Moment of Change, Cessation Implicatures and Simultaneous Readings*

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Abstract. This paper makes a hypothesis about the truth of a stative clause at a moment explicit: if a tenseless stative clause φ is true at moment *m*, then there is a moment *m′* preceding *m* at which φ is true and there is a moment *m′* following *m* at which φ is true. We show how this hypothesis underwrites the entailment from PRES-φ to PAST-φ and use this fact to derive a *cessation implicature:* the utterance of PAST-φ implicates that no state of the kind described currently holds. Our analysis makes use of an existential quantifier for tense with a domain restriction variable over reference time concepts. We predict the presence of a cessation implicature in matrix and embedded clauses when the reference time concept does not—by itself—make PRES-φ false. We also predict that the choice between an indexical versus a relative PRES in an embedded clause affects whether a cessation inference is found with an embedded PAST. We show how this prediction is borne out when we compare English to Hebrew and, in light of this comparison, discuss the traditional claim that, English—unlike Hebrew—has a 'vacuous' PAST that correlates with a so-called 'simultaneous reading'.

Keywords: tense, states, intervals, moments, scalar implicature, sequence of tense

1. Introduction

Let us begin with some commonly held principles of temporal semantics. There are durationless moments of time between any two of which there is a third. Tensed clauses are true at moments, while tenseless clauses can be true at intervals (e.g. *John built an aquarium* is true at a moment *m* if there is an interval *I* preceding *m* at which *John build an aquarium* is true). If a tenseless stative sentence is true at an interval *I*, it is true at any subinterval of *I* and at any moment *m* within *I*. With this much in place, we can formulate the following hypothesis:

(1)   *The Temporal Profile of Statives*
        For any tenseless stative clause φ, if φ is true at moment *m*, then there is a moment *m′* preceding *m* at which φ is true and there is a moment *m′* following *m* at which φ is true.

At first, (1) may sound incorrect. If John was anxious for an hour yesterday, then for any moment during his anxiety, *John be anxious* was true and for moments before the anxiety, *John be anxious* was false. So surely there must have been a ***first moment*** at which *John be anxious* was true but before which it was false. Surely not! For all we know, there might have been a lower bounding moment *m* such that *John be anxious* was true for any moment after *m* until the

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anxiety ended and *John be anxious* was false at *m* and at moments prior to *m*. In that case, there was no first moment at which *John be anxious* was true. Our experience of John's anxiety or even John's experience of it is of no help here. Whether or not there was a first moment, it would have been too small for us to perceive (Hamblin 1971). But in that case, why should one think that the correctness or incorrectness of the hypothesis in (1) is something semanticists should even consider? In fact, whenever reference is made to first and last moments in semantic theorizing, the hypothesis in (1) is considered and denied, often implicitly (see e.g., Musan's (1997: 279) discussion of lifetime effects, de Swart's (2000: 12) *bound* operator, Condoravdi's (2010: 888) *earliest* operator, etc.).[1]

We have taken the hypothesis in (1)—which is often left implicit—and made it explicit. The goal of the paper is to show that a phenomenon we will call "cessation" arises because the grammar is as the hypothesis in (1) claims. Before turning to cessation, we would like to offer a very old conundrum for the benefit of those who would resist (1) because they cherish the idea that any state that begins and ends must be a state that has a first moment and a last moment. Consider the following quote from *Aristotle on the Instant of Change* by Richard Sorabji (1979):

(2)   'The train leaves at noon', says the announcer. But can it? If so, when is the last instant of rest, and when the first instant of motion? If these are the same instant, or if the first instant of motion precedes the last instant of rest, the train seems to be both in motion and at rest at the same time, and is not this a contradiction? On the other hand, if the last instant of rest precedes the first instant of motion, the train seems to be in neither state during the intervening period, and how can this be? Finally, to say there is a last instant of rest, but not a first instant of motion, or *vice-versa*, appears arbitrary. What are we to do?

It should be pointed out that Sorabji and the sources he relies on are for the most part interested in the states themselves; theirs is a metaphysical question about the temporal properties of states (see Strobach 1998 for more discussion). By contrast, the hypothesis in (1) is a linguistic hypothesis. The two are of course related, but not identical. It is possible for a state to have a first moment at which it holds but for a sentence radical describing that type of state to be false or undefined at that moment.

