

REFERENCE TIME IN DISCOURSE

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1.0 INTRODUCTION

As is discussed in Partee (1984), while a event-describing sentence can put reference time forward in a discourse, a state-describing sentence cannot. This paper attempts to account for this difference between event-describing sentences and state-describing sentences by assuming event to be gestalt which consists of at least two distinct non-overlapping states and each state in events to need at least one point of time in order to obtain. This means that while a state can obtain at a particular moment, an event needs an interval which includes several distinct points in time in order to occur. The overall organization of this paper is as follows: in section two, we will introduce the notion of events and states into our ontology. In section three, we will examine how movement of the reference time in discourse can be treated in our framework. Finally, in section four, we will discuss the results of these investigations and draw some generalizations.

2.0 EVENTS AND STATES

2.1. Characterizations of Events and States

Following Galton (1984), we introduce the notion of events and states into our ontology. Galton argues that while events involve change of state, states are essentially unchanging. It should be noted that Galton claims that the situations described by a English progressive sentence are included in its state. Hereafter, we use the term "state" or "event" in Galton's sense.

According to Galton, for the evaluation of (1a, b), state-describing sentences, one point of time is enough, but the evaluation of (2), an event-describing sentence, needs an interval which contains some points of time. According to Galton, this difference between event-describing sentences and state-describing sentences comes from whether they involve change of state or not:

- (1) a. He is running.
b. He is dead.
- (2) He runs.

Galton argues that although what the subject denotes in the state described by (3) is changing with respect to its position, the state itself is not changing:

- (3) It is moving.

2.2. The Internal Structure of Events

We claim that every event can be viewed as a gestalt which consists of two or three states. Here, we use the term "gestalt" in Lakoff's (1977) sense. According to Lakoff, gestalt is a whole that we human beings find more basic than the parts.

According to Galton, every event contains at least two non-overlapping states: a state which obtains before the change and a state which obtains after the change. Henceforth, we call these two states an initial state and a final state, respectively. Some events contain a state of change, in addition to these two states. In this respect, we distinguish two classes of events. One consists of those events which contain a state of change, in between an initial state and a final state, and the other consists of those events which do not contain a state of change. See (4) below:

(4) a.

initial state	state of change	final state
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b.

initial state	final state
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An example of events that might be classified as (4a) is the event described by (5):

(5) A banana ripens.

According to Galton, we cannot draw a clear line between the bananas that have ripened and the bananas that have not ripened yet, and consequently, the event described by (5) is perceived to contain a gradual change. This gradual change corresponds to a state of change in our framework. An example of events that might be classified as (4b) is the event described by (6):

(6) The car starts moving.

In (6), the change is recognized by the observation of the difference between the initial state and the final state:

We examine how Vendler's (1967) classification of verbs can be considered in our framework. Vendler claims that verbs can be classified into the four groups listed in (7). Although Vendler himself said that this is a classification of verbs, we regard these classes as those of situations:

- (7) a. state
b. accomplishment
c. activity
d. achievement

Examples of these classes are shown in (8) below. (8a-d) correspond to (7a-d), respectively:

- (8) a. He was dead.
b. He made a chair.
c. He ran.
d. He reached to the top of the mountain.

We consider that (7a) is contained in state as Galton understands it, (7b) corresponds to (4a), and both (7c) and (7d) are contained in (4b). At first sight, it might seem odd to suppose that (7c) is contained in (4b), but this is right. We think that the difference between (7c) and (7d) is that while the final states of those events classified as (7d) represent a static situation, the final state of those events classified as (7c) represent types of motion. For example, the event described by (8c) can be considered to consist of an initial state where the object denoted by "he" is not in running activity and a final state where "he" is engaged in a running activity.

According to Vendler, while the progressive form of activity verbs entails their non-progressive counterparts, the progressive form of accomplishment verbs does not have such an entailment. For example, while (9a) entails (8c), (9b) does not entail (8b):

- (9) a. He was running.
b. He was making a chair.

We consider here that (9a) describes a final state and (9b) describes a state of change, respectively. Therefore, it is quite natural for (9a) to entail (8c), because the state described by (9a) can be assumed to obtain after the event described by (8c) has occurred. On the other hand, (9b) does not

entail (8b), because the state described by (9b) is not perceived as obtaining after the event described by (8b) has occurred.

