pies every Saturday.
b. She went to the orchard on Shady Lane early in the morning.
c. She then *usually* picked a basket each of apples and peaches.
d. Then she would *always* go into the kitchen and shoo everyone else away.
e. She would bake about half a dozen pies.
f. About 4:00 an irresistible aroma *usually* wafted through the entire house.

With an ordinary narrative, on the other hand, such frequency adverbs would "stop" the action, disrupting the temporal flow among events. Contrast (27) to the episodic sequence of (26):

27. Grandma went to the orchard on Shady Lane early this morning. She picked a basket each of apples and peaches. She *always* went into the kitchen and shooed everyone away. She baked about a half dozen pies. About 4:00 an irresistible aroma *usually* wafted through the entire house.

If one removes the frequency adverbs from (27), an ordinary narrative passage emerges. However, in the context of a generic passage, the frequency adverbs do not disrupt the temporal relations among events in this same way.⁴

2. Framework of analysis

With this set of basic observations in mind, we are now going to embark on a digression, returning to generic passages again in section 3. In this section we lay the groundwork for analyzing generic passages as the result of the natural interaction of two independent factors: the analysis of narrative,

and the analysis of generic sentences. In general we adopt the basic assumptions of DRT-based work, with some modifications.

2.1 Temporal subordination and coordination. We will first look at one of the discourse aspects of generic passages, and consider a general way of analyzing the actual layout of events that is described by a generic passage, without regard for the generic factor.

A generic passage describes a series of similar occasions, each of which is (typically) composed of several events. For instance, each occasion might be that of a pie-baking by grandma. Let us assume a simplified case in which the series of events is the same on each occasion. We get an overall picture something like this:

Occasion n	Occasion n+1	Occasion n+x
-----	-----	-----
event 1	event 1		event 1
event 2	event 2		event 2
...	
event y	event y		event y

What we have, then, is a sequence of events 1 through y, then another sequence of events 1 through y, and so on, where we assume that coindexed events are all of the same type. What we do not get is a series of occurrences of event 1 followed by a series of occurrences of event 2 and so on. In a layout like this, there are three different kinds of relations we need to keep track of: first, how the occasions (that is, a sequence of events) relate to one another; typically they are spread out over time and are fairly independent from one another. With a summary sentence like "Grandma used to bake pies every Saturday", there will be one occasion of pie-baking each Saturday over some period of time. This first factor is to be accounted for in the generics domain, which we will postpone

looking at for the moment. Basically, it comes down to the same types of questions one encounters in habitual sentences like "John feeds the dog cat food", where one asks how many occasions this must occur on in order to support the truth of the statement.

But for now, we concentrate on the two kinds of relations among events that are present *within* a given occasion. The first of these is the relation between the overall occasion and each sub-event, expressed by the summary sentence on the one hand, and the episodic sequence on the other. This would indicate, for instance, how a given event of going to the orchard relates to an overall pie-baking occasion. The second of these two is the set of relations among the sub-events themselves (i.e. the members of the episodic sequence). This includes accounting for what events preceded and followed which other events within a given occasion. We will begin our analysis by representing these last two factors in a slight variant of a DRT framework, and then we will look at how to genericize this set of relations.

2.1.1 Temporal Subordination. Spejewski and Carlson (1992, 1993) and Spejewski (1994), based on work by Polanyi (1985, 1986, 1988), Hinrichs (1986), Partee (1984), Kamp and Rohrer (1983), Webber (1988, 1991), Lascarides and Asher (1991, 1993), ter Meulen (1995), Grosz and Sidner (1988), Moens and Steedman (1988), and others, develop an analysis of temporal subordination in discourse. There are two main parts to the analysis. The first is a common assumption made in many temporal theories of discourse, which is that whenever an event is introduced in a discourse, there are two different discourse entities introduced: an event variable and a reference time variable.⁵ On this analysis, the event variable represents the actual time during which a particular event occurred, and the reference time variable is a larger more encompassing timespan within which the event is understood to occur, given the linguistic context. This timespan may be overtly constrained by an adverb or other linguistic expression, or it may be unspecified by the overt context. For instance, if one says, "Yesterday, Bill drove to Syracuse," the adverb 'yesterday' demarcates a stretch of time, and such a trip of Bill's must have occurred somewhere within that

time; in saying simply "Bill drove to Syracuse", on the other hand, some such time is implicitly introduced.

There are reference times which are associated with events, and additional reference times that are introduced explicitly by temporal adverbials. Furthermore, as in Hinrichs and Partee, the discourse itself is considered to introduce a reference time, which we designate with R_0 . In their system, R_0 was the grounding point for the first event in the discourse; all other events were then grounded in a preceding event. In our system, R_0 is the grounding point for the entire discourse, but in a different way: it is the timespan that covers the entire temporal content of the discourse. We will see shortly how this holds the temporal structure together.

The basic relation between an event and its associated reference time is that of containment. We use the following tree-type notation to represent this:

$$\begin{array}{c} R \\ | \\ e \end{array}$$

This notation is equivalent to the common DRT relation $[e \sqsubseteq R]$, where R is a discourse entity, except that this notation encodes the further relation of immediate dominance, that is $\square \square R' [R \sqsubseteq R \ \& \ e \sqsubseteq R']$. Since this tree-type notation will be uniquely recoverable from any more familiar formulaic representations we encounter in the course of this paper, we will use the notation most perspicuous for our purposes. Reference times are conceptually construed as discourse entities that map to timespans of whatever length is appropriate for the discourse; we will say a bit more about them further below.

The next thing we need to specify is how to relate events to other events. This element of the subordination theory is drawn in large part from Hinrichs and Partee. One leading claim is that event variables are (almost) never related directly to one another. Rather, temporal relations between

events are typically specified as relations between their associated reference times.⁶ It is very simple to specify what kinds of indirect relations may hold between two events, because the claim is that there are only two possibilities: temporal subordination and temporal coordination (see also Polanyi (1986)). Every temporal relation between events can be specified as one of these two types, or a chain of relations of these two types through other events and reference times. Hinrichs' and Partee's approach locates an event within a reference time, as we have done, and then they relate a subsequent reference time to the most recently-introduced event. However, they were dealing with a limited type of data, in which the events are understood to have occurred in the same order as they are presented in the discourse, one after another. We wish to describe a wider range of data, in which events may occur in a variety of orders other than order of presentation.

The kind of relation in which events are understood to have unfolded in the same order in which they appear in the discourse is a case of temporal coordination. In coordination, each event introduces a reference time, and then these reference times are specified as occurring one after the other. Supposing that these are the first two events in the discourse, as in (28) below, then each reference time would be grounded, or contained, in the discourse reference time, R_0 . In DRT-type specifications, this would be represented as the following set of relations:

28. Jacob sat down in his favorite chair (e_1). He noticed a strange stain on the carpet (e_2).

$e_1 \sqsubset R_1$

$R_1 \sqsubset R_0$

$e_2 \sqsubset R_2$

$R_2 \sqsubset R_0$

$R_1 < R_2$

This can be schematically displayed as a tree-like diagram, using the daughter relation as we did above to indicate containment, and using the symbol "<" to mean "(wholly) precedes":

(insert fig 1 here)

The coordination relation can also hold without the overt specification of an ordering between the reference times. It may not be clear from the discourse what particular order the events occurred in, as in the context of a list of things someone did yesterday. This is what we will call a "grab-bag" interpretation, as is the most salient interpretation of (29).

29. Bob played golf (yesterday). Mary went to an art festival.

What is clear in this case is that the events are temporally independent of one another. While playing golf and attending the festival may have occurred more or less simultaneously in (30), it's also possible that the first happened before the second, or the second before the first. The discourse structure itself does not restrict the possibilities. A "grab-bag" interpretation is represented as follows (taking e_1 to be playing golf, and e_2 attending the art festival):

(insert fig 2 here)

In contrast to temporal coordination, temporal subordination has the opposite effect, creating a temporal dependence of one event upon another event. The paradigm case of subordination is event decomposition. This is where one clause introduces some general event, and a subsequent clause gives a smaller piece of that general event. For instance, I say that I wrote a paper on temporal relations, and then I say that I included a paragraph on aspectual classes. It is not really possible to separate these two events from one another, because the second event is part of the first and thus logically dependent. Linguistic structures can also create such dependencies through such devices as 'when' sentences, which have been determined to indicate some temporal dependence from

the speaker's point of view (Ritchie, 1979, Moens and Steedman 1988, Spejewski and Carlson 1992, Sandström, 1993).

If an event e_2 is subordinate to an event e_1 , then the relationship between their reference times is one of containment: the reference time of e_2 is contained within the reference time of e_1 . Since each event is contained within its own reference time, this relation can be represented as follows:

(insert fig 3 here)

The subordination relation as specified here allows for the events themselves to occur in a variety of possible orderings: $e_1 < e_2$, $e_1 > e_2$, $e_1 \sqsubseteq e_2$. That is, from the standpoint of the temporal relations between the events themselves, subordination is as unconstraining as the "grab-bag" variety of coordination. Thus, subordination itself does not mandate a particular ordering between superordinate and subordinate event, but world knowledge and/or pragmatics is the source of these intuitions when any such is available. In some cases, world knowledge is quite specific. If you say "John painted the bed. He bought a can of latex enamel/he brushed the paint on smoothly/he cleaned the brushes with kerosene", we know that buying paint precedes painting, that applying paint is a part of painting, and that cleaning brushes normally occurs after painting, yet on our analysis all are instances of interpretations of the same subordination relation. In contrast, consider the following sentence:

30. Jean baked a Prussian almond-paste pie. She added a light oregano topping.

Here, the adding of the topping could easily have occurred prior to, during, or after the actual baking had taken place, and given the bizarre pie being baked, world knowledge is of little help.

What distinguishes coordination and subordination, then, is the temporal relations that hold between the reference times of the events, and not the events themselves. We do not have a general statement

to offer of the precise semantic relations that characterize subordination vs. coordination, nor is there anything comprehensive to draw on in the existing literature. However, subordination encompasses types of entailments that have been discussed extensively in the literature. For instance, Moens and Steedman (1988), Molendijk (1993), and others discuss how what we are calling subordinate events are related to what we are calling here the superordinate event by virtue of characterizing (a) a part of the preparatory period (b) a decomposition of the event itself, or (c) characterizing a part of the consequence period. For coordination, Lascarides and Asher (1993), for instance, suggest a number of relations, including causation, explanation, logical consequence, and so forth. However, we see these (and others) as types of entailments that follow from, or are consistent with, the two general types of discourse structures presented here.⁷

We need to add one more type of relation, which is a mixture of the two discussed above.

Spejewski (1994) discusses a particular sort of coordination of events, which we will here call *conjoined* events (though this does not directly correspond to syntactic conjunction). Conjoined events are coordinated under a common reference time which is the fusion of the reference times of the constituent events, immediately dominating an event which is the fusion of the constituent events themselves. Here, we are implicitly assuming a lattice structure for events such that if e_m and e_n are events, then $e_m \oplus e_n$ is also an event (e.g. Krifka, 1989). The structure resulting from the conjoining of coordinated events is actually a type of subordination structure which is pictorially represented as follows:

(insert fig 4 here)

We take R_1 here to be the temporal interval that results from $R_m + R_n$. While this is illustrated with the simplest case of two events, we are not aware of any principled limits on how many events can be so conjoined. This structure is motivated in part by the ability of singular anaphoric expression to refer back to what plausibly seems to be two events in some sense rolled into one:

31. Jerry chased the dog from the room. Then, he locked the door. *This* upset Alice very much.

The reading of interest is where Alice is not upset with the dog being chased out of the room, nor with the door being locked, but rather the entire sequence of actions. More directly motivating this structure is the observation that an event or sequence of coordinated events can be discourse subordinated to two or even more events in some sense simultaneously. Consider the following:

32. Mary painted the living room. Then, she painted the basement bathroom. She used one gallon of white latex paint.

Note here that the event of using one gallon of paint can easily be understood as a part of both the living-room and bathroom-painting events, and thus is subordinate in some sense to both events. We are going to take it that a proper analysis of this short passage treats the entire sequence as subordinate to the fusion of the first two events. Later on, we'll see a further need for these sorts of structures in section 6.

When a discourse consists of many sentences, as is the usual case, an event being added may simultaneously enter into the coordination relation with certain events in the discourse, and the subordination relation with other elements. Consider the discourse in (33).

33. Mary fixed some turnips yesterday. (e_1) She peeled them with a paring knife. (e_2)
Then she put them in boiling water. (e_3)

When the final event (e_3) is added, it becomes coordinated to e_2 but at the same time becomes subordinated to e_1 . This would be represented as follows.