Turning now to "cessation", consider the following situation. A little boy named Scotty has just been brought into the hospital. Dr. Spock is talking to him, when the head nurse walks in and

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[1] One possible exception is Bennett and Partee's (1972: 102) analysis of the progressive, which could be construed as an implicit endorsement of (1). Consider their remark below, which is part of an explanation of why *John is walking* entails *John has walked since yesterday*:

> (n) John is walking.
> Suppose (n) is true at *p*. Then there exists an interval *I* such that $p \in I$, *p* is not an endpoint for *I*, and *John walks* is true at *I*.

If one adopts the idea that the progressive is a stativizer (cf. Parsons 1990:234), Bennett and Partee's 'not an endpoint' requirement could be understood as a reflex of the fact that the grammar adheres to (1). If $p \in I$ and *p* is not an endpoint for *I*, then there is a p' before *p* and one after *p* which are in *I* and are not endpoints for *I*. In other words, the stative *John be walking* comports with (1). We return to this point in §4.

asks: "How is our patient doing?" Dr. Spock replies: "he was anxious". The nurse infers that Scotty is no longer anxious. We call this inference a *cessation implicature*, defined[2] in (3).

(3)   <u>Cessation Implicature</u>: When the utterance of a past tensed sentence implicates that no state of the kind described currently holds.

Here is an analysis of how the cessation implicature arises in the scenario described above and summarized in (4) below

(4)   a.   How is Scotty doing?
       b.   Scotty was anxious.

The proposition expressed by the present tense counterpart of (4)b, i.e. *Scotty is anxious*, entails the proposition expressed by *Scotty was anxious*, for if *be anxious* is true at the moment of utterance, then, by the hypothesis in (1), *Scotty be anxious* is true at some moment m' prior to the moment of utterance and the truth of *Scotty be anxious* at that prior moment verifies the past tensed *Scotty was anxious*. The entailment from PRES φ to PAST φ is asymmetric; PAST φ does not entail PRES φ. With this result in hand, we can advance to a calculation supporting a Gricean quantity implicature. The doctor chose to utter (4)b when she could have used the stronger statement *Scotty is anxious*. She must have avoided the stronger statement because it is false, assuming she possessed all the relevant information, which is plausible in this case. So the use of (4)b implicates that Scotty is no longer anxious.

Musan 1997 and subsequent work (e.g. Magri 2009, 2011, Thomas 2012) dismiss a straightforward Gricean analysis of this kind because they reject the idea that PRES-φ entails PAST-φ.[3] This, in turn, has to do with their implicit rejection of the hypothesis in (1).[4] The main contribution of this paper is that we show that once (1) is adopted, it is possible to provide a semantics of tense that not only accounts for cessation in examples like (4)b as a straightforward application of Gricean reasoning, but it is also explains why certain sentences with the past tense do not exemplify cessation. In the next section, we propose an analysis that makes use of an existential quantifier for tense with a domain restriction variable over reference time concepts. We argue that the cessation implicature arises in sentences of the form PAST-φ when the

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[2] Although the terminology in (3) is new, the observation is not. It is the starting point for (Bello 1847: Ch. 28, §692)'s theory of fake past and it is more recently discussed in Musan (1997), Iatridou (2000: 248), Hogeweg (2009: 189-90), van Gerrevink & de Hoop (2011: 161) and Magri (2011: §5). Given the hypothesis in (1), we might expect a corresponding implicature triggered by the use of the future. Such things may exist: "Whaddya mean I am GOING to be ok? Are you saying I'm not ok now?" We leave this half of the story for another time.

[3] Musan (1995) actually held the position that PRES-φ asymmetrically entails PAST-φ, but later dismissed it.

[4] Musan (1997: 279) asserts that "if Gregory came into existence right now, at this very moment while I utter this sentence, then *Gregory is from America* would be judged true, but *Gregory was from America* would be judged false". Musan is assuming the possibility of a first moment for the tenseless *Gregory be from America*. Similarly, Thomas 2012 considers the sentences below and claims: "…the present tense sentence in (b) is not stronger than the past tense sentence in (a). Rather, the two sentences are logically independent." Thomas concludes: "If the present sentence is not stronger than the past sentence, it cannot be negated by exploiting the maxim of quantity according to Gricean reasoning" (*ibid:* 47-48).
       (ia) John was a graduate student   (ib) John is a graduate student.

reference time concept does not—by itself—make PRES-φ false. In section 3, we extend our analysis to tense embedded under propositional attitudes. An important prediction will be that whether or not a cessation inference arises with an embedded PAST, depends in part on whether or not the present tense in the language in question is indexical. In section 4, we show how this prediction is borne out when we compare English to Hebrew and, in light of this comparison, we discuss the traditional claim that, English—unlike Hebrew—has a 'vacuous' PAST that correlates with a so-called 'simultaneous reading'.

