

Two puzzles concerning tense and aspect in English

Michael Bennett

(Presented to an APA-ASL Symposium, Seattle, March, 1973)

The problems considered in this paper developed out of my study of Richard Montague's work in linguistics and philosophy of language. These problems are especially acute given his approach to these topics. Therefore it is important to say something about the point of his work. Briefly, his main goal was to give a completely successful analysis of logical consequence for ordinary language. In his last papers he approached this end by giving such an analysis for what may be regarded as limited portions of English, or fragments of English. A fragment is a formal language in that it has a rigorous syntax and a model-theoretic semantics. The semantics provides a characterization of the notions of a true sentence (under a given interpretation) and of logical consequence. There are three papers where such fragments are presented: Montague [2], Montague [3], and Montague [5] (henceforth, EFL, UG, and PTQ respectively).

A fragment embodies decisions about which expressions are grammatical, how many readings a particular expression has, that is, its degree of ambiguity, and about which sentences entail which. There are at least two important ways to evaluate the success of a fragment. One can compare the fragment with English and determine to what degree the fragment reflects one's intuitions about English. Another important way is to attempt to extend the fragment in various directions. This paper concerns problems in both areas. In particular I will consider some problems that one faces in trying to formalize the logic of tense and aspect in English. I say 'the logic' because I am optimistically assuming that there is a unique such logic which remains to be described.

I will approach my topic by presenting two puzzles. One of them concerns Montague's treatment of the simple present tense in his fragments. The other puzzle concerns extending the fragments to include the present progressive tense.

Property of
R. H. Thomason

tense aspect

After presenting the puzzles, I shall attempt to account for them. I am not entirely happy with my answers but I believe that they give some insight into what we are up against and what we are looking for.

The first puzzle was brought to my attention by Barbara Partee. In order to present it, we should review how Montague treats tense in his fragments. In the fragments presented in EFL and in UG, Montague only treats the simple present tense. So these fragments only contain unadorned sentences such as John walks and Mary eats a fish.¹ However, the fragment presented in PTQ includes along with the simple present tense, the present perfect and the simple future tenses. This fragment includes sentences such as John walks, John has walked, and John will walk. The progressive tenses are conspicuously absent in these fragments. The fragments do not treat sentences such as John is walking, John has been walking, John will be walking.

In PTQ the truth value of a sentence (under an interpretation) is considered relative to a point of reference which is an ordered pair consisting of a possible world and a moment of time. The set of moments of time is linearly ordered. For our purposes, we can drop the possible world coordinate. Montague gives the standard analyses of the present perfect and the simple future. These analyses are indicated by truth conditions (1) and (2).

- (1) John has walked is true at moment of time t
if and only if there exists a moment of time t'
such that $t' < t$ and John walks is true at t' .
- (2) John will walk is true at moment of time t
if and only if there exists a moment of time t'
such that $t < t'$ and John walks is true at t' .

What is important to notice here is that these analyses of the present perfect and the simple future depend on the notion of a sentence in the simple present having a truth-value at a moment of time.

When starting to work with a Montague fragment, one of the first things one begins to wonder about is how we use the simple present tense in ordinary English.

Consider the sentence John walks. It seems that we can use this sentence to make a variety of statements. For example, we can assert that John occasionally walks, that he frequently walks, or that he regularly walks. I am not sure how many readings of this sort are to be distinguished. Notice that these readings can be true at a moment and yet John is not walking at that moment. Let us call such readings of the sentence John walks nonreportive readings. Such readings are to be distinguished from the reportive reading which asserts that John performs the act of walking at the present moment. It seems that we often have occasion to use a sentence in the simple present like John loves Mary in the reportive sense. However it seems that we usually use a sentence like John walks in a nonreportive sense and that we seldom use such sentences in this reportive sense.

Which sense of the simple present does Montague intend to be treating in his fragments? This is never made clear in his papers. Further I don't think that one can confidently infer from the nature of the fragments which sense, if any, is intended. You might think that it is evident that he is treating the reportive sense of the simple present since it is this tense which underlies his analyses of the present perfect and the simple future. However both these tenses allow for nonreportive readings as well. John has walked can mean that John has habitually walked, John has usually walked, and so forth. For various reasons, I am inclined to believe that Montague does intend to be treating the reportive sense of the simple present. Let me give just one reason. In PTQ, Montague considers sentence (a) to have only one reading--a reading which entails that there is at least one fish.