(insert fig 5 here)

We do not determine prior to incorporation what relation should be specified for an "incoming" event--for instance, an e_3 could have been subordinated to e_2 or conjoined to R_1 instead, with different semantic consequences. However, the choice of placement, while potentially ambiguous at any given point in the discourse, is not entirely free. We assume, along with Polanyi (1986) and Webber (1991), that the discourse representation includes a specification of 'open' and 'closed' nodes, and that any node on the 'right frontier' as defined by Webber is available for attachment (in the above diagram, it would be R_1 , R_3 , and e_3).

Along with the temporal structure of a discourse, inferential processes (possibly in parallel to or acting on the temporal relations) assign the various intensional relations, including rhetorical relations, to the event-relations; pragmatics may dictate further refinement of the precise temporal relations. (For example, if I tell you on a given day John ate breakfast, and he ate lunch, we know the breakfast came earlier than the lunch.) But we do not take this additional information as being directly represented in the discourse structure itself (in contrast to Mann and Thompson (1983), Thompson and Mann (1987), for instance).⁸

It should now be fairly easy to see how the structure of a single occasion from a generic passage would be analyzed in this framework. The overall event or situation introduced by the summary sentence serves as the superordinate event for the rest of the events, which make up the episodic sequence; each sub-event enters into the subordination relation with the overall event. The events within the episodic sequence may be related to one another by any combination of subordination and coordination. Our initial generic passage in (1), repeated here

1. a. My grandmother used to bake the most wonderful pies on Saturdays.

- b. She went to the orchard on Shady Lane early in the morning.
- c. She used to then pick a basket each of apples and peaches.
- d. Then she would go into the kitchen and shoo everyone else away.
- e. About 4:00 an irresistible aroma wafted through the entire house.

can be represented as follows:

(insert fig 6 here)

This gives us the temporal structure for a single occasion of the generic event, though we have yet to discuss exactly how to recover this structure from the actual discourse. The next step will be to genericize this whole structure, which turns out to be more complex than simply treating the whole sequence as a single event and applying the generic operator. The next section will review some basics of the analysis of generics and then turn to particular problems in applying this analysis to generic passages.

2.2 Generics. We have already mentioned the distinction between generic and episodic sentences. Generics include generalizations not only about types and kinds, but also about individuals and their habitual actions. In this section, we briefly present the outlines of the analysis of generics we will be assuming for the remainder of this paper.

In English, as in most other languages, sentences headed by main verbs may have a generic or non-generic reading, (e.g. see Dahl, 1975, Carlson, 1980). We assume that the episodic interpretation of a sentence is the basic interpretation, and that generic interpretations result from the addition of a generic operator to the more basic episodic interpretation. Thus, we say that episodic verbs allow for the introduction of a generic operator into the sentence. However, there is a class of verbs which does not exhibit a similar ambiguity; these are the 'stative' verbs such as 'know', 'weigh', 'cost', 'love',

and so forth. It turns out that these 'stative' verbs share much in common with generic sentences based on non-stative verbs (see Chierchia, 1995). Our analysis is going to invoke what we take to be a commonly-accepted view of generics, one which requires the partition of the sentence into a Restrictor-Matrix arrangement, the two being related by a generic operator GEN in a "tripartite" structure (Carlson, 1989, Partee, 1995, Diesing, 1992, Krifka et al, 1995). At the moment, deciding precisely which parts of the sentence should be assigned to the matrix and which to the restrictor remains something of an inexact science. In general, however, there is agreement that generic sentences require this division. Most typically, it appears as if the subject NP forms a part of the restrictor and the VP the matrix in such examples as the following:

34. a. Lions/ have tails.

b. Children who stray from their parents/ become frightened.

In some other examples, though, the restrictor-matrix division does not follow the subject-predicate division:

35. a. An alarm goes off/ when someone walks through this beam of light.

b. Typhoons arise/ in this part of the Pacific.

c. A computer computes/ the daily weather forecast.

The subject-predicate reading for the examples of (35) would attribute the predicate to "typical" instances of the subject (e.g. (35c) would mean that it's typical of computers to compute the daily weather forecast), whereas the divisions indicated in (35) designate their more plausible interpretations. It is not clear in general how to determine when a sentence should be divided up as in (34) or in the various ways of (35). Our representation of the generic operator GEN will, in outline, be as follows:

(insert fig 7 here)

(Or, to save space, we will often use: GEN [RESTRICTOR] [MATRIX] as an equivalent notation.) The provisional interpretation we associate with this configuration is largely borrowed from Krifka (1987) and Krifka et al (1995). We say "provisional" because there is an intensional component of genericity responsible for the "default" nature of generics that remain unaccounted for here; however, in the data we examine, the following account will do.

GEN [Restrictor] [Matrix] is true iff:

MOST $x_i \dots x_m$ ($\dots x_i \dots x_m \dots$) ($\square x_n \dots x_{n+j}$ [$\dots x_i \dots x_m \dots x_n \dots x_{n+j} \dots$])

Where the variables are discourse markers contained in the matrix and restrictor. We assume the GEN operator to be present in every generic sentence, whatever the sentence's syntactic or morphological makeup.

3. A first analysis

Let us now return to generic passages themselves. In this section, we are first going to pursue what we take to be the simplest analysis of generic passages, which is to treat the episodic sequence as an ordinary narrative in an intensional context. In critiquing this first-pass analysis, we will make a number of observations which, we believe, lead us to a more adequate analysis once all is taken into account.

3.1. A "single global operator" analysis. We begin by noting two parallels to help motivate this analysis. The first parallel we note is that there are corresponding generic and non-generic

passages. For instance, (36), on the appropriate interpretation, would appear to be the non-generic counterpart of (37):

36. Jane got up early this morning. She brushed her hair. Then she got dressed. Her husband cooked her a breakfast of eggs and toast.

37. Jane used to get up early in the morning. She brushed her hair. Then she got dressed. Her husband cooked her a breakfast of eggs and toast.

The most obvious difference between them is that in (36) the first sentence is non-generic, whereas in (37) it is generic. This difference alone could well be responsible for the natural interpretation of (37), where the sequence of events related in the episodic sequence occurred repeatedly in the past, whereas in (36) that sequence is reported to have occurred this morning. This notion of "repeatedness" is a typical characteristic of habitual generic sentences: "John walks to school" intuitively asserts or has implications of repeated walking events, for instance. So we are going to assume for the time being that the intensionality in generic passages can somehow be attributed to the presence of a generic operator found in the summary sentence.

The other parallel we wish to draw is between generic passages and genericized 'when' sentences. What we hope to do is to show a parallel between the interpretation of a 'when' sentence and the interpretation of a generic passage. A two-sentence narrative may, at times, be paraphraseable by a 'when' sentence. If we take a very short narrative passage, such as (38), we get an equivalent relations between events expressed in (39), with 'when':

38. John filled out the application form (e_1). In the slot for "occupation" he put "gardener" (e_2).

39. When John filled out the application form (e_1), in the slot for "occupation" he put "gardener" (e_2).

In addition, 'when' can also occur in a generic sentence, as in (41). This generic happens to be a close paraphrase of the generic passage in (40). These are not exact paraphrases, of course, because there are presuppositional differences between the examples in (38) and (39), and between (40) and (41), that we are setting aside to concentrate on the temporal relations that are understood to hold between the various events expressed.

40. John did the family grocery shopping (e.g. for years). He would buy 3 pounds of bananas.

41. When John did the family grocery shopping, he would buy 3 pounds of bananas.

In these examples, the relationship between the two different events is the same--in these cases, it is event decomposition: buying the bananas is a part of doing the shopping. This is one of the ways that events may be related by 'when'. The 'when' relationship more generally has been described as asymmetric (Sandström, 1993), such that the event of the 'when' clause is independent and the event of the main clause has some temporal or logical dependence on the 'when'-clause event; in our terms, 'when' signifies a case of temporal subordination. Spejewski and Carlson (1991) analyze 'when' as inducing temporal subordination between the two events in the 'when' sentence, as outlined in section 2.1. Now if 'when' induces temporal subordination, and a generic passage can be paraphrased by 'when', at least in terms of temporal relations, then all the sentences/discourses have in common a component representing subordination of the event in the second clause to that in the first.

'When' constructions have been previously discussed in a DRT framework, both in their episodic and in their generic versions (e.g. Partee, 1984), and this will give us a start to handling the generic

aspect of generic passages. A simple generic 'when' sentence can easily be broken into a restrictor and a matrix: the 'when' clause can serve as the restrictor and the main clause as the matrix.⁹ Using the analysis presented in 2.2, the representation for a generic 'when' clause comes out as a first approximation to:

GEN ['when'-clause] [main clause]

We have noted that the summary sentence of the generic passage corresponds to the 'when' clause of a 'when' sentence, so the summary sentence would typically dictate the contents of the left-hand box, and then the summary sentence plus episodic part would be contained in the right-hand box.

But what happens if we have more than two clauses in our generic passage, as in our lead example (1)? Again, we can take our cue from 'when' sentences. Note that our example (1) is paraphraseable by a lengthy single "when" sentence:

42. When grandma used to bake pies, she first went to the orchard, and then would pick some apples and peaches, and then returned home, and shoed us from the kitchen, and around 4 pm the pies would come out of the oven.

Note also that the conjunction of events in the main clause can be "broken" and presented in whole (as in (1)) or in part (as in (43)) as independent sentences:

43. When grandma used to bake pies, she first went to the orchard, and then would pick some apples and peaches. Then she returned home, and shoed us from the kitchen. Around 4 pm the pies would come out of the oven.

(de Swart (1991,p. 236) also notes a multi-sentence 'when' structure like this with respect to temporal quantifiers, though gives no specific analysis.) If we apply the analysis of generic 'when' clauses discussed above to (42), and if we assume that the conjoined sentences of the main clause form a syntactic constituent that the 'when' clause modifies, we end up with a structure for (42) that looks like the following:

GEN ['when' clause] [S₁ & S₂ &...S_n]

Our provisional claim is that this is also, in outline, the analysis of the generic passage in (1), with the material recovered from the summary sentence taking the place of the 'when' clause in the restrictor of the GEN operator. Since additional sentences added to the episodic sequence would also be paraphraseable by further conjuncts in a generic 'when' sentence, it is, in principle, easy to see how the analysis would account for passages of any length. We call this approach the "single global operator" approach, since it posits a single generic operator for the entire passage, and places the contents of what corresponds to the 'when' clause in the restrictor, and the rest in the matrix.

4. Evaluation of the single global operator analysis

This analysis has many promising features, even if it does leave a number of questions unanswered. First, it encodes the simplest assumption we think can be made about the episodic sequence in generic passages: that they are ordinary narratives. Second, since the whole passage is within the scope of the intensionalizing GEN operator, the intensionality phenomena would seem accounted for. Third, the temporal and other relations between the sentences in the sequence are easily accounted for along the lines of existing analyses since they are all from an ordinary narrative.

However, in section 1 we noted *prima facie* cause to think that each sentence of the episodic sequence should be analyzed as a generic sentence. Particularly persuasive is the fact that in

English and other languages, the sentences of the episodic sequence can bear what is normally disambiguating overt indications of genericity--e.g. the presence of "used to" English, or imperfectives in Romance, or frequentitives in languages such as Lithuanian. However, there also seems little question that the sentences of the episodic sequence introduce events that are related to other events introduced in the sequence, which is what we would expect if the sequence were a series of episodic sentences--the episodic sequence just doesn't "feel" like a series of generic statements but more like an ordinary narrative. So we appear faced with conflicting indicators, and in this section we seek to determine whether the sentences within the episodic sequence are in fact episodics (which would then leave us with how to explain the generic morphology), or whether in fact they are generics (which leaves us then with how to explain the narrative nature of the episodic sequence).

4.1. The sentences are not generic. We are now going to consider whether each of the individual sentences of the episodic sequence are, individually, generics. Two complementary sets of arguments--one that they are not generic, and the other that they are episodic--would seem at first sight to establish their episodic nature quite firmly, and we're going to discuss some here.

4.1.1. Free-choice 'any'. Certain facts predicted by treating each sentence as a generic do not fall out as expected. For instance, NP's quantified by so-called 'free-choice *any*' (Vendler, 1967) as subjects of sentences select for generic interpretations. Sentences like the following are hard to interpret episodically:

- 44. a. ?Any owl ate my pet mice.
- b. ?Any dog is eating next to me.
- c. ?Any sailor wrote a book.
- d. *Into the barn ran any cow.

As subjects of generics, though, such NP's are most natural:

- 45. a. Any dog chases cats.
- b. Any modern personal computer processes text.
- c. Any insect has six legs.