2.   Cessation Implicatures in Matrix Clauses

The past tensed sentence in (4)b, repeated below, triggers a cessation implicature.

(4)   a. How is Scotty doing?
       b. He was anxious.

This contrasts with what happens in the discourse below from Klein (1994: 4) in which a judge poses the question in (5)a to a witness, who then replies with (5)b,c:

(5)   a. What did you notice when you looked into the room?
       b. The light was on. There was a book on the table.
       c. It was in Russian.

According to Klein, the judge fixes a definite period of time and the witness is meant to talk about what happened at that time and that time only. The truthfulness of the testimony isn't affected by whether or not the light was on before or after the time period fixed by the judge. The same goes for the book's being on the table. As for being in Russian, Klein stresses that the book, if it still exists, is most likely still in Russian and nothing the witness says contravenes this. In other words, no cessation implicature is triggered by the past tensed (5)c.

Klein is right in pointing out that the witness's remarks do not say anything about the current state of things. Nevertheless, it is true that if the room survey occurred far enough in the past, listeners are likely to conclude that the light has gone off and on in the meantime. In other words, the state of the light being on referred to in (5)b has most likely ended. Following the terminology employed by Tonhauser (2007), we call this inference *change of state*. *Change of state* is an inference that the described state has ended, while *cessation* means that not only has that state ended, no state of the kind described obtains currently. It is important to keep these two types of inferences separate. Also notice that the change of state inference just discussed arose not from a choice of tense, but from ideas about how the world works (i.e. that lights are generally not kept on for long periods of time). Arguably, cessation implicatures may arise in this way as well.[5] We will not have any more to say about change of state and in what follows, we focus on cases like (4)b and (5)c above, where we claim that cessation (and the lack thereof) has to do with tense choice.

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[5] For example, if I am telling you about my previous trip to Nepal and utter: *I was standing on a elephant*, you'd likely conclude that I am not currently standing on an elephant because elephant standing is a rare state of affairs.

We have already outlined our analysis of how tense choice in (4)b triggers a cessation implicature. We now move on to explain why cessation is not triggered in (5)c, whose meaning is given in (6):[6]

(6) $\lambda t_0 \lambda w_0. \exists t \, (t \prec t_0 \wedge t \in C_1(w_0) \wedge \text{be.in.Russian}(w_0, t, \text{book}))$

Following von Stechow (2009: 140), we make use of an existential quantifier for tense and, following Roberts (1995) and von Fintel (1994), we assume that a tense is adjoined to a domain restriction variable C_n intended to capture reference time effects.[7] This is motivated (in part) by (5)c, where there is an implicit 'when I was in the room' given the discourse considered. Assuming this implicit 'when'-clause to be part of the proposition conveyed, C_n has to be intensional and we will refer to its value as a *reference time concept*. As spelled out in (7) below, we take the reference time concept in (6) to correspond to the implicit 'when I was in the room':

(7) $g(C_1) = \lambda w \lambda t. \, t$ is included in the interval during which the witness was looking in the room in w.

We take the meaning of an assertion to be given by the application of (6) to the speech time s^* (Ogihara 1995: fn26):[8]

(8) $\lambda w_0. \exists t \, (t \prec s^* \wedge t \in C_1(w_0) \wedge \text{be.in.Russian}(w_0, t, \text{book}))$

Let us now turn to explain why (8) does not trigger cessation. Recall that we hypothesized in the previous section that the cessation implicature is related to the choice of tense. In particular, we considered the fact that the doctor chose to utter the past tensed (4)b when she could have used the stronger statement *Scotty is anxious*. This allowed us to derive cessation as a quantity implicature. Let us, then, proceed in an analogous fashion by considering the PRES *alternative*[9] of (5)c, where the time quantified over by the tense is identified with the speech time:

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[6] Throughout the paper, meanings will be given as intensional logic translations. Four distinguished variables are used: s^* for speech time, w^* for speech world, t_0 for local evaluation time and w_0 local evaluation world. 'Local evaluation time' and 'local evaluation world' correspond roughly to the time and world in which propositional meanings are evaluated for truth respectively (cf. Abusch 1997).

[7] We disregard discussing the contribution of grammatical aspect, but recognize that this may ultimately play an important role in the proposed analysis. One possibility is to say that grammatical aspect constrains the location of the described eventuality relative to the time described by the domain restriction variable (cf. Kamp & Rohrer 1983).

