

<THIS IS A NEAR-FINAL DRAFT OF THE PRINTED VERSION, MISSING
SOME CORRECTIONS MADE TO PROOFS>

Eventualities and Narrative Progression¹

1 Underlying Events

The idea that verbs stand for events and states, and that subject and direct object stand for participants in those events or states has been with us since antiquity.² This idea was incorporated into formal semantics by Reichenbach (1947). Davidson (1967) argued convincingly that a use of a verb does not stand for a *particular* event; rather, the verb picks out a *kind* of event, and the logical form of a sentence says that an event of that kind occurs. Davidson confined his analysis to event sentences; I believe that it extends to state sentences as well (see Parsons 2000).

I follow Bach (1986) in using the term ‘eventuality’ to stand neutrally for events and states. A typical simple sentence then will have a logical form with the structure:

“For some eventuality e , . . . e . . .”,

or just

“ $\exists e\phi e$ ”,

where the dots or the ‘ ϕ ’ are filled in with conditions supplied by the parts of the sentence. For example, “*Agatha left*” will have the form “ $\exists e(e$ is a leaving & the agent of $e =$ Agatha). The advantage of attributing such forms to sentences has been argued extensively, and I will not repeat it here.

My topic involves how to add tense to such forms. In “*Agatha left*” there is nothing in the form proposed above to show that the leaving took place in the past; that clearly needs to be rectified.

In section 2, I describe the simplest elements of a sentence that show up between the subject and the main verb phrase (VP), the elements that indicate the time of occurrence of the eventuality. Section 3 gives the core of an algorithm for assigning logical forms to simple sentences, including the tense materials. Section 4 describes the main types of narrative progression. Section 5 expands the logical forms of narrative sentences so as to make explicit their relations to one another. Section 6 briefly discusses how logical forms should constitute a narrative; some problems remain open.

¹ For this anniversary issue of *L&P* it would be appropriate to write a survey of the area that it has served for the last 25 years. However it is to the credit of the journal that the range of topics dealt with has been both too broad and too deep to be informatively summarized. Instead, my essay is intended to be typical of one sort of topic that the journal publishes, a topic that straddles philosophy of language, semantics, and pragmatics.

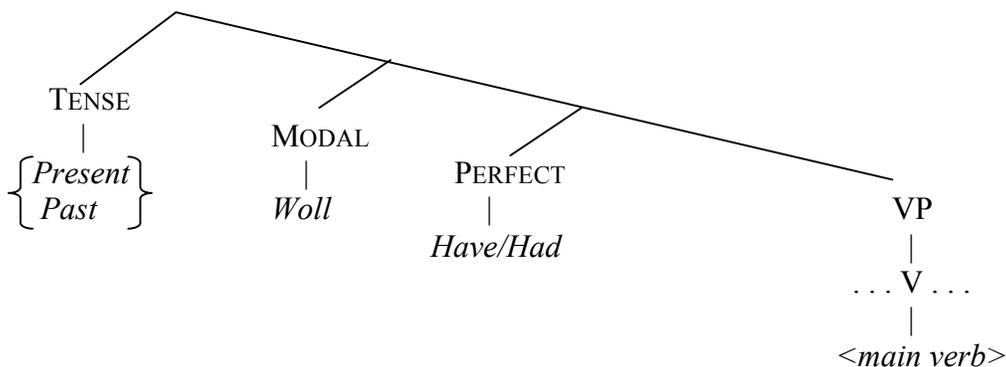
Similarly, the ideas that feed into this particular essay themselves have such a wide and rich history that I have despaired to producing a full set of references to previous work in the field(s) on which this work is based. Any detailed set of references would slight authors whose work has contributed importantly to this project. My impression is that the ideas on which I have relied are by now all common knowledge -- and thus I have provided only minimal references.

² In modern nontechnical grammar the word ‘action’ is used instead of ‘event’; the subject is identified as the “doer” of the action and the direct object the thing that “receives” the action.