If the sentences in the episodic sequence are generics, then 'any' NP's ought to sound acceptable; but if the sentences are episodic, then they ought to sound bad, or at least have to be interpreted as intrusive generics. In fact, they do not sound very good:

- 46. a. My grandmother used to bake the most wonderful pies every Saturday.
- b. She went to the orchard on Shady Lane early in the morning.
- c. *Any man would help her get all set.*
- d. She then used to pick a basket each of apples and peaches.
- d. Then she would go into the kitchen and shoo everyone else away.
- e. *Next, any dog used to wonder through the kitchen.*
- f. About 4:00 an irresistible aroma wafted through the entire house.

Such examples appear to be difficult to interpret in the context of the generic passage.

4.1.2. "*Universal*" readings of indefinites. As has been commonly observed, bare plurals, mass terms, and indefinite singulars are interpreted "universally" as the subjects of generic sentences provided the subject is analyzed as part of the restrictor clause; but these NP's are interpreted existentially as the subjects of episodics. In the following examples, the most natural (and possibly the only reading) requires a "universal" reading for the subject NP.

- 47. a. Dogs chase cats.

- b. Hot air rises.
- c. A troublemaker causes all sorts of difficulty.

In the context of a generic passage, however, intuitions are strong that the subject NP's are interpreted existentially and not "universally" (these intuitions can easily be substantiated by showing the properties of subsequent pronoun reference, which we do not go into here):

48. a. My grandmother used to bake the most wonderful pies every Saturday.
- b. She went to the orchard on Shady Lane early in the morning.
 - c. She then used to pick a basket each of apples and peaches.
 - d. Then she would go into the kitchen and shoo everyone else away.
 - e. *Dogs chased cats through the kitchen.*
 - f. *Next, hot air would rise.*
 - g. *Finally, a troublemaker used to cause all sorts of difficulty.*
 - e. About 4:00 an irresistible aroma wafted through the entire house.

The lack of a "universal" reading would be consistent with regarding each sentence as episodic.

4.1.3. Absence of basic generics. If each sentence is generic, would expect that all generic sentences, including basic generics such as stative verbs like 'weigh' or 'love', and individual-level adjectives such as 'intelligent' or 'four-legged' or most predicate nominals, could form a part of the episodic sequence. However, as we have already observed, these sentences have only an intrusive reading when placed within the episodic sequence of the text, and do not form a part of the semantics of the sequence. This would all make good sense if the sentences of the episodic sequence re required to be episodic, since basic generics lack an episodic reading.

4.2. The sentences are episodic. There are also positive indications that the sentences are episodic. Here are a few indications.

4.2.1. Temporal adverbials. The first and most obvious indication that we are dealing with a series of events comes from the sequencing words such as 'then,' 'next,' etc., which relate not generic states to one another, but episodic events. A passage in which generic states are so related is exemplified by the following (which is not a generic passage):

49. The Sumerians *first* smelted copper to a low level of purity. *Then* they smelted it to a much higher level. *Next*, they produced bronze. *Finally*, they smelted iron, but never learned about steel.

The adverbials here relate a series of generic states to one another on the most plausible reading, resulting in a progression of states which, one assumes, were introduced over the course of centuries. But it is clear that such adverbials in generic passages like (1) do not relate generic states to one another, but instead relate events to one another. If each sentence of a generic passage were a generic state, then one would not expect the episodic sequence to form a series of events that could be so explicitly related, and the episodic sequence should, it seems, form a sequence akin to (49) and not what appears to be a normal narrative.

4.2.2. Verbs of destruction/creation. A number of types of constructions and interpretations do not easily lend themselves to generic interpretations, but occur naturally in the episodic sequence. For instance, with verbs of creation and destruction, an indefinite singular in object position (as opposed to, for instance, a bare plural) makes a generic interpretation difficult.

50. a. John eats ham sandwiches.
b. John eats a ham sandwich.

51. a. John smokes cigarettes.
b. John smokes a cigarette.

The (b) sentences are not easily read generically, in contrast to the (a) versions. Yet, such examples set naturally in the episodic sequence.

52. a. My grandmother used to bake the most wonderful pies every Saturday.
b. She went to the orchard on Shady Lane early in the morning.
c. She then used to pick a basket each of apples and peaches.
d. Then she would go into the kitchen and shoo everyone else away.
e. *She then smoked a cigarette and ate a ham sandwich, and baked a pie.*
f. About 4:00 an irresistible aroma wafted through the entire house.

4.2.3. *Inversion.* One last example. I inversion structures in English and many other similarly configured languages allow only an episodic reading when the subject follows the verb (though if the subject is a pronoun, it remains before the verb). Thus, "Mary runs down the street" can either be generic or episodic on a reportive present tense reading, whereas "Down the street runs Mary" can only be episodic (=reportive). Inversion structures, modulo their children's book stylistic difficulties, set naturally in such passages:

53. a. My grandmother used to bake the most wonderful pies every Saturday.
b. Early in the morning, *to the orchard on Shady Lane she went.*
c. She then used to pick a basket each of apples and peaches.
d. *Then into the kitchen would come all the children of the household.*
e. About 4:00 an irresistible aroma wafted through the entire house.

4.2.4. *Summary.* So we see that the case for treating the sentences of the episodic sequence as episodics (as the name would suggest) appears fairly persuasive; the arguments above can easily be supplemented by many others leading to a similar conclusion. However, there are some nagging facts that such an analysis leaves unaccounted for. In the following section, we note some.

4.3. The sentences are generic.

4.3.1. *Generic markers.* As pointed out above, if the sentences are all episodic, one would not expect to find generic markers such as "would" and "used to" (and corresponding formal indicators of genericity in other languages). The single operator analysis would have to give a purely syntactic/morphological account which would apply to sentences in a discourse, but a generic account need not say anything.

4.3.2 *Frequency adverbs.* Also pointed out above, one does not expect to find frequency adverbs within the episodic sequence. In an ordinary narrative, frequency adverbs "stop" the action in a way characteristic of states (indeed, in pointing out their generic character, we claim they in fact are states), yet within the context of a generic passage, they do not have this effect, and the sequence of events "moves" forward as in an ordinary narrative.

4.3.3. *Recursion.* If the presence of a generic passage requires that there be a single global generic operator, and that the episodic sequence is a series of sentences lacking such operators, then the single global operator analysis would quite clearly predict that one could not have a generic passage within the episodic sequence of another generic passage. This situation would require some sentence of the episodic sequence be able to function as the summary sentence of a generic passage, yet a summary sentence must be a generic.

There is reason to think that this prediction is not borne out, however. Consider the following example of a generic passage.

54. Grandma used to set the table in an especially funny way.

First, she would put on the napkins.

Next, she used to put on the knives and forks.

Then came the plates and glasses.

Finally, she would distribute the spoons after we had all sat down.

Here, the first sentence functions as the summary sentence, and the episodic sequence explains how she would set the table. It seems quite clear that a passage with this structure and interpretation can be embedded within another generic passage, as the following example would show:

55. Grandma used to bake wonderful on Saturdays

She would go out to the orchard on shady lane.

There, she picked a bushel of apples and pears.

She would bake them into wonderful pies.

We all used to wait for them to come out of the oven.

Then Grandma used to set the table in an especially funny way.

First, she would put on the napkins.

Next, she used to put on the knives and forks.

Then came the plates and glasses.

She would distribute the spoons after we had all sat down.

Finally, we each took and gratefully devoured a piece of pie.

Introducing the subordinate summary sentence with 'then' in this case ensures that it is interpreted as a part of the episodic sequence, rather than as an intrusive generic. This situation would appear to be at odds with the prediction that every sentence of the episodic sequence cannot be a generic state,

which would outlaw any recursion of generic passages. Yet here we have prima facie evidence that such recursion exists.

4.3.4. *A puzzle concerning episodic states.* It has long been noted in work on discourse that episodic states may appear situated within the temporal sequence of a narrative. By 'episodic' states we mean the set of 'stage-level' (as opposed to individual-level) adjectives and prepositional phrases (see Carlson, 1980, Diesing, 1992, Kratzer, 1995). Some examples are 'be drunk,' 'be available', or 'be in the next room'. Less often noted English episodic states include progressives ('be running') and perfectives ('have run'). In typical narratives, such examples as these fit in quite easily:

56. John entered the room. He took a seat. *Mary was reading a book.* John got up and looked in the refrigerator. *Several types of herbs were on the bottom shelf.* He reached in and grabbed some garlic. *Plenty more were available....*

Usually, episodic states hold at the time of the previously-mentioned event in the narrative.

The single global operator analysis of generic passages makes the implicit claim that the episodic sequence is an ordinary narrative sequence, though occurring within an intensional context. There is, at this point, no particular reason to think that episodic states would be anything but fine in generic passages. However, as the following examples indicate, episodic states do not set at all well within the episodic sequence. There is something funny about the following examples:

57. a. My grandmother used to bake the most wonderful pies every Saturday.
b. She went to the orchard on Shady Lane early in the morning.
b'. *The alarm clock had gone off at 6 AM.*
c. She then would pick a basket each of apples and peaches.
c'. *Cows were in the orchard mooing at her.*

- d. Then she would go into the kitchen and shoo everyone else away.
- e. She fixed the pies and put them in the oven.
- d'. *The family dog was sleeping by the back door.*
- e. About 4:00 an irresistible aroma wafted through the entire house.
- f. *Grandma was tired.*

None of these episodic states is, according to our intuitions, acceptable. Each appears to have to be interpreted purely extensionally--i.e. outside the episodic sequence--if acceptable at all.

As the reader has no doubt already noted, each of these episodic states can be made acceptable by a variety of devices, the most obvious of which is the addition of 'would':

- 57'.a. My grandmother used to bake the most wonderful pies every Saturday.
- b. She went to the orchard on Shady Lane early in the morning.
- b'. *The alarm clock would have gone off at 6 AM.*
- c. She then would pick a basket each of apples and peaches.
- c'. *Cows would be in the orchard mooing at her.*
- d. Then she would go into the kitchen and shoo everyone else away.
- e. She fixed the pies and put them in the oven.
- d'. *The family dog would be sleeping by the back door.*
- e. About 4:00 an irresistible aroma wafted through the entire house.
- f. *Grandma would be tired.*

Now each of the episodic states is fairly naturally interpreted as occurring within the episodic sequence, with their expected temporal relations. Since the modal 'would' has the effect of 'saving' the episodic states from unacceptability, one would probably expect that 'used to' would have a

similar effect. However, it does not. The following we judge to be as unacceptable as (57), (omitting (d) as 'used to' does not cooccur with 'have' very easily):

- 57".a. My grandmother used to bake the most wonderful pies every Saturday.
- b. She went to the orchard on Shady Lane early in the morning.
 - c. She then would pick a basket each of apples and peaches.
 - c'. *Cows used to be in the orchard mooing at her.*
 - d. Then she would go into the kitchen and shoo everyone else away.
 - e. She fixed the pies and put them in the oven.
 - d'. *The family dog used to be sleeping by the back door.*
 - e. About 4:00 an irresistible aroma wafted through the entire house.
 - f. *Grandma used to be tired.*

Thus, in contrast to 'would', 'used to' fails to rescue episodic states from unacceptability in these structures. Each of these examples is, at best, interpreted as an intrusive generic. We also note that there are other ways episodic states can be fit in, chiefly through the addition of time adverbials such as frequency adverbs ('Cows were usually in the orchard, mooing at her' would be acceptable as (c)).

Why would episodic states behave this way in generic passages? The answer may come from an observation from Carlson (1980): episodic states do not introduce a generic operator, like (dynamic) verbs can. That is, a sentence like 'Bill is drunk' or 'A dog is sleeping by the door' cannot be interpreted generically (e.g. as roughly meaning 'Bill is generally drunk' or 'There is usually a dog sleeping by the door'). Now, if each sentence of the episodic sequence is required to contribute its own generic operator, and episodic states cannot do this, then they should be infelicitous as members of the episodic sequence unless something else capable of contributing a generic operator (e.g. 'would' or a frequency adverb) contributes it instead (on this story, 'used to' does not contribute

a generic operator, but reflects the presence of one contributed otherwise). In treating the episodic sequence as an ordinary narrative, the absence of episodic states would appear to go against a very definite prediction of that analysis.

4.3.5. An incorrect semantics. The overall semantics of a generic passage predicted by a single global operator analysis does not appear adequate. Let us begin with a basic observation: generics which (plausibly) relate event-types to one another, such as many 'when' or 'if' clauses, are stable generalizations. These generalizations do allow for some exceptional circumstances to arise, but on the whole are not subject to massive exceptionality paralleling examples like "Mammals give live birth" or "Lions have manes" when we pose the question of how many mammals give live birth, or how many lions have manes. Consider the following:

58. When John goes to the grocery store, he takes his checkbook with him.

Let us assume this is true. This does allow for John to go to the store and on occasion leave his checkbook at home. But it is very, very difficult to tell a story where (58) is held to be true, but on more occasions than not, the checkbook stays at home.