[8] Understanding of subsequent discussion may be facilitated if the reader mentally applies (8) to w^* the speech world. We refrain from doing so in order that we have a proposition on which we can consider entailment relations. Thanks to Jacopo Romoli for discussion of this point. In what follows, we will assume that the relevant values for w_0 in the matrix are those worlds that, for all the interlocutors know, could be the actual world.

[9] We follow Sauerland (2004: 374) and Russell (2012: 29) in defining *scalar alternatives* as in (i) below. In this way we differ from Thomas (2012: 47-48), who also treats PRES and PAST as scalar alternatives, but since he denies the entailment relation from PRES φ to PAST φ, he adopts a more intricate analysis in which scalar alternatives are not defined in terms of strength, but according to their syntactic structure (Katzir 2007, Fox & Katzir 2009).

    (i)   Given a pair of sentences ϕ_α and ϕ_β, ϕ_α is a *scalar alternative* of ϕ_β if and only if:
            a. ϕ_α is identical to ϕ_β except that in one place where ϕ_α has α, ϕ_β has β
            b.   α and β are members of the same Horn-Set
            c. ϕ_α asymmetrically entails ϕ_β

(9)   It is in Russian.
(10) $\lambda w_0. \exists t \, (t = s^* \wedge t \in C_1(w_0) \wedge \text{be.in.Russian}(w_0, t, \text{book}))$

Given the way C_1 is set in this discourse, recorded in (7) above, it follows that $t \in C_1(w_0)$ is false in (10): in the worlds of the context there is no time during the room-looking interval that includes the courtroom speech time. This means that regardless of what state the book is in at t, (10) is false. Therefore, a hearer may conclude that the witness chose the past tensed (5)c over the present tensed (9) because the present tensed (9) is false. But that tells him nothing about the current state of the book and so there is no cessation implicature. Cessation implication is obviated in this case because the reference time concept excludes the speech time. This observation, we believe, is what crucially distinguishes (4)b and (5)c. Below, we spell out the semantics of (4)b and its PRES alternative to make this comparison apparent.

(11)   a.   Scotty was anxious.
       b. $\lambda t_0 \, \lambda w_0. \exists t \, (t < t_0 \wedge t \in C_1(w_0) \wedge \text{be.anxious}(w_0, t, \text{scott}))$

(12)   a.   Scotty is anxious.
       b. $\lambda t_0 \, \lambda w_0. \exists t \, (t = t_0 \wedge t \in C_1(w_0) \wedge \text{be.anxious}(w_0, t, \text{scott}))$

(13) $g(C_1) = \lambda w \lambda t. \ t$ is in included in the period surrounding $g(t_0)$ in w.

What is crucial is that the reference time concept in (13) describes a time that surrounds $g(t_0)$, which is identified with the speech time (formally captured by applying the meanings to s^*). This is justified given the discourse considered in which the speaker asks how Scotty is doing and thus we understand the response in (11) to have an implicit extended "now" in the same way that (5)c has an implicit "when"-clause. And as result of the reference time concept describing a time that surrounds the speech time, $t \in C_1(w_0)$ is true in (11) and (12). Hence, whereas the reference time concept in (12) allows us to advance the Gricean reasoning to conclusions about Scotty's current state of anxiety, the reference time concept in (10) prevents similar inferencing. This leads to the generalization below:

(14)   A cessation implicature arises when the reference time concept does not—by itself—make PRES-φ false

Further evidence for (14) comes in the next section, when we look at tense in embedded contexts.

3.   Cessation Implicatures in Embedded Clauses

Suppose now, that a medical resident had entered the room with the head nurse and that he had, for some reason, not heard the doctor clearly. He asks the nurse: "Wait, HOW is the patient doing?" The nurse replies with (15) below. In this case, the resident will likely understand that the doctor believes that Scotty was anxious but no longer is.

(15)   The doctor believes that Scotty was anxious.

Our analysis of (15) will follow roughly the same pattern as its unembedded counterpart discussed in the previous section, taking into consideration that the embedded past tense is relative to the believer's (i.e. the doctor's) *now* and not the speech time.[10]

As a first step in the analysis, we'd like to argue that (15) above is entailed by (16) below, where the embedded PAST of (15) has been replaced by PRES:

(16) The doctor believes that Scotty is anxious.