2 Syntax

In English, tense *in the broad sense* includes past and present verb inflections, the modal ‘will’, and the perfect with ‘have’. Tense *in the strict sense* is an inflection operating on a verb. In many languages there are three tense inflections that a verb may take: Past, Present, and Future. English has no Future tense in this strict sense -- there is no “future” verb form -- rather, we have “periphrastic” forms for the future, such as the present tense plus the modal ‘will’ (“*She will leave*”) or the present progressive of ‘go’ followed by an infinitival clause (“*She is going to leave*”).

In this paper I ignore the form with ‘go’.³ I deal with three items which precede the main verb to assign tense in the broad sense: Strict Tense, Modal, and Perfect:



- The TENSE node is obligatory; it is either *Present* or *Past*, and it combines with the first verb to its right. If there is no modal or perfect in the sentence, the tense combines with the main verb, as in “*Agatha Present+left*” = “*Agatha leaves*”.⁴
- The MODAL node is optional. The word ‘*woll*’ used here is an invented root for the verb whose present tense form is ‘*will*’ and whose past tense form is ‘*would*’. The strict tense combines with the modal, yielding *Present+woll* = *will*, or *Past+woll* = *would*. The tense inflection is thus used up, and nothing to the right of the modal is inflected.⁵
- The PERFECT node is also optional. If the perfect occurs, and there is no modal, the tense combines with the perfective, yielding *Present+Have/Had* = *have*, or *Past+Have/Had* = *had*. The tense inflection is thus used up, and nothing to the right of the perfect has a tense inflection⁶.

These principles yield eight options: four in the present tense and four in the past:

³ I also ignore the Progressive (“*Maria is singing*”), which behaves somewhat differently than these others.

⁴ Many authors (e.g. Enc 19nn) believe that there is no strict present tense in English; rather, what we call the present inflection is actually the infinitive form of the verb, inflected not for tense but for subject agreement. On this view there are two settings for tense: +Past, which is the past tense, and –Past, which is the absence of tense; what we here call here the semantics of the present tense is strictly the semantics of –Past.

⁵ I ignore the other modals, such as ‘*may*’ or ‘*must*’.

⁶ The verb to the right of perfective ‘*have*’ appears in its past participle form. I ignore this complication.

Maria eats
Maria will eat
Maria has eaten
Maria will have eaten.

Maria ate
Maria would eat
Maria had eaten
Maria would have eaten.

3 Semantics

There is a simple way to construct logical forms for these items, using the method of underlying eventualities.⁷ We first suppose that parts of the VP characterize an eventuality variable, so that the logical form associated with the VP will be a formula with a free variable ‘e’. For example, the logical form of the VP:⁸

Brutus stab Caesar

is something with this form:

e is a stabbing of Caesar by Brutus

(The ‘is a stabbing of Caesar by Brutus’ following the variable actually has a complex and interesting structure that is not under discussion here.) If there is no modal or perfect then the tense *anchors* the event variable to a *point of view*, which in non-narrative discourse is usually, though not always, the time of utterance of the sentence. I will use ‘ π ’ for this point of view.⁹ The present tense says that the eventuality occurs at the time of the point of view, and the past says that it occurs earlier. So these sentences yield the indicated forms:¹⁰

Maria sees the cat **e \approx π & e is a seeing of the cat by Maria**

Maria saw the cat **e < π & e is a seeing of the cat by Maria**

The upper sentence identifies a kind of eventuality as a seeing of the cat by Maria now, and the lower as a seeing of the cat by Maria earlier than now, where “now” means the

⁷ What follows is not peculiar to the underlying event approach; equivalent forms are available e.g. in Discourse Representation Theory; cf. Kamp & Reyle 1993.

⁸ For simplicity I adopt the hypothesis that the subject of the sentence originates within the VP and is moved earlier in the sentence by a transformation that is not semantically relevant.

⁹ This leaves it unclear whether the point of view is a time or an eventuality. One can either take temporal relations such as “earlier than” to relate eventualities, or to relate the times at which such eventualities occur. Since that choice is not relevant to the topic under discussion here I am occasionally careless about which option is presupposed. As a default, assume that temporal relations are always relations between eventualities, and reconstrue references to times accordingly.