With this in mind, consider our 'default' analysis (from the standpoint of representational simplicity) for a generic passage with a single global GEN operator. Schematically:

GEN [e_s] [e_1, e_2, e_3, \dots]

Here, e_s is the event gotten from the summary sentence, and $e_1 \dots$ are the events of the episodic sequence. It is clear that each of the events of the episodic sequence need to occur on most occasions where e_s also occurs. On occasion, Grandma might burn the pies and so the aroma that wafted through the house on those Saturdays might not have been so tempting. But what this

formula in fact requires is that the whole episodic sequence itself must occur *in its entirety* nearly all the time--even the omission of one step in the sequence would result in an 'exceptional' sequence. But this seems an incorrect prediction. In fact, on the assumption that the elements of the episodic sequence are independent of one another (i.e. the omission of one does not causally or logically entail the omission of any others), then the longer the episodic sequence, the more "opportunity" for exceptionality, and in a representation like the above, the 'exceptionality' accumulates: if e_1 occurs 90% of the time given e_s and e_2 also occurs 90% of the time, then, roughly speaking, the combination of e_1 and e_2 will occur around 80% of the time; an e_3 occurring at 90% would reduce the frequency of e_1 - e_3 occurring even further to above 70%, and so on. That is, the longer the episodic sequence, the more opportunity for 'exceptional' circumstances to arise. However, if the semantics of the configuration above is as we suppose, then the analysis would seem to predict that the frequency of occurrence of any given e_n in the episodic sequence should become increasingly frequent, the longer the episodic sequence becomes. Either that or, the longer sequences are judged false (or as inaccurate or infelicitous descriptions of the situation) as exceptionality accumulates.

Insofar as our intuitions are reliable on this question, they do not seem to bear out these predictions. That is, there is no 'accumulation' of exceptionality of the sort predicted by the analysis, nor is there an intuition we can detect that, as length of the sequence increases, so must the frequency of each individual event described. In other words, the analysis above with a single global operator over the whole sequence would appear to make an incorrect prediction about the semantics of a generic passage.

4.3.6. *Evaluation.* Here is how an analysis with a single global generic operator fares so far.

While it does appear to be initially plausible, it raises the following questions:

- a) it does not readily account for markers of genericity in the episodic sequence
- b) it does not lead us to expect the presence of frequency adverbs

- c) it does not naturally allow for the presence of subordinate generic passages within other generic passages
- d) it gives us no ready account of the infelicity of episodic states in the episodic sequence
- e) it does not, insofar as intuitions can determine, give us a correct semantics

There is one more thing: the analysis of the single global operator also does not tell us where the generic operator that has scope over the whole passage comes from. It cannot come directly from the semantics of the summary sentence, since we are assuming that the restrictor clause for the whole discourse must appear within the *matrix* of the summary sentence, and so an additional GEN operator is required as well for the episodic sequence. The summary sentence has a restrictor of its own, but it is the matrix of the summary sentence that functions as the restrictor for the episodic sequence, not its restrictor. While technically this represents little problem (an additional operator for the rest of the passage can be introduced ad hoc), it would be nice to have a principled account of when and why it is introduced.

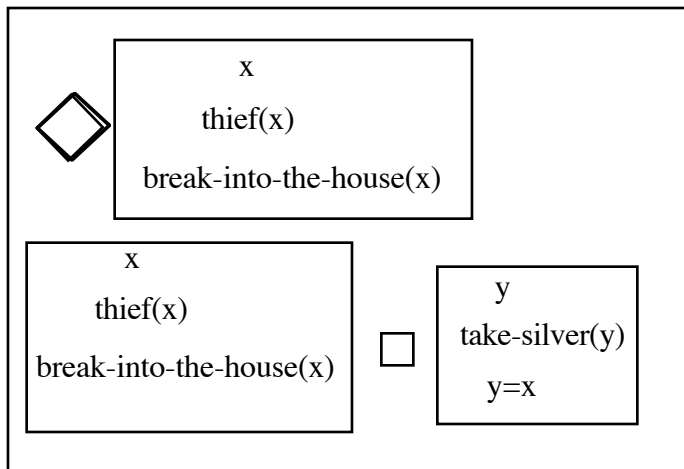
4.4. Summary. We are thus left with a conflicting set of data and concerns. While the sentences of the episodic sequence appear to have some properties of generics, when we look at the microstructure of the sentences we find that they do indeed appear episodic. Fortunately, it will turn out that these two apparently conflicting sets of arguments can in fact be squared with one another--provided we take each sentence of the episodic sequence to be a very particular type of generic. In the following sections we construct and explore an analysis of generic passages which promises to resolve these conflicts and shed light on the nature of generic passages.

5. A Modal Subordination approach

5.1 Modal subordination. The account we are going to explore in this section takes its inspiration from the analysis of modal subordination structures presented in Roberts (1987, 1989). While we are going to follow Roberts' lead in outlining this alternative, we are not attributing anything in this section directly to Roberts, whose analysis examines a range of data that generic passages bear a similarity to, but which may be quite different. In Roberts' analysis of modal subordination, the crucial element is that modals which appear in sentences are analyzable as 2-place relations (at least in the instances of interest). Following an analysis proposed by Kratzer (1981), Roberts proposes that modals take as their first argument an unexpressed set of presupposed conditions (the modal base), and the second argument is the contents expressed by the sentence. The information appearing in the first argument of the modal may be the result of the process of accommodation (Lewis, 1975). In Roberts' presentation of modal subordination, the accommodated information is found in propositions expressed by previous sentences in the discourse. To illustrate with Roberts' own example, consider her analysis of (59):

59. A thief might break into the house. He would take the silverware.

Here, 'might' is taken to correspond to a simple possibility operator, and 'would' corresponds to a 2-place necessity operator. In interpreting the second sentence, the material introduced by the first sentence is accommodated to the restrictor of the second:



Since the indefinite NP 'a thief' in the accommodated argument introduces a discourse marker that is accessible to the right-hand side of the formula, 'he' can be construed as the thief.

If we are to apply this approach to generic passages, we need first to assume that each sentence of the episodic sequence in fact has a generic operator in it in order to make it parallel to Roberts' account. This leaves unexplained for the time being why sentences of the episodic sequence appear to have episodic characteristics, a matter we will return to below. If we assume, following Krifka (1987), Carlson (1989), Diesing (1992), and others, that the generic operator is a 2-place relation, and that the first argument of the relation may have its contents accommodated (or otherwise specified by context), then we can analyze generic passages along the lines of modal subordination. Thus, the generic operator functions like the modals do in Roberts' analysis.

Let us construct a schematic example to illustrate. We assume that a generic passage with a summary sentence SUM is superordinate to the sentences of the episodic sequence, A, B, C, D, each one of which has a generic operator in it with an empty first argument which must have its contents accommodated from context; its second argument is the (episodic) contents of the matrix of the summary sentence itself (E_s), contents designated by primed letters.

SUM (= [GEN [RESTRICTOR] [E_s]])

GEN [...] [A']

GEN [...] [B']

GEN [...] [C']

GEN [...] [D']

5.2. The restrictor. In order to begin fleshing out the modal subordination analysis, the first question that must be answered is, what do we fill in for [...] in each case in the episodic sequence?

The answer that results from a straightforward application of Roberts' analysis is: the episodic information recovered from the summary sentence S (e.g. a pie-baking event in (1)). Let's designate this as E_s . So, on this analysis, the schematic example would appear as follows:

Summary sentence accommodation:

SUM

GEN [E_s] [A']

GEN [E_s] [B']

GEN [E_s] [C']

GEN [E_s] [D']

This claims that the event information E_s is accommodated to the restrictor of the generic operator in each sentence of the episodic sequence. But this gives rise to two obvious problems. First, the accessibility of elements in the episodic sequence to one another are destroyed (elements of A' are not accessible to anything in B', and so forth). Note that the issue of accessibility does not arise in the analysis with a single global generic operator, since everything there remains accessible to all subsequent sentences in the types of examples we've considered so far, which seems to be the correct generalization. It is clear that generic operators are not inherently transparent to accessibility. Consider the examples of (60). In order for each to be interpretable, the fork or loud dress must be identical on each occasion, and so the indefinite must be read as having widest scope on a scoping analysis.

60. a. John eats with *a fork*. *It* is in the cupboard.

b. Mary wears *a loud dress* to presidential receptions. She is taking *it* to the cleaners now.

In neither of the examples we are concerned with will we require that the entity be identical on all occasions, but may change from occasion to occasion. (We will deal with examples like "John eats with a fork. Then, he washes it." further below)

Even more problematic for this analysis is that summary sentence accommodation gets the semantics wrong. It claims that, typically, any E_s event has an A' event within E_s 's reference time, regardless of how that event relates to any other events of the episodic sequence. But this is manifestly not accurate. In examples like (1), it is clear that grandma shooed us all out of the kitchen AFTER picking the fruit on a Saturday pie-baking occasion, and that what is typical is this particular relation between baking pies, picking fruit, and us being sent from the kitchen. It may have been typical for grandma to send us away again after we had eaten in order to clean up, but *these* events of being sent from the kitchen are not what is being talked about here. In short, summary sentence accommodation does not appear to get the semantics right, either. But perhaps a refined version of the analysis presents more hope.

5.3. A refined analysis. In order to relate the events to one another, and to ensure accessibility, an accumulation of material is required at some point. There are various ways to accomplish this accumulation of information, but accommodation of some sort seems the best means for doing this (see, for instance, Zucchi and Poesio, 1992, and Kamp and Reyle, 1993, for analyses in which both restrictor and matrix may be accommodated). It will be advantageous for reasons to be discussed as we proceed, to take the GEN operator (as well as other operators) to copy all of the information of the restrictor to the matrix, and add the 'incoming' information to the matrix (this is reminiscent of conservativity in generalized quantifier theory) when the restrictor is otherwise empty, i.e. where no partition of the sentence has been induced by the GEN operator). An uneconomical analysis from an ink-savings point of view, it has nevertheless been argued that in some instances such copying of information is necessary for other purposes (see, for instance, Kadmon (1990) and Parsons (1994)). The net result of this organization of things is we can very simply state what gets

accommodated into the restrictor argument of the next GEN operator:¹⁰ the matrix of the previous sentence; this information also then gets copied into the restrictor. This organization makes some sense if we take the matrix to contain the (local) assertion, or what gets contributed to the common ground and hence presupposed by the next sentence in the discourse.

Let us go through an example step by step to illustrate how this works, before reconsidering the issues raised in Section 4. Take the following slightly simplified Grandma passage:

60. Grandma used to bake wonderful pies on Saturdays.

She would go out to the orchard on shady lane.

There, she picked a bushel of apples and pears.

She would bake them into wonderful pies.

We all used to wait for them to come out of the oven.

The first sentence, the summary sentence, is a generic. The 'used to' is reflective of that fact. In the restrictor clause, we are going to assume that the reference time R_0 has the property of being a Saturday (occurring within the context of some lengthy time in the past serving as the reference time of the whole generic state), and in the matrix clause we see that the reference time is not only a Saturday, but, typically, one on which Grandma bakes wonderful pies, during some reference time R_1 , the reference time going with the baking of pies on a Saturday. In the interest of simplicity, we omit discourse markers for individuals, and other elements that would be included in a full treatment.

(insert fig 8 here)

The next sentence (the first sentence of the episodic sequence) is then processed; the modal 'would' in this instance yields a GEN operator in which the restrictor takes all the

information from the matrix of the previous sentence, it gets copied into the matrix, and event e_2 is related to e_1 by subordination.

(insert fig 9 here)

The third sentence, the second of the episodic sequence, is then processed. The dynamic verb in the sentence is compatible with the introduction of a GEN operator, which takes the contents of the previous matrix for its restrictor. That information is copied into the new matrix, and the event e_3 is then related to the structure by general principles of narrative discourse. In this particular case, we take e_3 to be coordinated to and temporally after e_2 . Other options are possible here: 'grab-bag', subordination to e_2 , and even coordination to the summary sentence. (Due to the complexity of the list of formulas, it becomes much more perspicuous at this point to revert to a tree-type notation)

(insert fig 10 here)

The last two sentences are sentence also introduce GEN operators and coordinate the "incoming" events to the previous ones. After the last sentence is processed, the result would be as follows:

(insert fig 11 here)

5.4 merits of this approach. Before we move on to a discussion of why this analysis stands in need of further refinement (i.e. it still does not get the semantics correct), we will discuss the merits of this approach. If we examine the difficulties listed above with the single global operator approach, the present approach fares quite a bit better. 1) We are able to account for the generic markers that may appear in each sentence since each of the sentences of the episodic sequence is a generic sentence in its own right. 2) Since we take sentences with frequency adverbs to be generics,

we would expect their presence. 3) We fully expect the possibility of recursion of generic passages within generic passages, since each sentence can function simultaneously as a summary sentence and as a member of the episodic sequence. 4) The presence of episodic states is, in general, not expected in the episodic sequence since such sentences are not able to contribute a GEN operator on their own. On the other hand, if we take the modal 'would' to lexically introduce a GEN operator, its presence should license the appearance of episodic states, as would the appearance of frequency adverbs which would have a similar effect. We take the inability of the "used to" construction to enable the appearance of episodic states as indicative of it not introducing a GEN operator independently, but only appearing in a sentence that has such an operator introduced by other means.