(a) John finds a fish

However, if we give (a) a nonreportive sense, intuitively it has a reading which does not entail that there is at least one fish. For example, (b) has a reading which does not entail the existence of fish.

(b) John frequently finds a fish

Evidence such as this leads me to believe that Montague intends to be treating

the reportive sense of the simple present.

Some sentences in the simple present seem to wear the reportive sense more comfortably than others. We can easily imagine that we might have occasions to use sentences (c) and (d) in the reportive sense to make statements.

(c) John believes that Mary loves him

(d) John walks

However it seems much less likely that we would have occasion to use sentence (e) in the reportive sense.

(e) John builds a house

Why is this? When we use the simple present in the reportive sense, we psychologically perceive the described event as taking place in its entirety at the moment of speech. It seems unlikely that we would have occasion to use (e) in the reportive sense since this would be an occasion where we perceive John to be building a house at an instant. Of course, the usual situation when one encounters an event of house-building is that it is extended through time and overlaps the present moment. In such cases we use the present progressive, John is building a house.

A familiar situation in which the reportive simple present is used is sports reporting (Jones throws the ball to Smith). Again this tense is being used because the events are being viewed as almost instantaneous and as occurring at the moment of speech.

The so-called "historical present" tense seems to be related to the reportive simple present. This tense is used to describe past events as if they are happening at the moment of utterance. For example, if we are reviewing John's life history, we might use (e) in the historic present tense. Here we are, so to speak, "speeding up the past action" and describing the past event of John's building a house as if it is almost instantaneous and occurring at the moment of speech.²

I hope I have provided enough background in order to effectively present the first puzzle. Montague treats a sentence like John has built a house as indicated in truth condition (3).

- (3) John has built a house is true at moment of time t if and only if there exists a moment of time t' such that $t' < t$ and John builds a house is true at t' .

After thinking about the way we use the simple present, and because I believe that Montague intends to be treating the reportive sense of that tense, his truth condition for John has built a house turns out to be that there exists a past moment at which John instantaneously builds a house. Of course, it seems logically possible that someone build a house at an instant. But an adequate analysis of the present perfect should allow for the more normal kind of house-building. Let me state the first puzzle relative to the sentence John has built a house. How can we reflect in the analysis of the present perfect the intuition that the truth condition for John has built a house is that there exists some past interval of time, possibly a moment of time, during which John is building a house and eventually completes it?

Incidentally, it seems implausible to think that John builds a house in the reportive sense is true at the moment that John completes the house, that is, at the moment when he drives in the last nail. For if someone says that John built a house last month, no one asks on which day and at what time he did it.

The second puzzle concerns an analysis of the present progressive tense which Montague presents in his paper Montague [4].³ His remarks suggest that the analysis might be due to some extent to Dana Scott. In fact the analysis does make a brief appearance in Scott [1].⁴ Let us suppose that time is the set of real numbers T . I indicate the analysis by giving truth condition (4) for the very sentence which Montague chose to illustrate his analysis.

- (4) Jones is leaving is true at moment of time t if and only if there exists an open interval of moments of time, say I where $I \subseteq T$, such that t is a member of I and for all times t' in I , Jones leaves is true at t' .

The idea here is that a sentence in the present progressive is true at a moment t , if there exists a neighborhood about t such that the related sentence in the simple

present tense is true at all times in the neighborhood. This analysis, as I said, appears in Montague [4]. It is clear in that paper that Montague would give the same analysis of the present perfect tense that he gives in PTQ.⁵ Thus along with (4) we have truth condition (5).

- (5) Jones has left is true at moment of time t
 if and only if there exists a moment of time t'
 such that $t' < t$ and Jones leaves is true at t' .

Now given these truth conditions, Jones is leaving entails Jones has left. For if Jones is leaving is true at moment of time t , there is a neighborhood about t such that for all times in the neighborhood Jones leaves is true at those times. But the neighborhood must contain a time earlier than t . Therefore Jones has left is true at t . Intuitively Jones is leaving does not entail Jones has left. It could be true that Jones is leaving but false that he has left. There are verb phrases where the present progressive intuitively does entail the present perfect. For example, Jones is walking intuitively entails Jones has walked. What accounts for this difference?