3.0 MOVEMENT OF REFERENCE TIME

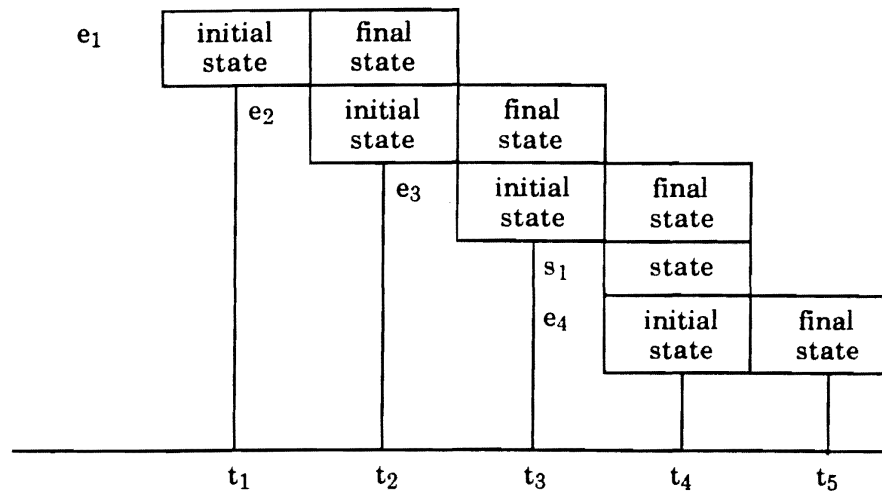
As is discussed in Partee (1984), while events can put the reference time forward in a discourse, states cannot. Consider (10) below. Here, "e" and "s" indicate event-describing sentences and state-describing sentences, respectively:

- (10) John got up, went to the window, and raised the blind. It
 e₁ e₂ e₃
 was light out. He pulled the blind down.
 s₁ e₄

In (10), the final state of each events overlaps with the initial state of the following events and the s₁ overlaps both the final state of e₃ and the initial state of e₄. See diagram 1. In diagram 1, as well as in the other diagrams in this paper, we omit states of change for the convenience of explanation.

As is discussed in Reichenbach (1947), the reference time of a non-perfect sentence is equal to the event time of it. Thus, the reference time of an event-describing sentence in the simple past tense must be an interval including every point/interval of time at which the states in that event obtain. For example, in diagram 1 the reference time of e₁ is an interval including t₁ and t₂ and that of e₂ is an interval including t₂ and t₃, and so on.

Diagram 1



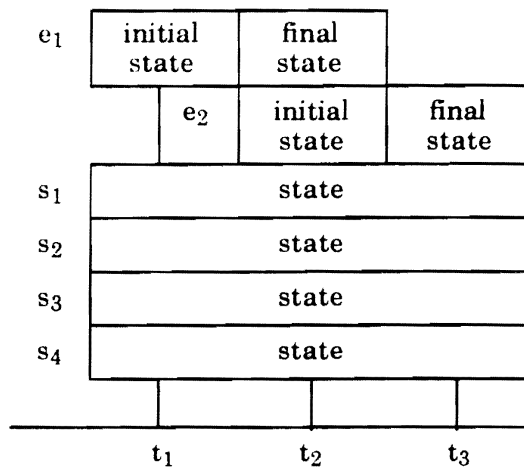
We assume that events cannot overlap directly with other events or states but states in those events can overlap with other states. We think that when a new state is introduced into a discourse, it overlaps with the latest state and when an event is introduced into a discourse, the initial state of that event overlaps with the latest state.

In (10), the events and the state are understood to be happening in succession. However, while the events of the first sentence in (11) below are understood to be in a temporal sequence, the states of the remaining sentences are interpreted as obtaining at the same time the events in the first sentence of (11) occurs:

- (11) He went to the window and pulled aside the soft drapes. It was a
 e_1 e_2 s_1
 casement window and both panels were cranked out to let in the night
 s_2
 air. The apartment was on the second floor. The window itself
 s_3
 was a scant five feet above the roof.
 s_4

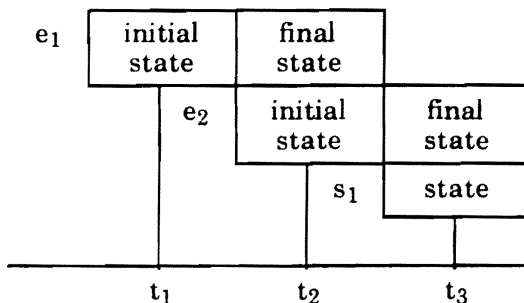
In (11), movement of the reference time can be represented as in diagram 2. We think that even in this case, the introduction of states in the discourse is in basically the same way as in diagram 1. This means that when a state is introduced in discourse, it overlaps with the latest state in that discourse.