This leaves us to account for why the sentences of the episodic sequence show the interpretive and formal properties of episodics, and not some of the properties of isolated generic sentences as noted above in section 4. We take this to be a consequence of the fact that the restrictor clause associated with a member of the episodic sequence must be (initially) empty. Consider the analysis of a generic sentence like "Cats chase mice." We attribute the "universal" reading of the subject bare plural to the act that it must appear within the restrictor, roughly as follows:

GEN [cat (x)] [mouse (y) & x chase y]

To get this interpretation, the sentence partitions itself into a restrictor and matrix portion (in the spirit of Diesing, 1992), and in this instance places the subject NP in the restrictor and the remainder in the matrix. Or, following Chierchia (1995), if we take basic generics to lexically enforce such a partition, the only possible analysis of a sentence like "Dogs are intelligent" has (presumably) the subject NP in the restrictor. We need to couple these observations with a plausible assumption which we investigate no further here: ¹¹

● **Accommodation may apply only to an empty restrictor**

On this assumption, we would not expect to find "universally"-interpreted subjects in sentences which form a temporal part of the episodic sequence, nor basic lexical generics. The same line of reasoning may be applied to sentences with free-choice 'any' as well, assuming 'any' must appear in the restrictor (Diesing, 1992).

Once we recognize that the GEN operator in the episodic sequence leaves the entire contents of the sentence that hosts it within the matrix, we expect that the sentence would exhibit the same properties it would if it were the main clause of a genericized 'when' sentence. So, for instance, a genericized 'when' sentence allows for the inversion structures characteristic of episodic interpretations:

61. When(ever) Bill thinks he is safe, into the room comes his nasty uncle.

The sentence as a whole is generic in interpretation, but the main clause in isolation is episodic as a part of the interpretation as a whole. Similarly, in a structure like the following

GEN [...] [into the room come the guards]

the matrix likewise exhibits episodic properties even if the sentence as a whole is a generic. If we run down the list of properties found above in section 4, and see if those same properties may appear in the main clause of genericized 'when' sentences, we find a complete parallel to properties of sentences of the episodic sequence. In this way, we account for the mixed appearance of the sentences of the episodic sequence--they are globally generic but the contents of the sentence itself is fully episodic.

Finally, the semantics of the multiple-operator analysis would appear to be more satisfactory, in that it avoids the prediction of accumulating exceptionality, and we can account for all the necessary accessibility relations. However, as we will see, the present account would appear to commit the opposite difficulty of not generating enough exceptionality, a matter that will occupy us after we digress briefly on the existence of conjunctive generic passages within this framework.

5.5 Conjunctive generic passages. In this section we show that by adopting the temporal subordination analysis for generic passages, we predict the existence of another class of generic passages. Recall that there are two kinds of temporal relations, subordination and coordination. In most cases, it is possible for a subsequent event introduced by a discourse to bear either relation to the most recently introduced event. As long as there is a higher-level reference time to serve as the attachment site, the new event could be coordinated to the last event, or subordinated to it. In all the examples we have looked at so far, the first sentence introduced an overall event, and each subsequent event was subordinate to it, giving more detail to the overall event. This is the kind of structure we find in (62):

62. Kenneth teaches children addition. First he uses pieces of candy to convey the concept. Then he switches to a more abstract approach.

Now notice that in our analysis of generic passages, the GEN operator of the first sentence itself introduces a reference time, which serves as the overall reference time for the entire discourse. This indicates that after the introduction of the first event in the generic passage, it should be possible to introduce an event which has the coordination relation to the first event, rather than the subordination relation. In fact, it is possible to have sequences in which the first sentence is a generic, and the next sentence is explicitly coordinate to it. We can use the temporal connective 'then' to indicate the coordination relation with a subsequent generic sentence:

63. Kenneth teaches the younger children addition. Then Sarah teaches the older children subtraction.

Both sentences in this case are generic (the natural use of the English simple present tense in such examples is some evidence of this), yet there is a sequential understanding relating an event of Kenneth teaching children addition to be followed by an instance of Sarah teaching subtraction.

A sequence like this can be represented with the following set of tripartite structures:

(insert fig 12 here)

(insert fig 13 here)

With this structure we get an interpretation in which there is a sequence of occurrences, each of which contains an event of Kenneth teach some children addition followed by Sarah teaching them subtraction. We understand that there is a series of pairs of events. This is different from cases in which there is a single occurrence of a generic state, which is followed by a single occurrence of a different generic state.

Thus, we see that a general application of the principles presented so far naturally produces generic passages which lack an overt summary sentence.

6. The semantics of generic passages

6.1. The problem. We criticized the single global operator above on the grounds that it seemed to give an incorrect semantics, since it ended up claiming that the entire conjunction of events in the episodic sequence occur with generic regularity under the circumstances described by the summary

sentence. However, the analysis outlined immediately above goes too far in the other direction. It makes the claim that the "incoming" event occurs with generic regularity just under those conditions where the entire sequence of previously-introduced events has occurred, and it says nothing about the instances where at least one of the previous events has not occurred.

Let us first illustrate the problem with the following example. In this example, (c-f) are to be understood as describing in more detail how grandma went about picking the fruit, and that (g) describes an event that is subsequent to all discussed in (b-f):

64. a. Grandma used to bake delicious pies every Saturday.
- b. She would pick a basket of fruit at a nearby orchard.
- c. The owner would find a ladder.
- d. Then, she examined the orchard carefully.
- e. Grandma then picked from the tallest trees first.
- f. The owner would watch cheerfully.
- g. Around ten in the morning, she prepared fruit for baking...

We take it, then, that (c-f) are subordinate to (b) and that (g) is coordinated with (b). Now, suppose there is an occasion on which the owner of the orchard would not watch cheerfully (i.e. (f) did not occur), but stayed inside drinking coffee. Or, where grandma went right to fruit picking without a careful examination of the orchard. In those instances, do we have no expectations at all about her preparing fruit for baking? It seems we still do.

Consider, by way of contrast, occasions where grandma baked pies but did not pick the fruit herself; it seems under these conditions that nothing is said about her carefully examining the orchard, or the owner getting a ladder. That is, we understand the events of (c-f) to occur only on those occasions where the superordinate event introduced in (b) also occurred; in this instance,

there is a dependency between the occurrence of the event in (b) and the events of (c-f). However, we have no similar intuitions of any such dependency among the events in (c-f) themselves, nor between (g) and any of (c-f), or even between (g) and (b). We do recognize a dependency between all of the episodic sequence (b-g) and what we are analyzing as the superordinate event (pie-baking, in this instance) introduced by the summary sentence (a). However, as noted above, the current analysis predicts that everything subsequent in the discourse should be conditioned on everything previous.

At this time, we formulate a preliminary working generalization:

- **An "incoming" event is independent of anything that it is not subordinate to (i.e. its occurrence is not conditionalized upon the occurrence of any non-superordinate event)**

Consider schematically a fairly long and complex generic passage consisting of coordinated events 1 through $n+1$ (e.g. how someone changed the oil in the old car) which in the real world occurred in the past on (coincidentally) n different occasions. Now, suppose that on the first occasion, event 1 exceptionally did not occur (or was replaced by an event of a different type) but all the others did; in occasion 2 event 2 (exceptionally) did not occur, but all the others did, and so on, except that the last event, $n+1$, always occurs. This pattern of events, which seem appropriately described by a generic passage, is not consistent with the current analysis--the current analysis would say nothing whatsoever about this pattern of occasions since each incoming event is conditionalized on the occurrence of *the entire series* of previous events that get mentioned, and in fact all never occur. But this does not seem correct: in long and involved passages, it is very easy to imagine the description being consistent with all sorts of events in the episodic sequence exceptionally not occurring, just as long as each individually occurred on "most" occasions.

Let's illustrate with a second somewhat clearer example using a frequency adverb. Consider the following variant of (1):

65. a. My grandmother used to bake the most wonderful pies on Saturdays.
- b. She would go to the orchard on Shady Lane early in the morning.
- c. She used to pick a basket each of apples and peaches.
- d. Then she would go into the kitchen and shoo everyone else away.
- e. Then, she would *sometimes* shoo the dog out, too.
- f. Then, about 4:00 an irresistible aroma wafted through the entire house.

In this particular instance, we clearly interpret the passage to mean that on those times when grandma allowed the dog to remain in the kitchen, around 4:00 pm it was *still* the case that an irresistible aroma wafted through the house: the aroma is in no sense dependent upon the shooing of the dog.

Note, however, that if we insert a sentence expressing an event subordinate to the event of shooing the dog, then, under these circumstances, the next event (in this case, using a broom) is clearly dependent upon the occurrence of the shooing of the dog:

66. a. My grandmother used to bake the most wonderful pies on Saturdays.
- b. She would go to the orchard on Shady Lane early in the morning.
- c. She used to pick a basket each of apples and peaches.
- d. Then she would go into the kitchen and shoo everyone else away.
- e. Then, she would *sometimes* shoo the dog out, too.
- f. She would wield the broom in a menacing fashion and yell "Get out!".
- g. Then, about 4:00 an irresistible aroma wafted through the entire house.

The independence of one event in the sequence from others is the part that the analysis presented in 5.2 above ("Summary sentence accommodation") gets right, where the claim is that each event of the episodic sequence occurs with generic regularity given only the matrix of the summary sentence. However, as discussed above, it could not account for the temporal relations among the events of the episodic sequence, or give a proper account of the semantics as a consequence. And, as we have just seen, it does not account for the dependency that holds between the occurrence of an event and a superordinate events, whether from the summary sentence or from another sentence of the episodic sequence. Thus, we need an analysis which does not in general create any dependency between coordinated events, yet preserves the temporal relations among them anyway. In this next section we explore how this might be accomplished.

6.2 Reference times and events. The framework we have been assuming so far takes as fundamental that a reference time is an additional time introduced above and beyond the time of the event that it encompasses. The most natural interpretation of a reference time is that it is an interval of time whose location is partially determined by tense and aspect information from the sentence being interpreted. In the case of a simple narrative, we take $e \sqsubseteq R$ to be interpreted as asserting that the time of the event e occurred within the interval of time denoted by the reference time R , and, further, that such a configuration makes an existential claim, namely, that there is an event (of a specified type) that occurs within the timespan of R : i.e. $\exists e [e \sqsubseteq R]$. Thus, if the restrictor clause in a generic passage contains such a claim, then any subsequent events would be conditionalized upon the appearance of an event in that reference time. However, as we have seen, we need to allow for instances where no such event occurs.

There is a mechanism that has been proposed in the discourse literature that would appear to have the effects we need, once we construct an appropriate interpretation. This is the notion, mentioned earlier, of "open" and "closed" (or [+open] and [-open]) nodes in a discourse (Polanyi (1986), Webber (1991)). The feature "open" or "closed" is assigned to nodes (in a tree-type

representation) in the following way: a new structural node, which in our case would be a reference time, is assigned the feature "open". An open node converts to a closed one only when a new node is added to the structure such that the new node is coordinated with the open node. This means that a node will be open as long as subsequently-added nodes are subordinated to it, so that the nodes on the "right frontier" will remain open. Thus, when we add a new node, it and all its ancestor (i.e. superordinate) nodes remain open, and all other nodes will be closed. Thus, schematically, what we have been representing as something like the following:

(insert fig 14 here)

Would when annotated with the $[\pm\text{open}]$ feature be rendered as follows:

(insert fig. 15 here)

We propose to add a corresponding semantic interpretation: the interpretation interprets any $[\text{+open}]$ node containing an event (a "node" in this case is a reference time) as meaning $\exists e [e \sqsubseteq R]$. Any reference time marked in the DRS as $[\text{-open}]$ would be taken as meaning that the reference time is present, but there is no existential claim made about the occurrence of any event within that timespan.