There is a well-known classification of intransitive verb phrases in the philosophical and linguistic literature which distinguishes stative verb phrases, activity verb phrases and performance verb phrases.⁶ I am not entirely happy with this terminology but I am using it because it is familiar.⁷

Stative verb phrases are used to ascribe states of individuals. Some examples are be happy, love Mary, and believe that Mary loves John. They characteristically do not take the progressive tenses. For example, notice that (f) is ungrammatical.⁸

- (f) * Bill is believing that Mary loves John

Activity verb phrases do take the progressive tenses. Some examples are walk and push a cart. One characteristic of these verb phrases is that intuitively the present progressive form entails the present perfect. For example, John is walking entails John has walked and John is pushing a cart entails John has pushed a cart.

Performance verb phrases also take the progressive tenses. Some examples are

leave and build a house. However they are distinguished from the activity verb phrases in that intuitively the present progressive form does not entail the present perfect. Jones is leaving does not entail Jones has left and John is building a house does not entail John has built a house. This is because a performance verb phrase describes an act or event which involves a completion whereas an activity verb phrase does not.

Returning to the Montague-Scott analysis of the present progressive tense, we see that the analysis seems adequate for activity verb phrases but inadequate for performance verb phrases.

The second puzzle is the following. How do we analyze the present progressive tense for performance verb phrases? It would be nice if we could give a uniform analysis of this tense for both activity and performance verb phrases. Of course, in addition, the two kinds of verb phrases would have to be distinguished in certain ways with respect to entailments.

Now that we have our two puzzles before us, I will attempt to account for them by using a suggestion of Barbara Partee's. Let us keep time as the set of real numbers. But let us change the notion of a point of reference from that of an ordered pair consisting of a possible world and a moment of time to that of an ordered pair consisting of a possible world and an interval of time. We take an interval of time to be a set of moments of time.⁹ So certain intervals, namely the one-membered sets, correspond to moments of time. In short, the suggestion is to consider the truth-value of a sentence relative to an interval of time and not just a moment.¹⁰

This notion enables us to account for the first puzzle. We only allow sentences in the reportive simple present to be true at an interval which is not a moment. All other kinds of sentences can only be true at moments of time. We give (6) as the truth condition for John has built a house.

- (6) John has built a house is true at interval of time I if and only if I is a moment of time, there exists an interval of time I' (possibly a moment) such that $I' < I$, and John builds a house is true at I'.

The truth condition requires that there exist a past interval of time at which John builds a house is true. The intuition motivating this analysis is that if John builds a house is true at an interval I, then the event of John's building a house is regarded as starting at the beginning of I, taking place during I, and finishing at the end of I. This reflects our intuition that the truth condition should involve some past interval of time during which John is building a house and eventually completes it.

We now turn to the second puzzle. We give (7) as the truth condition for Jones is leaving.

- (7) Jones is leaving is true at interval of time I if and only if I is a moment of time, there exists an interval of time I' such that I is a member of I' but I is not an endpoint for I', and Jones leaves is true at I'.

The idea here is that a sentence in the present progressive is true at a moment t if t is in the middle of an interval of time at which the related sentence in the simple present tense is true. In other words, Jones is leaving is true at a moment of time t if t is in the middle of an event of Jones' leaving.¹¹ On this analysis, Jones is leaving does not entail Jones has left since if Jones is leaving is true at a moment t, there is no guarantee that there exists an interval of time earlier than t at which Jones leaves is true.

This takes care of performance verb phrases. How about activity verb phrases? The truth condition for Jones is walking exactly parallels truth condition (7) for Jones is leaving. However, we still have to accommodate our intuition that Jones is walking entails Jones has walked. This can be done by placing a special condition on those sentences in the simple present tense whose main verb phrases are activity verb phrases. The condition is that if such a sentence is true at an interval I, then it is true at every subinterval of I including every moment of time included in I. For example, if Jones walks is true of the interval yesterday, then it is true of every subinterval of yesterday including every moment of time included in

yesterday. Given this special condition for activity verb phrases, Jones is walking entails Jones has walked. For if Jones is walking is true at a moment of time t , then there exists an interval of time I about t at which Jones walks is true. But interval I must include a time t' earlier than t . Since walk is an activity verb phrase, Jones walks must be true at t' . Therefore Jones has walked is true at t .

