

Events and States in Discourse

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1. Introduction

The behavior of events and states in discourse has been explained in two different ways. Kamp and Rohrer (1983) and Kamp and Reyle (1993) presented a framework (DRT) in which events and states are primitive entities and are characterized in terms how they behave in narrative discourse: the episode described by an event sentence is located within a "reference time", whereas the situation depicted by a state sentence surrounds it. On the other hand, Dowty (1986) claimed that an interval-based framework supplemented by his Temporal Discourse Interpretation Principle accomplishes the same task. In this talk, I will discuss a proposal that synthesizes the two approaches in such a way that the behavior of events and states follows from the model-theoretic definitions of event predicates and state predicates.

2. The DRT account

Consider (1a-b):

- (1) a. John opened his eyes. The doctor performed an operation.
- b. John opened his eyes. The doctor was performing an operation.

(1a) says that the doctor performed an operation right after John opened his eyes, whereas

(1b) means that the doctor was already performing an operation when John opened his eyes. This difference clearly stems from the difference between the simple past tense and the past progressive employed in the second sentences. The same type of difference is found between (1a) and (2):

(2) John opened his eyes. He was in a hospital room.

Just as in (1b), John's being in a hospital room is understood as overlapping with his opening his eyes. This shows that progressives (e.g. The doctor was performing an operation.) and sentences containing a lexical stative verb (e.g. He was in a hospital room.) have something in common: when they occur in a discourse following an event sentence, they are understood as surrounding it. Discourse Representation Theory proposed by Kamp et al. claims that events and states should be distinguished by the ways in which they behave in discourse. That is, a sentence that occurs in a discourse following an accomplishment/achievement sentence is an event sentence if it is understood as following the episode depicted by the first sentence. On the other hand, if the situation depicted by the second sentence is understood as surrounding the event depicted by the first, it is stative. This proposal leads us to conclude that both lexical statives (e.g. to be in a hospital) and progressives (e.g. to be performing an operation) serve to describe states. This position resembles that taken by Vlach (1981), who maintains that the Aktionsarten (or aspectual) status of a sentence is determined by its interaction with point adverbials.

One important assumption that underlies the DRT proposal is that the traditional truth conditions for English sentences do not do justice to the above data. This claim appears justified when we compare (3a) and (3b), which symbolize the traditional truth conditions for (1a) and (2):

(3) a. $\exists t$ [t precedes now & The doctor performs an operation at t]

- b. $\exists t$ [t precedes now & John is in a hospital room at t]

These two formalizations are based upon the traditional account of past tense sentences, namely that they exert existential quantification over past times. They show no indication that they behave differently in discourse. However, it is somewhat misleading to conclude simply on the basis of (3a) and (3b) that the traditional approach is problematic.

Obviously, we agree that contextual factors must be taken into consideration in order to account for the interpretation of tensed sentences. It is usually the case that existential quantification associated with past tense is restricted to a contextually salient interval. For example, the difference between (1a) and (2) can be described as in (4a-b):

- (4) a. $\exists t$ [t precedes now & $t_R < t$ & The doctor performs an operation at t]
 b. $\exists t$ [t precedes now & $t_R \subseteq t$ & John is in a hospital room at t]
 [N.B. $t_R < t$ reads 't follows t_R '. $t \subseteq t_R$ reads 't is part of the reference time t_R '. t_R is a reference time.]

Assuming that the "reference time" t_R is provided by the preceding event sentence, the above two formulas represent the facts that DRT attempts to explain. The question is whether the above difference between events and states has to be stipulated or can be derived from an independently motivated principle. The position advocated by DRT can be restated as follows: the difference between (1a) and (1b) (or (2)) in discourse must be stipulated and should be understood as a direct reflection of their Aktionsarten status.