To allow for a consistent application of this algorithm, we will need to introduce the reference time of an "incoming" event in the matrix in its restrictor, thus creating a separation between the two, and creating "empty" reference times in our representations. Consider the following examples. Let R_4 be the reference time of an incoming event e_4 . If we wish to coordinate e_4 to e_3 , the result would be as follows, with e_4 subordinate only to e_1 . We use the typographical device of parentheses to indicate events under closed nodes for ease of representation; lack of parentheses indicate open nodes:

(insert fig. 16 here)

This conditionalizes the appearance of e_4 only to the appearance of an e_1 , and not to either an event of the type e_2 or an e_3 belong to. On the other hand, if one were to subordinate to e_3 instead, then R_3 would remain open:

(insert fig 17 here)

In this case, the generic appearance of an e_4 in R_4 is conditionalized on the appearance of a superordinate e_1 and e_3 , but not on the appearance of an event e_2 . What this should be interpreted as saying, then, is that an event of the sort that e_4 is an instance of generically appears under the conditions where (a) there is a superordinate event of the type that e_1 is an instance of, (b) there is a superordinate event of the sort that e_3 is an instance of (with e_3 subordinate to e_1), and (c) if there also happens to be an event of the sort that e_2 is an instance of, then e_3 (and hence e_4) temporally follow it.¹²

The view of reference times implicitly taken by the analysis just outlined allows "empty" reference times in certain extensions (i.e. reference times which do not necessarily include events). There certainly is precedent; Partee (1973) Hinrichs (1986) and Partee (1984) make use of just such a notion. Here, we too allow for interpretations where a reference time may not contain any event at all, yet is still present as a structuring element of the discourse. This situation becomes most pointed for us when an empty reference time is ordered with respect to a previous and a following time (e.g. in $R_1 < R_2 < R_3$, where R_1 and R_3 contain events, but R_2 does not). The notation seems to mandate a "blank" time between e_1 and e_3 under these conditions--as if Grandma has to sit and do nothing for a time. But this is illusory. Reference times are characterized by their set of discourse relations, and are as long or as short as they need to be to maintain those relations when defined

with respect to extensions in a temporal model. For instance, take the passage in (1). The interpretation certainly allows for grandma on one occasion to pick apples for ten minutes between 7:00 and 7:10 in the morning, and get to baking pies by 7:20, and on another occasion pick apples for several hours, say between 8:00 and 10:30, and not get to baking until 1:00. Thus, on different occasions, the "pick apples" reference time must be interpreted as longer or shorter as the real situation demands. So, in a sequence like $R_1 < R_2 < R_3$, as discussed above, R_2 will be as long or as short as it needs to be to preserve the appropriate temporal relations among the events themselves.

However, the presence of closed reference times which deprive a representation of access to the event information gives rise to a problem that goes unnoticed if one confines attention to ordinary (extensional) narrative. The problem is this. Suppose you have a portion of an episodic sequence in which you have, say, three coordinated and temporally-ordered reference times, and so the first two are closed. This means that at those first two times, events of the appropriate type may, or may not, have occurred on a given occasion. However, if we have no access to the event information, the model theoretic interpretation will simply say that the third occurs after two other reference times, i.e. two arbitrary intervals of time. Presumably, this will satisfy any reasonable model in which only the third event occurs. Note that given our representations, where the GEN operator (or local existential closure) binds reference times, one cannot in general identify a given reference time in a representation with what is intuitively the same one in a previous representation (despite having the same subscript in our representations thus far). Yet, we do have to say that the third event occurs after the first and the second *when the first and the second actually occur*. For instance, consider a portion of an episodic sequence such as the following:

67. ...Grandma would peel some apples (e_1). Then, Gramps would help her stoke the stove (e_2).

Then, Grandma would light up a cigarette and take a break (e_3)...

Suppose that Grandma, like most smokers, takes many smoke breaks during the day. We need to be sure to interpret our representations in such a way that this particular smoke break is what is being discussed--the one that occurred after the peeling of the apples and the stoking of the stove when those two things (or either) in fact occurred. A smoke break taking place earlier in the pie-baking process, or later, is irrelevant to the interpretation.

As a means of dealing with this problem, we posit that reference times come indexed by the type of event they may dominate in a discourse. Thus we will interpret our informal representation of closed nodes:

R
|
(e)

e: Type

in the following way. Suppose we have a model in which there are temporal intervals that are the denotations of reference times, however one wishes to represent intervals. In the interpretation, with respect to each occasion, a given reference time "indexed" by an event of type E will denote an ordered pair $\langle I, E \rangle$ (where I is an interval of time) subject to the relations to other events and reference times required by the particular DRS, whether or not I contains an event of type E. If, for example, it is asserted in a previous DRS that the occasions denoted by a given reference time generically contain an e of Type E, then most intervals $\langle I, E \rangle$ so picked out will contain such an e, and some may not. But what if a discourse mentions two events of the same type occurring at different times? Note that if we rely solely on the typing for cross-referencing, we cannot distinguish two reference times indexed by the same type (this distinguishes the indexing view from the intensional view), yet it is quite clear that events of the same type may occur at different points in the episodic sequence. In this case, the two reference times are distinguished by their differing relations. If another reference time R' dominating the same parenthesized event-type appears in a subsequent representation in the restrictor, it will, in a restrictor clause, pick out just those same

intervals $\langle I, E \rangle$ as the previous R indexed by that type of event, being subject to the same relational constraints. All this will work out, provided of course that we keep the domain that the reference times find their denotations with respect to constant throughout. It is this issue that we return to in section 6.4. However, first, we have some critical business to take care of. There are, after all, dependencies between coordinate events in many instances.

6.3 Coordinate dependencies. The analysis sketched so far posits no dependencies between coordinated events at all, but it is very likely that the reader has realized that such dependencies do exist. Though a comprehensive analysis of how these dependencies arise is well beyond the scope of this paper, our analysis already has a means of accommodating these coordinate dependencies, and, under a reasonable set of assumptions, actually predicts them. Here are several such instances, intended to be understood within the context of a modified "grandma" passage.

a) One event is the causal or motivational antecedent of another:

...Grandma would chase the cats from the kitchen. Then she would lock the door...

What of the times when she did not find it necessary to chase cats from the kitchen? It seems, so long as we understand that locking the door is a consequence of chasing cats from the room, that we know nothing about those times. On the other hand, if we interpret the locking of the door as having nothing to do with the cats, then on those non-cat-removing occasions, we would expect her to be locking the door anyway.

b) There is implicit or explicit anaphoric reference back to an event.

....Grandma would chase the cats from the room. Then, Jenny would chastise her (for it....)

Again, in cases where cats are not chased out, we have no expectations that Grandma would get chastised anyway.

c) There is anaphoric reference to an indefinite that is introduced by the event:

...Grandma then served Jenny *a piece of delicious pie*. Then, Jenny would thank her and eat *it* greedily...

In this case, we have no sense that Jenny still ate any piece of pie under circumstances where none was served to her.

This is by no means an exhaustive listing of conditions where coordinate dependencies arise, but they serve to illustrate the present point. Since coordination, as we have outlined, always results in "closed" reference times, these are exactly the sorts of dependencies that we have sought to rule out.

Recall, however, that we introduced a third type of relation between events earlier in the paper: what we called "conjoined" reference times. In these cases, the summed event composed of the two events was in fact still available:

(insert fig. 18 here)

In a structure of this sort, the information from e_m is not closed off since R_1 remains open and e_m is guaranteed to exist in any interpretation. Thus, the contents of e_m remain available to e_n .

However, the discourse relation that holds between the two simple events is that of coordination.

We propose that it is structures of this sort that give rise to the cases of coordinate dependencies,

whereas interpretations where the events are simply coordinated are ones where there is no such dependency. That is, they are different discourse structures.¹³

This view of things turns out to make a prediction that we believe is correct. Suppose in an episodic passage we have three events, *e*, *e'*, and *e''*. If *e* and *e'* are conjoined, then *e''* may also be conjoined with them, creating a dependency of *e''* on the occurrence of the first two. Or, it may be coordinated, in which case *e''* is independent of the two. On the other hand, if *e'* is judged independent of *e*, and hence coordinated, then *e''* has no opportunity to be conjoined with *e*: it could only be conjoined with *e'*. Thus, if the middle event is independent of the first, the third must also be independent of it. Let's look at an example:

68. ...Grandma would stoke the old wood stove with large amounts of kindling. Then, she would open the window slightly...

The most natural interpretation of this seems to be that Grandma would open the window as a consequence of stoking the stove. In this case, we can understand the following continuation:

...Jenny then would go outside and chop some wood...

as meaning that Jenny chopped wood in order to replenish the wood Grandma just used (e.g. to keep the kindling box full). However, fix now on an interpretation where Grandma opened the window for another reason, e.g. to prepare a place to set the pies to cool. With this understanding, on those exceptional occasions where someone else stoked the stove, or grandma went light on the kindling, we would still expect her to open the window some. Now, bearing this interpretation in mind--where the events are coordinated rather than conjoined--it our clear sense that it is no longer possible to understand that Jenny's chopping of wood as dependent upon Grandma's stoking the stove with kindling: it has to be something Jenny typically did then anyway.

Similarly, anaphora from the third event to an indefinite in the first also requires that the middle event be dependent upon the first. Consider the following passage.

69. ...Grandma would take *some apples* from the barrel and set them on the table. Then, she would stoke the wood stove. Jenny would come into the kitchen and help her peel *them*..

We need to fix on the interpretation where stoking the wood stove is independent of taking out some apples. Under these circumstances, the anaphoric reference in the third sentence appears infelicitous. On the other hand, if we include a second sentence which is very naturally understood as dependent upon the first, the possibility of anaphoric reference becomes much more natural. In the following, the anaphoric reference in the last sentence comes as much less of a surprise that it does above:

70. ...Grandma would take *some apples* from the barrel and set them on the table. She then took out some paring knives and a large mixing bowl. Jenny would come into the kitchen and help her peel *them*....

We do not have a specific theory of how anaphora to indefinites can be defined in terms of the availability of the event introducing them, but the approach of Csuri (1995), where discourse markers are represented as dependent upon their introducing events, appears to be quite consistent with the approach we employ here.

At this point, we claim to have constructed representations that underlie the differing types of interpretations that we find in generic passages. In particular, the representations promise to adequately deal with the 'dependency' problems that the single global operator approach (too little dependency) and the full inheritance of the previous matrix (too much dependency) fell prey to.

We claim that there is always a dependency between subordinate and superordinate events, and optional dependencies between adjacent (in terms of order of presentation in the discourse) events. We are going to conclude by jumping back up a level, to examining reference times we have been setting aside so far; those associated with the generic states themselves, instead of the composing events.

6.4. State reference times. We have thus far been preoccupying ourselves with relations among the events that form a part of the discourse. However, each of the sentences of a generic passage is a generic state, and not an event (as observed by Chierchia (cited in Partee (1984)), and by de Swart (1993)), and we need to discuss the relations of these states to one another. We assume that states in fact do introduce their own reference times, but unlike events which occur within an associated reference time, states contain their associated reference times. This means that any state is asserted to persist throughout its own reference time, and may or may not persist before and after.

We may begin by asking what relationships the reference times of the sequence of generic states bear to one another in a generic passage. We take it that the summary sentence:

71. Grandma used to bake wonderful pies on Saturdays.

establishes, intuitively, some period of time in the past which the statement is "about" (e.g. back when the narrator lived with his or her grandmother, etc.). Let us call this reference time R_s . The first sentence of the episodic sequence:

72. First, she would go to the orchard on Shady Lane.

Also establishes a reference time for that generic state, let's call it R_e . What then is the relation between R_s and R_e ? Note that the generic state expressed by the summary sentence is something

akin to "When Grandma baked pies, she first would go to the orchard on Shady Lane." Now, how long must that generic state have persisted?

The answer is fairly straightforward: the period of time that the first sentence of the episodic sequence is "about" is the same period as the summary sentence is "about"; that is, $R_s = R_e$. During the whole period of time being talked about that Grandma baked pies on Saturday, during that time, it was typically the case that when she baked the pies, she first went to the orchard. Consider, for example, our intuitions if we make the reference time of the summary sentence explicit, say, talking about the period of time when the narrator of the passage was in grade school. Then, it is clear that Grandma also took her trips to Shady Lane, typically, throughout that period under the stated conditions. We believe we also have somewhat less accessible intuitions that if the actual extent of R_s varies intensionally (e.g. in one world the narrator skips a grade and spends a year less in elementary school), we still take it that R_e is about that same period of time.

In contrast consider an understanding where a sentence of the episodic sequence seems to be "about" a time other than R_s . Consider the following discourse, with the addition of the italicized sentence.

73. My grandmother used to bake the most wonderful pies on Saturdays.

She would go to the orchard on Shady Lane early in the morning.

She used to pick a basket each of apples and peaches.

Then she would go into the kitchen and shoo everyone else away.

She would mix the ingredients for several pies.

Grandma usually used refined sugar.

About 4:00 an irresistible aroma wafted through the entire house.