Stative verb phrases characteristically do not take the progressive tenses. This feature can be reflected by requiring that a sentence in the reportive simple present with a stative verb phrase, such as John believes that Mary loves him, can only be true at moments of time and is always false at any interval of time which is not a moment.

As I said earlier, I am not entirely happy with my answers to the two puzzles. I foresee many difficulties in carrying the ideas through into a formalization. Even worse, I am not sure that the approach satisfactorily captures what is going on in English. Let me conclude by mentioning one problem in this respect. Consider sentence (g).

(g) John was building a house at midnight on Tuesday

On our analysis, (g) is true at the present moment if there exists some interval of time I about midnight on Tuesday such that John builds a house is true at I . The intuition that motivates our analysis is that if John builds a house is true at I , then John starts to build at the beginning of I , he is building throughout I , and he finishes building a house by the end of I . So our analysis of (g) is such that, in some sense, (g) implies that John completes the house. But then how can we explain a sentence like (h)?

(h) John was building a house when he died at midnight on Tuesday

It seems that if (h) is true, then the sentence John is building a house is true either at the moment that John dies or shortly before. This indicates that John is building a house has a reading which does not imply the completion of a house in any sense. The reading is almost paraphrased by the sentence John is working to build a house. Such a reading will require an analysis of the present progressive

other than the one I have considered and I am not sure how this analysis should go.¹² In fact, the existence of this noncompletion reading causes me to question whether a sentence like John is building a house has a completion reading at all. Do we use a sentence like John is building a house to make statements which imply that he will finish the house? If not, we must return to our second puzzle and try to find a successful solution.¹³ To my mind, the attractiveness of considering sentences in the simple present to have truth values relative to intervals of time lies in its providing solutions to both of the puzzles. If it cannot be used to solve the second puzzle, I would be inclined to look for an alternative solution for the first puzzle as well.

Footnotes

¹Standard face with wavy underlining is used in lieu of boldface type.

²After struggling to achieve this understanding of the simple present tense in the reportive sense, and the historical present tense, I was pleased to see that Leech, in Leech [1], pp. 139-140, gives essentially the same explanation.

³Montague [4], p. 73.

⁴Scott [1], p. 160.

⁵Montague [4], p. 73.

⁶Aristotle appears to have been the first to make a distinction between activities and performances (Aristotle [2], 1048b 18-35 and Aristotle [1], 1174a 14-1174b 7). The topic has been much discussed by current philosophers and this has led to a distinction between different kinds of intransitive verb phrases (Ackrill [1], Kenny [1] (chapter 8), Lemmon [1], Penner [1], Potts [1], Ryle [1] (chapter 5, section 5), and Vendler [1] (chapter 4)). I am especially grateful to John Giuliano with whom I have spent many hours discussing this topic.

⁷The terminology is misleading because it suggests that we are only concerned with verb phrases which describe intentional actions--actions of conscious beings. However, move and disintegrate, an activity verb phrase and a performance verb phrase respectively, can be used to describe nonintentional events.

⁸As usual, the asterisk indicates ungrammaticality.

⁹It might be desirable to only allow certain kinds of sets of moments of time to be intervals. For example, one might only allow sets with an upper and lower bound, sets with endpoints, continuous sets, sets having combinations of these properties, etc.

¹⁰I find this notion of a sentence having a truth-value relative to an interval prefigured in Montague [1], p. 161, and in Lemmon [1], p. 100. In Montague [1], Montague analyzes an event as a property of moments of time--a function from possible worlds to sets of 1-place sequences of moments of time. An experience is analyzed as a function from possible worlds to sets of 2-place sequences of persons and moments of time. The latter is a minor variation of his analysis of the intension of an intransitive verb phrase in PTQ--a function from ordered pairs of possible worlds and moments of time to sets of individuals (actually individual concepts, but that is irrelevant here). Montague states in Montague [1] that his analysis of events is adequate for instantaneous generic events. In order to treat protracted generic events, such events should be identified with properties of intervals, rather than moments, of time (or more generally with properties of unions of intervals of time). From this one can extrapolate a more general analysis of the intension of an intransitive verb phrase--a function from ordered pairs of possible worlds and intervals of time (or more generally, unions of intervals of time) to sets of individuals. On this line, a point of reference is an ordered pair of a possible world and an interval of time. Accordingly we would now consider the notion of a sentence being true (under an interpretation) relative to a possible world and an interval of time.