3. Dowty's account

The DRT account is not the only possible account of the difference between events and states presented above. Dowty (1986) argues that the alleged difference between events and states is a pragmatic one and that it can be derived from the standard truth

conditions of event and state sentences in non-discourse-based systems. Let us reconsider the above formulas (4a) and (4b). According to the general interval-based approach (Bennett and Partee 1972, Taylor 1977, Dowty 1979) to temporal semantics, stative and telic events can be distinguished as in (5a-b):

- (5) a. α is a state sentence iff the truth of α at some t entails the truth of α at all the subintervals of t .
- b. α is a telic event sentence iff the truth of α at some t entails the falsity of α at all the proper-subintervals of t .

The property (5a), which is associated with state sentences, is often referred to as the subinterval property. The above criteria clearly distinguish between events and states in an intuitively appealing way. The definition is not intended to account for their difference in discourse. However, Dowty claims that it helps to account for the behavior of events and states as a by-product. If true, it has a good chance of being a viable theory as it stipulates nothing new. Dowty's argument goes as follows: Suppose that there is no stipulated difference between events and states and that in all cases, the general rule is that the so-called "reference time" for a new sentence is set slightly after the reference time for the immediately preceding sentence. Thus, the assertion made by (1a) and (2) are formalized as (6a-b):

- (6) a. $\exists t$ [t precedes now & $t \subseteq t_R$ & The doctor performs an operation at t]
- b. $\exists t$ [t precedes now & $t \subseteq t_R$ & John is in a hospital room at t]

Note that in both (6a) and (6b), the episode described falls within the reference time t_R . Thus, the difference between events and states is not captured here. Given the above difference between events and states defined in terms of the subinterval property, however,

we arrive at different conclusions about them. Let t_1 be an interval located within t_R such that the doctor is in the extension of **performs an operation** at t_1 . Then it follows that there is no interval t_2 that properly contains t_1 such that the doctor performs an operation at t_2 . On the other hand, assuming the sub-interval property of stative sentences, we reach a different conclusion about states: Let t_3 be an interval at which John is in a hospital room. Then it is possible for there to be a more "inclusive" interval at which John is in a hospital room. This itself does not prove that the state surrounds the preceding event. However, it is plausible to maintain that this establishes the pragmatic inference pattern (7):

- (7) The truth of a stative sentence ϕ at t pragmatically entails the existence of an interval t' such that $t \subseteq t'$ and ϕ is true at t' (unless proven otherwise).

To say that the difference between events and states is pragmatic in nature seems to be desirable in that states do not necessarily "move narrative time forward." It is widely acknowledged that some state sentences do move narrative time forward. The example (8) is due to Hinrichs (1986: 68):

- (8) Jameson entered the room, shut the door carefully and switched off the light.
It was pitch-dark around him because the Venetian blinds were closed.

Its being pitch-dark around him must be understood as temporally following Jameson's switching off the light. This can be accounted for by the above explanation as there is no intrinsic semantic difference between events and states in discourse. In (8), the situation forces us to move narrative time forward, i.e. its being pitch-dark must follow his switching off the light. In normal situations, however, stative sentences are interpreted in reference to the pragmatic inference rule (7). Dowty (1986: 44) also shows that if we follow the truth conditions for progressives given in Dowty (1979), it follows that

progressives also have the subinterval property. In other words, they are stative sentences. Thus, the above analysis of statives is also true of them.

4. Proposal #1

The analysis proposed by Dowty (1986) is based upon the theory of aspect developed by Taylor (1977) and Dowty (1979). Recently, Krifka (1989) proposed a lattice-theoretic semantic theory that aims at modelling the difference between telic and atelic events/sentences. Dowty (1991) summarizes the similarity and difference between the two approaches and concedes that the lattice-theoretic event-based approach initiated by Krifka (1989) is probably a more natural proposal than his original proposal given in Dowty (1979). Krifka's theory is an event-based approach in that a declarative sentence is assumed to involve an existential assertion about an eventuality. The model is assumed to contain a set of eventualities with a built-in lattice structure. Technically, it is an ordered set of events, and this order should intuitively correspond to a "part of" relationship. Krifka's main interest is to account for the difference between telic and atelic predicates in a way parallel to the distinction between count and non-count nouns. Our interest here is slightly different from his. (9a-b) represent one way of characterizing the difference between event sentences and state sentences within Krifka's (1989, 1991) theory:

- (9) a. P is a (telic) event predicate iff
 $\forall e \forall e' [P(e) \ \& \ P(e') \rightarrow \neg e \subseteq e']$ (P is quantized)
- b. P is a state predicate iff
 $\forall e \forall e' [P(e) \ \& \ e' \subseteq e \rightarrow P(e')]$ (P is divisive)
- [N.B. e is a variable over eventualities.]