There are two salient ways to read the italicized sentence with respect to the rest of the discourse. On the one hand, it can be read as meaning that grandma usually used refined sugar in mixing the ingredients for pies (though she may have used refined sugar with other frequencies for other tasks). This is the sort of reading we have been modeling so far, where the event 'grandma use refined sugar' would be subordinate to an event of mixing ingredients for several pies. However, there is another salient reading: where grandma, generally, was a person who used refined sugar (whenever there was a choice) under all circumstances, including making things other than pies. On this reading, the using sugar event would not be represented as subordinate to the mixing event, and does not form a part of the episodic sequence (note, for instance, it would not be a contradiction to say "Grandma usually used refined sugar, but not ever in the baking of pies"). In this latter sense, the position of the sentence in the discourse can be changed, just as in the case of any intrusive generic, without changing its informational contribution to the discourse. On the other hand, where it forms a part of the episodic sequence, its position in general cannot be changed, and make the same informational contribution to the discourse.¹⁴

Now, note that on the latter "intrusive" reading, we have no particular identification of the state reference time with the reference times of anything else in the discourse: grandma might have been a frequent refined-sugar-user life-long, and that is what is intended. However, once the reading requires incorporation into the episodic sequence, the reference time gets set once again to the reference time of the rest of the discourse. From these observations, we note the possibility of an organizational generalization:

- **Only states with identical reference times allow (discourse) inheritance from matrix into restrictor**

We offer this as a descriptive hypothesis about how generic passages are organized; its corollary is:

• **Only empty restrictors allow for inheritance**

That is, if in the semantic partition of a sentence a generic operator creates a restrictor with contents, no such inheritance is possible. So, for instance, individual-level generics generate restrictor clauses with contents, and so do not and cannot form a part of a generic passage, as noted above. While we offer these observations descriptively here, it is our sense that these observations--if sound--should fall out as special instances of a general theory of presupposition inheritance in discourse. Thus, the representation of a generic passage would be a series of states associated with each condition introduced by the GEN operator:

(insert fig. 19 here)

In light of this discussion, we wish to turn our attention briefly to two related pieces of data which can be understood in terms of whether the reference time setting allows for inheritance. Above, we noted that certain types of sentences do not easily have generic readings if taken in isolation. In contrast to "Grandma ate ham sandwiches", which does have a generic reading (alongside a natural episodic reading), "Grandma ate a ham sandwich" does not at first sight appear to have any such generic reading but appears unequivocally episodic. Yet, in the context of a generic passage, we are claiming that such sentences do have generic readings. Note that if a "used to" is inserted:

74. Grandma used to eat a ham sandwich

we have the intuition that such a statement is by itself incomplete--it does not tell us when or under what circumstances grandma did this. In contrast, the example:

75. Grandma used to eat ham sandwiches

appears to have a reading that stands on its own as a statement about grandma's past habits, dispositions, etc. But note that this latter example also can be understood as "incomplete" in the same way as the former example, as somehow leaving open the question of when or under what circumstances grandma would do any such thing.

In the context of a generic passage, note that example (75) is ambiguous between a reading where it forms a part of the episodic sequence, and another reading where it is an intrusive generic that simply gives more information about grandma's general habits. Consider (76):

76. My grandmother used to bake the most wonderful pies on Saturdays.

She would go to the orchard on Shady Lane early in the morning.

She used to pick a basket each of apples and peaches.

Then she would go into the kitchen and shoo everyone else away.

Grandma ate ham sandwiches/Grandma ate a ham sandwich.

About 4:00 an irresistible aroma wafted through the entire house.

Only the first of the two italicized examples has an intrusive reading. We note a similar phenomenon with frequency adverbs. von Fintel (1994) argues that frequency adverbs in general do not actually create a partition of the sentence, but rather owe their restriction to general pragmatic constraints. So, for instance, a sentence like:

77. Tai always eats.

leaves open the circumstances under discussion, yet within a given context the pragmatics may make it clear. Some sentences, though, appear to contain the restricting information themselves. Thus, there is a way of taking the following example (cited in von Fintel, attributed to Quine):

78. Tai always eats with chopsticks.

as meaning something like, whenever Tai eats, she eats with chopsticks. However, (78) can also be taken as leaving the context open, just like (77), saying that there are some conditions under which Tai always eats with chopsticks, which when uttered in isolation are left open.

If we represent an unresolved context as being an empty restrictor (as von Stechow argues we should not), then (77) generates only an empty restrictor, while (78) generates two interpretations, one with an empty restrictor, and one without. Now, if we embed such examples, altered slightly here, into the episodic sequence of a generic passage, we note that the cases where an empty restrictor is generated can form part of the episodic sequence of a passage, whereas the reading attributed to a restrictor with material in it, does not, and only has an intrusive reading:

79. My grandmother used to bake the most wonderful pies on Saturdays.

She would go to the orchard on Shady Lane early in the morning.

She used to pick a basket each of apples and peaches.

Then she would go into the kitchen and shoo everyone else away.

About 4:00 an irresistible aroma wafted through the entire house.

We'd all then sit down at the table.

Grandma always ate/Grandma always ate with chopsticks

Here, the first example ("Grandma always ate") must be interpreted as a part of the episodic sequence; the second ("Grandma always ate with chopsticks") can be interpreted intrusively and so having a reference time not equated to that of the rest of the discourse (i.e. she had a general habit of eating with chopsticks whenever she ate), or as a part of the episodic sequence (i.e. as meaning she ate with chopsticks all those times when we sat down at the table when she baked pies on Saturday) and thus with a reference time equated to the rest of the discourse.

6.5. 'Would' vs. 'used to'. The final phenomenon we'd like to point out is the difference between the use of the modal 'would' in generic passages, vs. the simple past generic and the 'used to' version. As we have seen, in many cases the three are equivalent in interpretation, though the version with 'would' seems in most instances the more natural. However, there is a difference between 'would' and the other two that parallels the contrasts we have just been discussing.

Consider the following in isolation:

- 80. a. Grandma picked apples.
- b. Grandma used to pick apples.
- c. Grandma would pick apples.

The first two, but not the third, can tell us about a past habit/disposition of grandma's, namely, that she was a picker of apples on some sufficient number of occasions. However, the third example intuitively asks us to understand some type of situation in the context in which grandma was an apple-picker with respect to, and cannot "stand on its own" like the first two can. Also, the first two can be understood in the same way as the third, namely, as leaving the context open, and thus appear "incomplete". What we are suggesting, then, is that this use of the modal 'would' necessarily creates a GEN operator with an empty restrictor and an overall reference time that must be set equal to another existing reference time in the discourse; GEN operators introduced by sentences with 'used to' or simple tenses may create similar structures, or else filled restrictors that require no further specification (and, it seems, preclude any). One way of looking at this is that 'would' in the sense under discussion is a genuine modal with a lexical semantics of its own, whereas 'used to' is a marker with no lexical semantics of its own which appears in generic contexts.

Once again, we note that sentences without 'would' can be interpreted in generic passages intrusively, but those with 'would' must form a part of the episodic sequence (or otherwise sound "incomplete"):

81. My grandmother used to bake the most wonderful pies on Saturdays.

She would go to the orchard on Shady Lane early in the morning.

She used to pick apples./She picked apples./She would pick apples..

Then she would go into the kitchen and shoo everyone else away.

About 4:00 an irresistible aroma wafted through the entire house.

The first two, but not the third, can be interpreted intrusively. If we assume 'would' requires the setting of its reference time equal to that of another already introduced into the discourse, it cannot then introduce an independent reference time, and cannot be interpreted intrusively; rather, by virtue of having an empty restrictor, it must inherit the value of the restrictor from the discourse itself, and thus must form a part of the episodic sequence.¹⁵

Let us summarize our claims, then. We have been analyzing generic passages as discourses composed of a sequence of generic states, the generic states being generalizations over events. Each of the generic states introduces a reference time of its own that is included within the temporal extent of that state. It appears that in order to "inherit" the matrix information from a previous generic state by a second state, the reference times must be set as identical, and that this setting requires, or is required by, an empty restrictor. We have not made any claims about why these two should necessarily go together, which we leave as an open question.

7. Conclusion.

The goal of this paper has been to present, examine, and analyze generic passages, and to point out a number of issues for further consideration. While we have employed a suitable descriptive framework in which to couch our conclusions, we have not argued that this particular framework is the only way to express our conclusions. A good many issues could not be properly explored in this paper, including frequency adverbs, negation, disjunction, modality, plurality and NP quantification, etc. We wish to make clear that we do not claim that "generic passages" as presented here are a natural class of constructions. We have intentionally construed the data narrowly in order to explore their structure in enough detail to flesh out the issues, and, in part, to set aside the question of whether (e.g.) instructional sequences or instances of modal subordination are, or are not, 'the same' discourse structures. We leave open the question of whether the principles outlined here can be fruitfully applied to the study of other types of intensionalized discourse.

Footnotes

1. Portions and versions of this paper have been presented at the 1991 LSA Summer Institute Conference on Foundations of Grammar and Prosody, the 1992 Arizona Conference on Linguistic Theory, and at Ohio State University, the University of Alberta, the University of Pennsylvania, and the University of Rochester. We gratefully acknowledge the generous support of NSF/Linguistics grant SBR-9309332 and NSF/IRIS Grant IRI-9503312 in the preparation of this paper.
2. Roberts (1995) discusses cases of modal subordination involving sequences of subordinate sentences, which looks very similar to generic passages as we have identified them here. However, in Roberts' examples, the subordinate sentences are states and do not form a temporally-related sequence as found in the examples we focus on here.

3. We thank Antanas Klimas for his help with the Lithuanian, Julie Sedivy for French, Roberto Zamparelli for Italian, and Montserrat Sanz for Spanish.
4. A consequence of this observation is that frequency adverbs appear in sentences that are classified as generic. This, in fact, is not the standard analysis of such sentences. We omit a defense of this notion here, as we do an analysis of frequency adverbs in generic passages, in order not to be taken too far afield.
5. Nelken and Francez (to appear) show that that the practice of introducing the reference time at the same time as the event variable as we do, rather than beforehand as Partee and Hinrichs do, has the benefit of solving the proportion problem for proposed box-splitting temporal anaphors such as 'before' and 'after'.
6. There are empirical reasons behind this claim. The only case so far that we have found a need to specify the relations between events directly through the event variables is when the events are overtly specified as overlapping one another. In this case, there is no relation that can be specified between reference times that will guarantee overlap of the events themselves, since the reference times may be larger than the event time. However, this seems only to happen in the presence of some overt word with a lexical semantics of its own (e.g. such expressions as "in the meantime", "while", etc.).
7. See footnote 11 for some empirical justification for treating these entailments as facets of the same basic discourse relation.
8. We intend to be theoretically neutral on the question of whether the rhetorical relations found in discourse are calculated independently and then combined with temporal information in a constraint-satisfaction manner, or whether the temporal structure represents the input to such

information. Note that in Lascarides and Asher (1992), it is necessary for them to rely upon a notion of "e-connectedness" in identifying which events form the input to the calculation of such relations. Within the framework here, "e-connected" means either having a reference time that is an adjacent sister to that of another event, or subordinated to it. We also note that the one rhetorical relation that cannot appear in generic passages is that of "explanation" (e.g. the reading of "John fell down. Mary pushed him," where John fell because Mary pushed).

9. When working with 'when' sentences with generic main clauses, we point out that other analyses of the same sentence may exist as well. An example of a sentence in which the generic operator is associated with each of the clauses independently is in (i), on the reading where we are discussing a certain time in history:

i) Wheat was grown in small patches when chariots were still used in battle.

+GEN

+GEN

Or, a more complex interpretation is possible, where there is a law-like relation that holds between two generic states.

ii) Carnivores eat well when herbivores also eat very well.

+GEN

+GEN

+GEN

But we are going to focus on 'when' clauses that introduce a single global operator which semantically relates the two clauses, inducing a partition in the sentence placing the 'when' clause in the restrictor, and the main clause in the matrix.

10. The relationship between the event introduced in a sentence of the episodic sequence and the structure that it gets integrated with is not determinate. The set of options available depends on the

complexity of the event-structure and the normal processes found in ordinary extensional narratives for relating an event to previous events. All these relationships may be found within the episodic sequence of a generic passage. So, for example, subordination of one event to another may be found, as well as coordination and sequencing, coordination and lack of sequencing (a "grab-bag" structure), backgrounding, and the usual attention to 'open' and 'closed' nodes, as discussed above. Since these relations may be defined for any open node in the structure, there is no constant set of alternatives available.

Consider, for example, how we might express these relations in the dynamic framework presented in Chierchia (1992). There, dynamic counterparts of sentence meanings are represented as adding a 'slot' for a proposition. So, the dynamic meaning of a sentence S would be defined by the formula:

$$\lambda p[S' \lambda p]$$

(Here, S' is the meaning of S, and λ is the dynamic counterpart of λ)

We could define a dynamic counterpart to the GEN operator, as follows:

$$\text{GEN}(X) (Y) = \lambda p[\text{GEN} (X) (X \lambda p)]$$

The shortcoming of this solution is that the integration of the proposition p in the matrix requires extra specification: what other events the event recoverable from p is coordinated with, subordinate to, temporally before, overlapping, or after. In other words, not only must the structure of X be made available, but based on the structure of X the rules of discourse relations allow for any number of alternatives.