¹¹This analysis of the present progressive tense might be objected to as follows. For any moment of time t , usually there will exist an interval I about t such that Jones leaves is false at I . Thus Jones does not leave is true at I . Therefore, considering Jones is not leaving to have a truth condition parallel to (7), Jones is not leaving is true at t . The analysis cannot be correct, it is argued, since whenever Jones is leaving is true at a moment of time, usually Jones is not leaving will also be true at that moment of time.

I do not accept this objection since I do not think that Jones is not leaving has a truth condition parallel to (7). I regard Jones is not leaving as having only one reading, the reading contradictory to the reading of Jones is leaving.

¹²One clue is that there seems to be a noncompletion reading of John is building a house which does not entail that a house exists.

¹³Dahl, in Dahl [1], pp. 21-22, considers our analysis of the present progressive tense and rejects it because, in essence, he believes that a sentence like John is building a house only has a noncompletion reading. I agree that it has a noncompletion reading. However I am uncertain as to whether it has a completion reading as well. If it does, then I think our analysis captures it.

References

- Ackrill, J. L. [1]. 'Aristotle's distinction between energeia and kinesis', in Bambrough [1], pp. 121-141.
- Aristotle [1]. Ethica Nicomachea.
- Aristotle [2]. Metaphysica.
- Bambrough, Renford [1]. New Essays on Plato and Aristotle (New York, 1965).
- Dahl, Östen [1]. 'Some suggestions for a logic of aspects', Logical Grammar Reports, No. 3 (University of Göteborg, Department of Linguistics, 1973).
- Hintikka, K. J. J., J. M. Moravcsik, and P. C. Suppes (editors) [1]. Approaches to Natural Language, Proceedings of the 1970 Stanford Workshop on Grammar and Semantics, (Dordrecht, 1972).
- Kenny, Anthony [1]. Action, Emotion and Will (New York, 1963).
- Lambert, Karel [1]. Philosophical Problems in Logic (Dordrecht, 1970).
- Leech, Geoffrey N. [1]. Towards a Semantic Description of English (London, 1969).
- Lemmon, E. J. [1]. 'Comments on D. Davidson's "The logical form of action sentences"' in Rescher [1], pp. 96-103.
- Montague, Richard [1]. 'On the nature of certain philosophical entities', The Monist, vol. 53 (1969), pp. 161-194.
- Montague, Richard [2]. 'English as a formal language', in Visentini et al. [1], pp. 189-224.
- Montague, Richard [3]. 'Universal grammar' Theoria, vol. 36 (1970), pp. 373-398.
- Montague, Richard [4]. 'Pragmatics and intensional logic', Synthese, vol. 22 (1970), pp. 68-94.
- Montague, Richard [5]. 'The proper treatment of quantification in ordinary English', in Hintikka, Moravcsik, and Suppes [1].
- Penner, Terry [1]. 'Verbs and the identity of actions--a philosophical exercise in the interpretation of Aristotle', in Wood and Pitcher [1], pp. 393-460.
- Potts, Timothy C. [1]. 'States, activities and performances', Proceedings of the Aristotelian Society, supplementary volume 34 (1965), pp. 65-84.
- Rescher, Nicholas (editor) [1]. The Logic of Decision and Action (Pittsburgh, 1968).
- Ryle, Gilbert [1]. The Concept of Mind (London, 1949).
- Scott, Dana [1]. 'Advice on modal logic', in Lambert [1], pp. 143-173.

Vendler, Zeno [1]. Linguistics in Philosophy (Ithaca, 1967).

Visentini, Bruno, et al. (editors) [1]. Linguaggi nella societa e nella tecnica (Milan, 1970).

Wood, Oscar P. and George Pitcher (editors) [1]. Ryle--a Collection of Critical Essays (New York, 1970).