(9a-b) make practically the same predictions as the proposal made by Dowty (1986). (9a) guarantees that if some event e_1 is in the extension of P, there is no event e_2 of which e_1 is

a proper part. (9b) is again practically equivalent to the subinterval property. It leaves open the possibility that when some eventuality e_1 is in the extension of a stative predicate P , there is a "super-eventuality" e_2 of e_1 such that e_2 is also in the extension of P . In fact, unless the event in question is the "most inclusive eventuality", this is guaranteed to obtain. If an eventuality is in the extension of a state predicate, we can assume that there is a more inclusive eventuality that overlaps with the immediately preceding eventuality. Let us refer to this proposal as proposal #1. If we follow this proposal, (1a) and (2) are formalized as (10a-b):

- (10) a. $\exists e$ [e precedes now & $e \subseteq t_R$ & e is the doctor's performing an operation]
 b. $\exists e$ [e precedes now & $e \subseteq t_R$ & e is John's being in a hospital room]

As λe [e is the doctor's performing an operation] is an event predicate, there is no e' that properly includes e such that e' is the doctor's performing an operation. Hence, the doctor's performing an operation is understood as following the previous event. On other hand, λe [e is John's being in a hospital room] is a state predicate. Thus, it pragmatically entails that there is an eventuality e' that properly includes e such that e' is also John's being in a hospital room.

5. Proposal #2

An alternative way of accomplishing the same goal is to adopt the approach proposed by Ogihara (1989, 1993) in conjunction with Krifka's approach. Let us call it proposal #2. In order to solve a problem independent of discourse, I claimed in Ogihara (1989, 1993) (11a-b):

- (11) a. For any state s and time t , s exists at t iff the temporal extension of s includes t .

- b. For any event e and time t , e exists at t iff the temporal extension of e equals t .

According to this proposal, (1a) and (1b) are symbolized as (12a-b):

- (12) a. $\exists t \exists e [t \text{ precedes now} \ \& \ t \subseteq t_R \ \& \ e \text{ exists at } t \ \& \ e \text{ is the doctor's performing an operation}]$
 b. $\exists t \exists s [t \text{ precedes now} \ \& \ t \subseteq t_R \ \& \ s \text{ exists at } t \ \& \ s \text{ is John's being in a hospital room}]$

As in the earlier proposal, an event sentence is predicted to "move narrative time forward." As e exists t means that the temporal extension of e equals t , e cannot overlap with the preceding event. Moreover, if e is the doctor's performing an operation, there is no event e' that properly contains e such that e' is the doctor's performing an operation. On the other hand, the state of John's being in a hospital room is allowed to overlap with the preceding event. As mentioned above, we assume that s exists at t iff the temporal extension of s includes t . This already predicts the possibility that the state in question in fact overlaps with the preceding event. Moreover, as $\lambda s [s \text{ is John's being in a hospital room}]$ is a predicate of states, this predicts the possibility that there is a more inclusive state that overlaps with the preceding event.

6. Closing Remarks

The two new proposals are eventuality-based. Thus, their comparison with Kamp et al.'s proposal can be made easily. Proposal #1 (Dowty's proposal supplemented by Krifka's methodology) claims that the traditional truth conditions together with the assumption that stative sentences have the subinterval property accounts for the difference between events and states in discourse in pragmatic terms. Proposal #2, on the other hand,

claims that events and states are claimed to interact with tense in different ways. According to this proposal, a state s is said to exist at t even if the temporal extension of s properly includes t . This allows the state to surround the preceding event. It seems to me that these new proposals, which predict the behavior of events and states in terms of the independently motivated truth conditions for event and state sentences, should be considered seriously as alternatives to the DRT account.

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