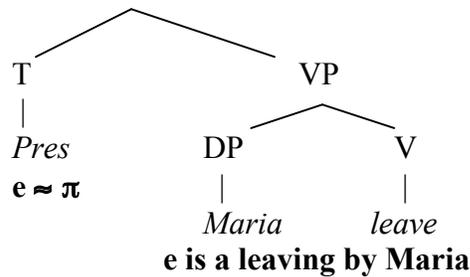
¹⁰ It is a matter of some difficulty to give the truth conditions for ‘ \approx ’ and ‘<’, that is, to say when one eventuality is at the same time as another, or is earlier than another. One difficulty is that we have no clear data about what the results are supposed to be. So if Maria wins a race exactly when I begin uttering “*Maria won the race*” should my utterance be true? What if John shuts the door by kicking it, and because of the way it is mounted, it takes three seconds to fully close? If I say “*John closed the door*” after he kicked it but while it is still swinging, is my utterance true? Or “*Maria thinks the cat is sick*” if she starts to think that just as I pronounce the last word? These uncertainties are reflected in our usage -- that is, native speakers vacillate about close cases.

time of the point of view. The full sentences say more than this; they say that *there is* an event of that kind. So the final logical form will either have a default existential quantifier placed on the front, or (as in DRT) there will be no quantifier, but the semantic theory will tread it as if it were existentially quantified. I will take for granted that if there are to be explicit quantifiers, they are put on last, and I omit them below in order to concentrate on the other material.

3.1 Strict Tense

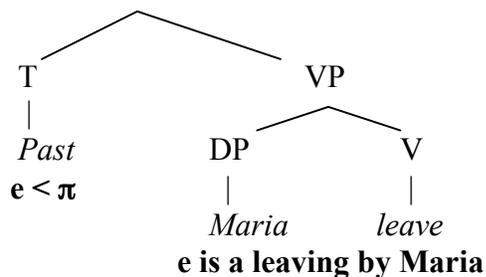
The rule for strict tenses combines the logical form of the tense with the logical form of the part of the sentence to its right. If α is a free eventuality variable that appears with the verb in the logical form for that sentence part, then the present tense conjoins ' $\alpha \approx \pi$ ' to that logical form, and the past conjoins ' $\alpha < \pi$ '.

Maria leaves:



Overall form: $e \approx \pi$ & e is a leaving by Maria

Maria left:



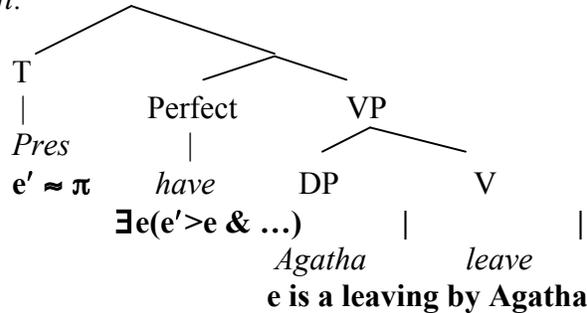
Overall form: $e < \pi$ & e is a leaving by Maria

3.2 The Perfect and the Modal

The perfect and the modal are roughly on a par: each is essentially the reverse of the other. Each of them replaces the eventuality under discussion with a state, temporally related to the eventuality replaced. The perfect introduces a state which holds after the eventuality contributed by the main verb, and the modal introduces a state which holds before the eventuality contributed by the main verb, or by the perfect+main verb if the perfect is present.

Suppose that the logical form of ‘*Agatha leave*’ is ‘**e is a leaving by Agatha**’. The perfect converts this form into ‘ $\exists e(e' > e \ \& \ \mathbf{e \text{ is a leaving by Agatha}})$ ’. This is a formula with a free variable e' which characterizes e' as being a state which occurs after some leaving by Agatha. Because ‘ e ’ has been bound by the inserted existential quantifier in adding the perfect it is no longer visible from outside, and the tense of the sentence (if there is no modal) anchors the new variable ‘ e' ’ to the point of view, instead of anchoring the main verb variable ‘ e ’. Here are the logical forms associated with the parts of ‘*Agatha has left*’:

Agatha has left:

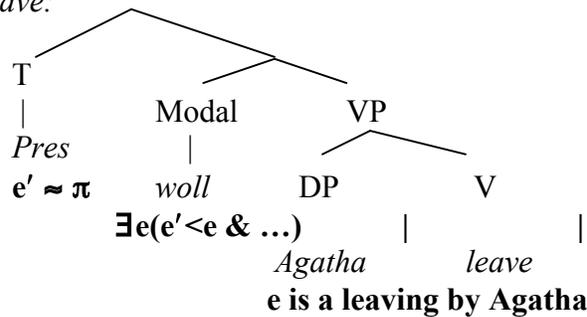


Overall: $e' \approx \pi \ \& \ \exists e(e' > e \ \& \ \mathbf{e \text{ is a leaving by Agatha}})$

An utterance of this sentence is true if and only if there is some state e' which occurs at the point of view and which is later than an event e of Agatha’s leaving. So it is true if and only if a leaving by Agatha takes place before the point of view.

The modal ‘*woll*’ combines in exactly the same way, except that the new state is temporally ordered *before* the eventuality characterized by the remainder of the sentence. Parallel to the example just given, here are the logical forms associated with the parts of ‘*Agatha will leave*’:

Agatha will leave:

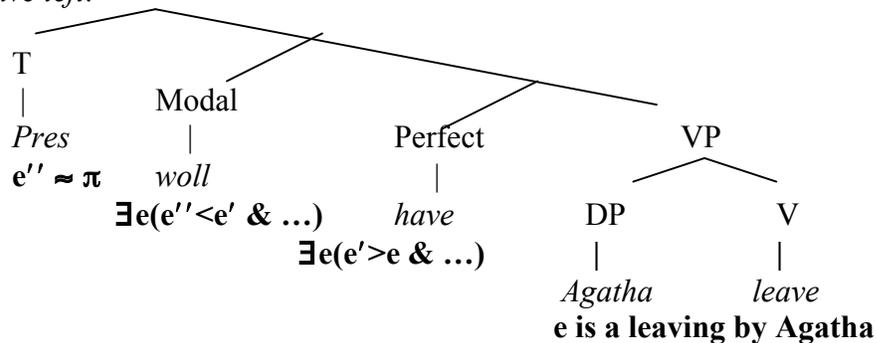


$e' \approx \pi \ \& \ \exists e(e' < e \ \& \ \mathbf{e \text{ is a leaving by Agatha}})$

An utterance of this sentence is true if and only if there is some state e' which occurs at the point of view and which is before an event e of Agatha’s leaving. So it is true if and only if a leaving by Agatha takes place after the point of view.

These principles work recursively, and so we automatically have an account of the modal perfect, as in ‘*Agatha will have left*’:

Agatha will have left:



$$e'' \approx \pi \ \& \ \exists e'(e'' < e' \ \& \ \exists e(e' > e \ \& \ e \text{ is a leaving by Agatha}))$$

An utterance of this sentence is true if and only if there is some state e'' which occurs at the point of view and which is before a state e' , which is itself after a state e of Agatha’s leaving. So it is true if and only if a leaving by Agatha takes place before a time that is after the point of view.

3.3 An odd phenomenon

The truth conditions just given for the modal perfect are peculiar, in that they do not by themselves pin down the time of Agatha’s leaving at all. For *any* time is before a time which is after the point of view, no matter when the point of view is. Notice that this oddity comes from our natural understanding of the English sentence itself; if you reflect on “*Agatha will have left*” it seems to be in some sense incomplete. You want to say “*When* will be the time at which Agatha has left?”. In normal usage the time is pinned down either by context or by additional material in the sentence. For example, temporal adverbials or subordinate clauses functioning adverbially in the sentence place constraints on the occurrence of the eventuality contributed by the main verb, or on the state contributed by the perfect, or the state contributed by the modal. Natural readings of the following illustrate this:

- Agatha will have left at noon.* <leaving is at noon>
- At noon, Agatha will have left.* <state of having left is at noon>
- Right now, she will return.* <state of being going to return holds right now>

More typically, there are contextual constraints on the times of the various states, or else the times are constrained by knowledge of when it is possible for them to occur. Often there is a certain future time under discussion. This happens e.g. when a sentence is embedded in a narrative. I turn next to how narratives constrain the times.