11. We would, of course, hope that deeper principles would be responsible for this descriptive formulation. There are passages that have sequences of generic states based on individual-level summary sentences, so it doesn't seem reasonable to rule out individual-level states on those grounds alone. Consider the following:

i) Frogs grow in four stages. First, they are tadpoles without legs but with a tail. Then, they have a tail and back legs but no front legs. Then, they have four legs and a tail. Then, finally, they have no tail but have four legs.

Note that this tracks typical the growth and development of an individual frog, and not frogs in general. Each sentence of the episodic sequence would be an individual-level sentence.

12. Above we took it that subordination was a unified phenomenon in spite of its differing entailments. Within the episodic sequence, it is, as pointed out here, natural to have one event subordinate to another. Now consider a case where the temporal relation between the superordinate and subordinate event is not pragmatically determinable, as in the italicized sentences below:

i) Jenny used to set the table with varying amounts of care.

First, she would put the forks on.

She'd clean them with a soft moist rag.

....

Now, on some occasions, she'd clean the forks before putting them on the table, but, if we understand Jenny to be a rather casual person, it is also very easy to understand that on other occasions she cleaned them as she was putting them on, and on still other occasions, after she put them on, as long as all the cleaning is understood as a part of the process of setting the table. Our representations make just this sort of prediction. In most instances, however, the constraints that naturally order such events (e.g. making a getaway happens only after a robbery, whereas phoning in a warning makes sense only before), will make this relation constant among occasions.

13. Note that in ordinary narrative, there will be nothing along the lines discussed in this section that distinguishes coordinate from conjoined events. This is so since every reference time introduced by an event will, in ordinary narrative, be guaranteed to map to a model where each

reference time has an event of the appropriate type within that interval. Thus, presuppositions about there being such an event will always be fulfilled in ordinary extensional narrative whether the previous reference times are open or closed.

14. Yeh (1993) notes that the verbal marker '-guo' in Mandarin gives rise only to what we are calling here "intrusive" readings of what appear to be eventive sentences. It seems quite possible that the marker gives rise to a state but not an empty restrictor, which is under our analysis crucial for an event within a generic state to be able to participate in the episodic sequence.

15. This discussion can bring us back to the analysis of generic 'when' sentences, which we have been assuming not to have an empty restrictor. However, 'when' sentences can appear within the episodic sequence, e.g.

i) a. My grandmother used to bake the most wonderful pies on Saturdays.

b. *When she baked those pies*, she would go to the orchard on Shady Lane early in the morning.

c. *When she baked those pies*, she used to then pick a basket each of apples and peaches...

Note the use of 'then' in (c) as meaning that picking followed going. One possibility is that a generic 'when' sentence, in the main clause, generates an empty restrictor by virtue of being independently generic, which then accommodates the information from the 'when' clause along with other elements of the discourse that could be accommodated. The immediate problem with this is that episodic states are just fine in main clauses of generic 'when' sentences:

i) When John is on the couch, he is asleep.

What is odd about this, though, is that it has no episodic reading despite the fact that either clause alone has one.

References

Banfield, Ann, 1982. *Unspeakable Sentences*. London: Routledge and Kegan Paul.

Banfield, Ann, 1985. *Grammar and Memory*. Niepokuj, M., VanClay, M. Nikiforidou, V and Feder, D. (eds.). *Proceedings of the Eleventh Annual Meeting of the Berkeley Linguistics Society*, Berkeley, CA.

Carlson, Greg, 1980. *Reference to Kinds in English*. NY: Garland Press.

Carlson, Greg 1989. *The Semantic Composition of English Generic Sentences*. In G. Chierchia, B. Partee, and R. Turner (eds), *Properties, Types and Meaning*, Vol. 2, 167-91. Dordrecht: Kluwer.

Chierchia, Gennaro, 1992. *Anaphora and Dynamic Binding*. *Linguistics and Philosophy* 15, 2, 111-183.

Chierchia, Gennaro, 1995. *Individual-Level Predicates as Inherent Generics*. In G. Carlson and F.J. Pelletier (eds), *the Generic Book*. Chicago: University of Chicago Press. 176-223.

Csuri, Piroska, 1995. *Generalized Referential Dependencies*. Unpublished Doctoral Dissertation, Brandeis University.

- Dahl, Östen, 1975. On Generics. In E. Keenan, ed., *Formal Semantics of Natural Language*, 99-111. Cambridge: Cambridge University Press.
- Dahl, Östen, 1985. *Tense and Aspect Systems*. Oxford: Blackwell.
- Dahl, Östen, 1995. The Marking of the Episodic/Generic Distinction in Tense-Aspect Systems. In G. Carlson and F.J. Pelletier (eds), *the Generic Book*. Chicago. 412-26.
- de Swart, Henriëtte, 1991. *Adverbs of Quantification: A Generalized Quantifier Approach*. PhD thesis, Groningen. (Also published by Garland, New York, in the *Outstanding Dissertations in Linguistics series*.)
- Diesing, Molly, 1992. *Indefinites*. Cambridge, MA: MIT Press.
- Grosz, Barbara and Candace Sidner, 1988. Attention, Intentions, and the Structure of Discourse. *Computational Linguistics*, 12, No. 3, 175-204.
- Heim, Irene, 1982. *The Semantics of Definite and Indefinite Noun Phrases in English*, Dissertation. University of Massachusetts, Amherst.
- Hinrichs, Erhard, 1986. Temporal Anaphora in Discourses of English. *Linguistics and Philosophy*, 9, 63-82.
- Kadmon, Nirit, 1990. Uniqueness. *Linguistics and Philosophy* 13, 273-324.

- Kamp, Hans, 1981. A Theory of Truth and Representation. In J. Groenendijk, T. Janssen, and M. Stokhof, eds, *Formal Methods in the Study of Language*, 277-322. Amsterdam: Mathematisch Centrum.
- Kamp, Hans and Uwe Reyle, 1993. *From Discourse to Logic*. Dordrecht, The Netherlands: Kluwer.
- Kamp, Hans and Christian Rohrer, 1983. Tense in Texts. In Bäuerle, R, Schwarze, C, and von Stechow, A (eds.), *Meaning, Use and Interpretation of Language*. de Gruyter, 250-269.
- Kratzer, Angelika, 1981. The Notional Category of Modality. In H.J. Eikmeyer and H. Reiser (eds.) *Words, Worlds, and Contexts: New Approaches in Word Semantics*, Berlin: Walter de Gruyter.
- Kratzer, Angelika, 1995. Stage-level and Individual-level predicates. In Carlson, G, and Pelletier, J, (eds.), *The Generic Book*. Chicago University Press, 125-175.
- Krifka, Manfred, 1987. An Outline of Genericity. SNS-Bericht 87-23. Tübingen: University of Tübingen. (in partial collaboration with Claudia Gerstner)
- Krifka, Manfred (1989). Nominal Reference, Temporal Constitution, and Quantification in Event Semantics. In J. van Bentham, R. Bartsch, and P. van Emda Boas, eds., *Semantics and Contextual Expression*, 75-115. Dordrecht: Foris.
- Krifka, Manfred, et al, 1995. Genericity: An Introduction. In G. Carlson and F.J. Pelletier (eds.), *The Generic Book*, 1-124. Chicago: University of Chicago Press.

- Lascarides, Alex and Nicholas Asher, 1991. Discourse Relations and Defeasible Knowledge. In Proceedings of the 29th Meeting of the ACL, Berkeley, CA.
- Lascarides, Alex and Nicholas Asher, 1993. Temporal Interpretation, Discourse Relations and Commonsense Entailment. *Linguistics and Philosophy*, 16, 437-493.
- Lewis, David, 1975. Adverbs of Quantification. In Keenan (ed.), *Formal Semantics of Natural Language*. Cambridge University Press, Cambridge, pp. 3-15.
- Mann, William C. and Sandra A. Thompson, 1983. Relational Propositions in Discourse. USC/Information Sciences Institute, Technical Report RR-83-115, July 1983.
- Moens, Marc and Mark Steedman, 1988. Temporal Ontology and Temporal Reference. *Computational Linguistics*, 14, No. 2, 15-28.
- Molendijk, Arie, 1993, Temporal Anaphora and Tense Use in French. In P. Dekker and M. Stokhof, eds, *Proceedings of the Ninth Amsterdam Colloquium*. University of Amsterdam, 427-45.
- Nelken, Rani and Nissim Francez, to appear. Splitting the Reference Time: The analogy between Nominal and Temporal Anaphora Revisited. Manuscript.
- Parsons, Terence, 1994. Anaphoric Pronouns in Very Late Medieval Suppositional Theory. *Linguistics and Philosophy* 17, 429-446.
- Partee, Barbara, 1973. Some Structural Analogies Between Tenses and Pronouns in English. *Journal of Philosophy* 70, 601-9.

- Partee, Barbara, 1984. Nominal and Temporal Anaphora. *Linguistics and Philosophy*, 7 243-286.
- Partee, Barbara, 1995. Quantificational Structures and Compositionality. In E. Bach, E. Jelinek, A. Kratzer, and B. Partee (eds), *Quantification in Natural Languages*, 541-602. Dordrecht: Kluwer.
- Polanyi, Livia, 1985. A Theory of Discourse Structure and Discourse Coherence. In W.H. Eilfort, P.D. Kroeber, and K.L. Peterson (eds.), *Papers from the General Session at the Twenty-First Regional Meeting of the Chicago Linguistics Society, Chicago, April 25-27, 1985*.
- Polanyi, Livia, 1986. Keeping it Straight: Interpreting Narrative Time in Real Discourse. *Proceedings of the Berkeley Linguistic Society*. 229-45.
- Polanyi, Livia, 1988. A Formal Model of the Structure of Discourse. *Journal of Pragmatics*, 12, 601-638.
- Ritchie, Graeme D., 1979. Temporal clauses in English. *Theoretical Linguistics*, 6, 89-115.
- Roberts, Craige, 1987. Modal Subordination, Anaphora, and Distributivity. Ph.D. Dissertation, University of Massachusetts, Amherst.
- Roberts, Craige, 1989. Modal Subordination and Pronominal Anaphora in Discourse, *Linguistics and Philosophy* 12, 683-721.

- Roberts, Craige, 1995. Domain Restriction in Dynamic Semantics. In E. Bach, E. Jelinek, A. Kratzer, and B. Partee (eds), *Quantification in Natural Languages*, 661-700. Dordrecht: Kluwer.
- Sandström, Görel, 1993. *When-Clauses and the Temporal Interpretation of Narrative Discourse*. Dissertation, University of Umeå, Published by the Department of General Linguistics as Report 34, 1993.
- Spejewski, Beverly, 1994. *Temporal Subordination in Discourse*. Ph.D. Dissertation, University of Rochester.
- Spejewski, Beverly and Greg N. Carlson, 1992. *Reference Time Relations*. Proceedings from the Eastern States Conference on Linguistics, Baltimore, The Ohio State University Press.
- Spejewski, Beverly and Greg N. Carlson, 1993. *Modification of Event Relations*. Proceedings from the 23rd Annual Conference of the North Eastern Linguistics Society, Ottawa, Canada, published by the Graduate Linguistics Students Association of University of Massachusetts.
- ter Meulen, Alice, 1995. *Representing Time in Natural Language*. Cambridge, MA: MIT Press.
- Thompson, Sandra and William C. Mann, 1987. *Rhetorical Structure Theory: A Framework for the Analysis of Texts*. *International Pragmatics Association Papers in Pragmatics*, 1, 79-105.
- Vendler, Z., 1967. *Verbs and times*. *Linguistics in Philosophy*, 97-121. Ithaca, NY: Cornell University Press.

von Fintel, Kai, 1994. Restrictions on Quantifier Domains. Ph.D. Dissertation, University of Massachusetts, Amherst.

Webber, Bonnie, 1988. Tense as Discourse Anaphor. *Computational Linguistics* 14, 61-73.

Webber, Bonnie, 1991. Structure and Ostension in the Interpretation of Discourse Deixis. *Language and Cognitive Processes*, 6, 107-135.

Yeh, Meng, 1993. The Experiential *-Guo* in Mandarin: A Quantificational Approach. University of Texas at Austin Ph.D. Dissertation.

Zucchi, Alessandro, and M. Poesio, 1992. On Telescoping. In C. Barker and D. Dowty (eds.), *Proceedings of the Second conference on Semantics and Linguistic Theory*, 347-66. Working Papers in Linguistics No. 40, Department of Linguistics, Ohio State University.