Diagram 2



When s_1 is introduced in (11), the temporal structure of discourse can be represented as in diagram 2'.

Diagram 2'



After that, s_1 spreads backward and overlaps with the previously introduced states. We call this phenomena backward-spreading (BS) and stipulate the conditions for BS as in (12) below:

(12) Backward-Spreading (BS)

- a. A state may spread and overlap with previously introduced states, if it is compatible with those states.
- b. Whether the said state is compatible with other states or not is decided in terms of real world knowledge and the internal structure of events.

We think that we cannot stipulate exactly what state should overlap with another state without concerning real-world knowledge. But after we find out what state is overlapping with other states, we can infer how reference time moves in a discourse. We claim that the temporal structure of a discourse is mentally represented as in diagram 1 or diagram 2.

Let us turn now to (13) below:

- (13) Jaime was building another boat. He sang happily as he worked,

s_1

e_1

the muscles of his brown arms rippled in the sun, and crispy wood

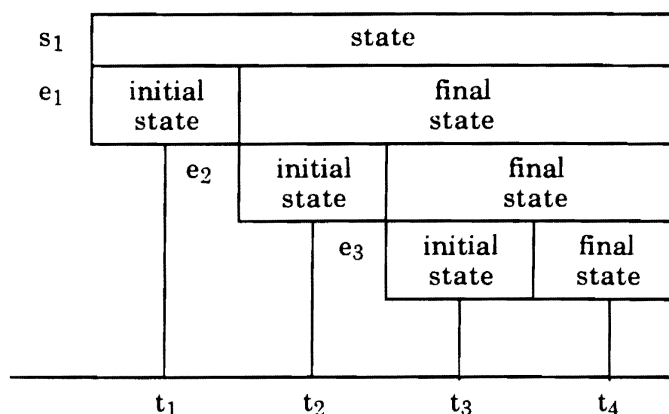
e_2

shavings made a carpet between his bare feet and the sand.

e_3

The temporal structure of (13) can be represented as in diagram 3.

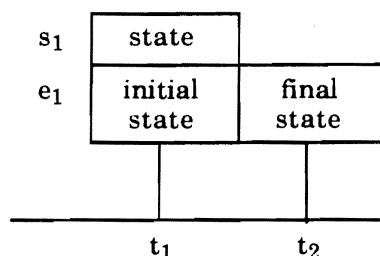
Diagram 3



Hinrichs (1986) claims that the events and states in (13) overlap each other and obtain/occur at the same time. However, we think that the initial states of e_1 , e_2 and e_3 do not overlap each other and they are temporally ordered as in diagram 3. This means that even in (13), the reference time moves.

We think that in this case too, the introduction of states in the discourse is basically the same as in diagram 1 or 2. When e_1 is introduced in (13), the temporal structure of discourse can be represented as in diagram 3'.

Diagram 3'



After that, s_1 spreads forward and overlaps with both the initial and final state of e_1 . The same processes take place when e_2 , e_3 and e_4 are introduced in the discourse.

We generalize this kind of spreading of states and BS as state spreading (SS). We stipulate the conditions for SS as (14) below:

(14) State Spreading

- a. A state may spread and overlap with other states in discourse, if it is compatible with those states.
- b. Whether the said state is compatible with other states or not is decided in terms of real world knowledge and the internal structure of events.

4.0 CONCLUSION

In this paper, we have attempted to explain how reference time moves in discourse and why event-describing sentences and state-describing sentences show different behavior with respect to the movement of reference time in discourse. Our claim is that the movement of reference time can be explained by clarifying the overlap relations between states. The difference between events and states can be characterized by assuming events as gestalt which consists of various states, each state needing to obtain at a different point / interval of time.

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