4 Narrative Progression

Utterances may or may not be interpreted as forming part of a narrative. The sentence ‘*Agatha will have left*’, interpreted on its own, needs some kind of contextual interpretation to constrain the future time alluded to. If it is interpreted as part of a narrative, the rest of the narrative provides this need. Example:

“*Bob will arrive in the afternoon. Agatha will have left.*”

Here, the future time alluded to must be the time of Bob’s arrival. Such cross-sentence constraining within narrative is the subject of this section.

4.1 Idealizations

I concentrate on the mainest of the main: narratives in which event sentences “advance the time”, and state sentences do not advance the time.¹¹ The event of Maria’s standing up is understood to occur *after* Fred’s walking in, in this example:

Fred walked in. Maria stood up.

whereas the state of its being dark is understood to hold *when* he walks in in this example:

Fred walked in. It was dark.

There are a number of ways in which actual narratives depart from this neat sort of dichotomy. Some are well-understood alterations of the overall progression pattern. These include:

Departures from the narrative so that the author can insert observations about human affairs, or other profundities.

Breaks in the sequence, such as flashbacks wherein the progression starts anew in the same mode as before but representing a sequence of events that occurred earlier than the series that is being broken away from

Multiple beginnings, when several characters are each introduced from scratch, only later to get together in the main narrative.

There are other well-known variations within the main narrative.¹² These include:

Enhancements: An event is mentioned, and then its parts are given:

She fixed the problem. She opened the hood, removed the distributor cap, removed and cleaned the rotor, and reinserted it.

Explanations: An event is mentioned, and then some others are mentioned to explain it:

¹¹ This principle is not applicable to the first sentence in a narrative, since there is as yet no time to advance from or to stay at.

¹² Lascarides and Asher 1993 investigate principles that permit one to predict when such variations do or do not take place. They show how world knowledge is needed to decide this, working within the primary narrative past. It would be interesting to extend their study to secondary progressions.

She fell off the bike. The maintenance people left gravel on the road, and she skidded on it and became unstable.

I will ignore all of these complications, focusing only on the simple parts of narratives in which event sentences advance the time and state sentences leave you at the same time you were at in the previous sentence.

4.2 Types of Narrative Progression

4.2.1 Primary Types of Narrative Progression

There are three types of *primary narrative progression*:

the narrative past
the narrative present
the narrative future

These types are primary in that narratives always take one of these three forms. There is no a priori reason why other forms could not be used,¹³ but these are the ones that are in fact used. By far, the narrative past is the most commonly used type of progression, with the narrative present second. The narrative future is somewhat rare, being mostly limited to nonfiction, such as when giving someone instructions about what should be done:

“You will enter through the left door. There will be another door to your right. It will be locked. . . .”

Here is an example of a narrative past, and a description of what I take to be its understood temporal structure:

“He walked in. The yard was gloomy. He had prepared himself. He struck out at the dragon. The dragon lunged and bit off his hand. It would grow back later.”

This will be interpreted as if there are successive times t_1 , t_2 , t_3 , and t_4 , such that:

at t_1 : He walks in.
It is gloomy.
He has prepared himself (preparation is before t_1)
at t_2 : He strikes out.
at t_3 : The dragon lunges.
at t_4 : The dragon bites off his hand.
It will grow back later (growing back is later than t_4)

Each of t_1 - t_4 are understood to be previous to the time of the viewpoint, which itself remains static. That viewpoint may itself be in the past if, e.g., the story is thought of as being narrated in 1922, or in the future if thought of as narrated in 2050. It is often in the present if the narrative is understood to be factual. Typically the viewpoint remains static. But in either fictional or factual discourse the viewpoint may shift in the course of

¹³ For example, we could freely intermingle past and present tense forms in the text. (Authors sometimes do switch between past and present, but only in major blocks of uniform text, and we then interpret them as switching back and forth between the narrative past and the narrative present, instead of interpreting them as using a distinct “free” form.)

the story-telling, especially if e.g. the narrative is being told in installments over a period of years, and the viewpoint is considered to be the time of the telling of the current installment.

Here is the same story in the narrative present:

“He walks in. The yard is gloomy. He has prepared himself. He strikes out at the dragon. The dragon lunges and bites off his hand. It will grow back later.”

This will again be interpreted as if there are successive times t_1 , t_2 , t_3 , and t_4 :

- at t_1 : He walks in.
It is gloomy.
He has prepared himself (before t_1)
- at t_2 : He strikes out.
- at t_3 : The dragon lunges.
- at t_4 : The dragon bites off his hand.
It will grow back later (= later than t_4)

Here the times are all identical with that of the viewpoint, which itself is considered to advance as the story progresses. There is nothing in the text to indicate the relation of the viewpoint to the time of utterance. So if the narrative is interpreted as factual, no relation is assumed relating the viewpoint to the time that the story is told. (We would normally assume a viewpoint that is previous to the telling-time, since we normally assume that the speaker has knowledge of the events in question, or is feigning such knowledge if the story is fictional. But the speaker may be relating what s/he believes will happen based on a script or a plan. There is nothing in our understanding of the story that itself pins it down in time.)

Here is the same story told in the narrative future:

“He will walk in. The yard will be gloomy. He will have prepared himself. He will strike out at the dragon. The dragon will lunge and bite off his hand. It will grow back later.”

This will be interpreted as if there are successive times t_1 , t_2 , t_3 , and t_4 :

- at t_1 : He walks in.
It is gloomy.
He has prepared himself (before t_1).
- at t_2 : He strikes out.
- at t_3 : The dragon lunges.
- at t_4 : The dragon bites off his hand.
It will grow back later (= later than t_4)

This form of progression is primarily used in factual narrative, rarely in fiction. If the narrative is interpreted as factual, the viewpoint is usually that of the utterance time. If it is understood as fictional, one is feigning a telling of a nonfictional account; each of t_1 - t_4

*He will prepare for battle. He will attack the dragon. His hand will be bitten off.
But it will grow back. Still, he will lose. He will go into politics.*

(For this story line to be feasible imagine that it described a video game in which charms make the hand grow back immediately.) But in the following excerpt interpreted as in the narrative present, the same clause occurs, and it is the future-making state (its going to be the case that his hand is bitten off) that is ordered with respect to the sequence of eventualities reported (it is located at the same time as the attacking).

He prepares for battle, unaware of what lies in wait for him. He attacks the dragon. His hand will be bitten off, but it will grow back though he doesn't know that yet. He loses. He goes into politics.

The biting off and growing back events are not ordered at all as part of the narrative progression. One only knows that they are after the attacking by adding something to the narrative ordering, namely the future meaning of 'will'. In fact, whether the growing back precedes or follows the losing is not determined at all by the text. The biting off precedes the growing back if the underlined phrase above is interpreted as a secondary narrative future. (In this case the meanings of the conjuncts strongly suggest that the growing back follows the biting off, so there is some redundancy here.)

4.2.3 Tertiary types of Narrative Progression

There are two types of *tertiary narrative progression*, which produce substories within a secondary progression by the use of a series of (past or present) modal perfect state sentences.

perfect within a secondary future within a primary past
perfect within a secondary future within a primary present

These are too complicated to be common. An example is the doubly underlined portion of the following text:

"He walked in. The yard was gloomy. He had prepared himself. He struck out at the dragon. The dragon lunged and bit off his hand. It would grow back later. In fact, it would be better than new, since it would have grown back stronger. He would have gone to the the Tucson clinic, and got it examined, and treated. They would have released him soon thereafter. It would continue to get even stronger. But he didn't know that now, and he retreated to his camp in despair."

5 Which Eventualities Progress?

Which eventualities in the logical forms of these sentences make up the series in a narrative progression? In a sentence such as ‘*She had left*’ or ‘*She will leave*’ there are two eventuality variables, one at the VP level for the leaving, and one just below the tense level for the subsequent (perfective) or previous (modal) state. The sequence of times in the progression are times at which certain eventualities hold; but which? The answer depends on the type of narrative progression.

Narrative Past: Looking first at the narrative past, it is easy to see from the “time charts” given above that the progression of times is a progression of the times of the highest eventuality in each sentence; no matter how complex the sentence, it is the “top” eventuality – the one that the tense anchors – that is temporally ordered with respect to the top eventuality of the previous sentence in the progression. This can be determined by inspection of the logical forms associated with the first sample text in section 4.2.1.

Narrative Present: The same is true for the narrative present. See the second text in 4.2.1.

Narrative Future: In the narrative future the pattern of the narrative past and present does *not* hold; instead, the eventuality *just below* the modal node is ordered within the series. (This is illustrated in the third text in 4.2.1.) So the sentence:

She will leave

occurring as part of a narrative present will have the time of its modal state ordered with respect to the other parts of the story, but occurring in a narrative future it will be the time of the leaving that is ordered with respect to the others.

Secondary Narratives: A secondary narrative is an ordering within an ordering. This can only happen when there is a series of states in the primary series that hold at the same time with respect to the primary ordering: a series of simultaneous future-making states or of simultaneous perfective-making states. This series of states is part of the primary narrative structure. Each such state is generated by an eventuality characterized at a deeper level (at the perfective level in a series of future constructions, or at the progressive level, or at the VP level, whichever is highest), and the series of these deeper eventualities forms the secondary progression. For an example, consider the embedded part of the example in 4.2.2; each of the states hold at the time of the hand-biting, and each of the states is linked to a future event or state in the logical form. The sequence of these further eventualities form the secondary progression.

Tertiary Narratives: In the case of tertiary orderings, we get a progression within a progression within a progression, and in this case the only things that are left to order are the eventualities picked out by the VP node (or the progressive node, if present).

6 Logical Forms

In narrative progression, eventualities are presumed to be ordered with respect to others, and this presumed ordering is not (usually) encoded explicitly in the wording of the sentences themselves. How are these orderings to be given an explicit semantic (or pragmatic) representation? This will be addressed in two steps: the introduction of temporal parameters into logical forms, and then speculation about how these parameters ought to be related.

Step 1: Introducing parameters: To begin, we need to make the temporal narrative-time parameters explicit in the logical forms. All narratives will have a primary narrative time, call it *primnt*. In the primary narrative present and narrative past, we add a conjunct of the form ‘ $e \approx \text{primnt}$ ’ to the clause given by the tense node. (The clause to which it is conjoined will be of the form ‘ $e \approx \pi$ ’ for the narrative present, and ‘ $e < \pi$ ’ for the narrative past.) For the primary narrative future we add a conjunct of the form ‘ $e \approx \text{primnt}$ ’ to the clause contributed by the modal condition, where e is the variable for the eventuality that is said to be later than the modal state which is constrained by the tense. For example, the form for ‘*He will walk in*’:

$$e' \approx \pi \ \& \ \exists e[e' < e \ \& \ e \text{ is a walking in by him}]$$

becomes:

$$e' \approx \pi \ \& \ \exists e[e \approx \text{primnt} \ \& \ e' < e \ \& \ e \text{ is a walking in by him}]$$

Secondary narratives will need a secondary narrative time parameter, *secnt*. A clause of the form ‘ $e^n \approx \text{secnt}$ ’ will be conjoined to the initial clause containing the first eventuality variable below the one used with ‘*primnt*’. For example, the form for ‘*He will have walked in*’ used in a secondary perfect narrative within a primary future narrative will initially be:

$$e \approx \pi \ \& \ \exists e'[e < e' \ \& \ \exists e''[e' > e'' \ \& \ e'' \text{ is a walking in by him}]]$$

This will become:

$$e \approx \pi \ \& \ \exists e'[e' \approx \text{primnt} \ \& \ e < e' \ \& \ \exists e''[e'' \approx \text{secnt} \ \& \ e' > e'' \ \& \ e'' \text{ is a walking in by him}]]$$

Similarly for tertiary narratives.

Once this is done, the parameters need to be linked with the similar ones (if any) in the previous sentence. This will mean adding conjuncts of the form (where ‘*primnt*_{PREVIOUS}’ is the *primnt* parameter from the previous sentence):

$$\begin{aligned} &\text{primnt} \ \# \ \text{primnt}_{\text{PREVIOUS}} \\ &\text{secnt} \ \# \ \text{secnt}_{\text{PREVIOUS}} \\ &\text{tertnt} \ \# \ \text{tertnt}_{\text{PREVIOUS}} \end{aligned}$$

where ‘#’ is ‘ \approx ’ if the current narrative time parameter is linked to a state variable, and ‘>’ if it is linked to an event variable. So e.g. the final logical form for ‘*He will have walked in*’ used in a secondary perfect narrative within a primary future narrative will end up as:

$e \approx \pi \ \& \ \exists e' [e' \approx \text{primnt} \ \& \ \text{primnt} \approx \text{primnt}_{\text{PREVIOUS}} \ \& \ e < e' \ \& \ \exists e'' [e'' \approx \text{secnt} \ \& \ \text{secnt} > \text{secnt}_{\text{PREVIOUS}} \ \& \ e' > e'' \ \& \ e'' \text{ is a walking in by him}]]$

The sketch just given is a terse one, couched in terms of the notation of the theory of logical forms used here. Working out the details should be mostly straightforward. I do not attempt it here, since, as above, there would be little interest in the particular way that I would proceed, and since details will vary with the syntactic-semantic framework used by the researcher. It seems to me that the task will be straightforward to implement in most frameworks.

Step 2: Using the parameters: The second step is to combine these logical forms into a narrative. This appears to raise foundational issues that I don't know how to answer. For it is not clear what we expect a "narrative" to be.

We cannot say that a narrative is a series of sentences, each with its own meaning. For the sentential parts of a narrative are not understood to be independent of one another; this is what makes it a *narrative*.

This difficulty is overcome if we identify a narrative with the conjunction of the (linked) sentences making it up, with the parameters all existentially quantified with scope over the whole conjunction. This identifies a narrative with a "big" proposition. This is not immediately absurd; for example, it gives a neat account of when a narrative is entirely true: it is entirely true when that big conjunction is true. But in the case of fictional narrative, this seems like an odd thing to assess. And in the case of factual narrative it sheds no light at all on cases in which narratives are mostly true, but contain some minor inaccuracies. Any inaccuracy makes the big quantified conjunction false, but this seems like an overly crude assessment of the narrative. We tend to judge a narrative mostly true when only a few inessential parts are false.

One might try to say that a narrative is mostly true when the big conjunction can be turned into an entirely true proposition by deleting a small number of component sentences. But since the parts of the narrative are linked, deleting a single sentence may destroy a crucial link for later sentences, yielding absurdity, or making the later sentences false by default, contrary to our intent. Deciding how to excise flawed parts of a narrative so as to yield a coherent remainder is not at all easy, if we are to do so in a way that preserves judgments of truth of the parts of the narrative. In fact, people seem to have no hard and fast judgments about how to assess parts of a narrative for truth-value when other parts are false. (This is easy to establish by considering a few simple narratives and asking what to say about the truth values of later sentences when the first sentence is false, or the second, . . .) This probably means that it is a mistake to focus centrally on truth when assessing a narrative.

References

- Bach, Emmon. 1986. "Natural language metaphysics". In Ruth Barcan-Marcus, Georg J.W. Dorn, and Paul Weingartner, eds. *Logic, Methodology, and Philosophy of Science VII*. Amsterdam: North Holland Press, 573-95.
- Davidson, Donald. 1967. "The logical form of action sentences". In N. Rescher, ed., *The Logic of Decision and Action*. Pittsburgh: University of Pittsburgh Press. Reprinted in Davidson 1980.
- Davidson, Donald. 1980. *Essays on Actions and Events*. Oxford: Clarendon Press.
- Kamp, Hans and Reyle, Uwe. 1993. *From Discourse to Logic: Introduction to Modeltheoretic Semantics in Natural Language, Formal Logic, and Discourse Representation Theory*, Vols 1 & 2. Dordrecht, Kluwer Academic Publishers.
- Lascarides, Alex, and Asher, Nicholas. 1993. "Temporal Interpretation, Discourse Relations and Commonsense Entailment," *Linguistics and Philosophy* 16, 437-93.
- Parsons, Terence. 1990. *Events in the Semantics of English*, MIT Press, 1990, xviii + 334. Paperback edition, 1994.
- Parsons, Terence. 2000. "Underlying States and Time Travel," in Higgenbotham, James, Pianesi, Fabio and Varzi, Achille (eds) *Speaking of Events*. N.Y.: Oxford University Press, 2000, 81-93.
- Reichenbach, Hans. 1947. *Elements of Symbolic Logic*. New York: Free Press.