The meaning of (15) applied to s^* is in (17):

(17) $\lambda w_0. \exists t \, (t = s^* \wedge t \in C_1(w_0) \wedge \text{believe}(\text{doctor}, w_0, t, \lambda t_0 \lambda w_0. \exists t'(t' \prec t_0 \wedge t' \in C_1(w_0)$
$\wedge \text{be.anxious}(w_0, t', \text{scott}))))$

(18) $g(C_1) = \lambda w \lambda t. \, t$ is included in the interval surrounding $g(t_0)$ in w.

We take the sentential complement of *believe* to denote a set world-time pairs, each of which is required to be compatible with what the doctor believes in the world of evaluation at s^*. The embedded tense is relativized to t_0, the believer's *now*, and is restricted by the reference time concept provided by C_1. The use of the same reference time concept variable as in the matrix corresponds to the fact that the nurse is reporting on a belief held during the time spent with Scotty and the belief itself concerns the time spent with Scotty.[11] Note that (18) puts this as times included in the interval surrounding $g(t_0)$, which is identified with the speech time in the matrix clause, and with the doctor's *now* in the embedded clause.

An utterance of (15) triggers consideration of its PRES alternative in (19) below, whose meaning is provided in (20).

(19) The doctor believes that Scotty is anxious.
(20) $\lambda w_0. \exists t \, (t = s^* \wedge t \in C_1(w_0) \wedge \exists t'(t' = s^* \wedge t' \in C_1(w_0) \wedge s^* = \text{f}(w_0, s^*)$
$\wedge \text{believe}(\text{doctor}, w_0, t, \lambda t_0 \lambda w_0.\text{be.anxious}(w_0, \text{f}(w_0, t_0), \text{scott}))))$

Assuming that the English present tense is indexical, it undergoes *res*-movement, appearing outside the scope of believe (see, e.g. Kratzer 1998, von Stechow 2009). In its place we have an acquaintance relation, *f*, applied to a world-time pair to produce a time. This analysis follows Abusch (1997) and, following Heim (1994: 155), we take the acquaintance relation in this example to correspond to the concept of *now*, so that $\text{f}(w_0, t_0)$ is t_0. We thus simplify (20) to:

(21) $\lambda w_0. \exists t \, (t = s^* \wedge t \in C_1(w_0) \wedge \exists t'(t' = s^* \wedge t' \in C_1(w_0) \wedge s^* = \text{f}(w_0, s^*)$
$\wedge \text{believe}(\text{doctor}, w_0, t, \lambda t_0 \lambda w_0.\text{be.anxious}(w_0, t_0, \text{scott}))))$

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[10] The notion of a believer's *now* is from Abusch 1997; it is any of the candidate times that are compatible with where the believer temporally locates himself at the time the belief was held.
[11] More intricate discourses involving attitude reports have recently been explored by Altshuler (2008) and Bary & Maier (2009), following Kamp's (1990, 2005) seminal work.

And now we reason about the believed proposition. By the hypothesis in (1) discussed at the outset, we have:

(22) $\lambda t_0 \lambda w_0. \text{be.anxious}(w_0, t_0, \text{scott}) \subseteq \lambda t_0 \lambda w_0. \exists t'(t' \prec t_0 \wedge \text{be.anxious}(w_0, t', \text{scott}))$

Moreover, since $C_1(w_0)$ includes t_0 and times in its immediate vicinity we have:

(23) $\lambda t_0 \lambda w_0. \text{be.anxious}(w_0, t_0, \text{scott}) \subseteq \lambda t_0 \lambda w_0. \exists t'(t' \prec t_0 \wedge t' \in C_1(w_0) \wedge \text{be.anxious}(w_0, t', \text{scott}))$

Assuming a Hintikkan (1962, 1969) analysis for *believe*, we then get:

(24) $\text{believe}(\text{doctor}, w_0, t, \lambda t_0 \lambda w_0. \text{be.anxious}(w_0, t_0, \text{scott})) \models$
(25) $\text{believe}(\text{doctor}, w_0, t, \lambda t_0 \lambda w_0. \exists t'(t' \prec t_0 \wedge t' \in C_1(w_0) \wedge \text{be.anxious}(w_0, t', \text{scott})))$

From (25), we get back to (17), namely the interpretation for *The doctor believes that Scotty was anxious*. Therefore, we conclude that the proposition expressed by the nurse's utterance of (15) in the context considered is weaker than the proposition that would have been expressed if (16) had been uttered instead. In turn, this fact can serve as the basis of a Russellian analysis of the cessation implicature (Russell 2006, 2012). The nurse's use of the weaker *was anxious* leads the resident to conclude that the stronger *is anxious* is false, that is, the doctor does not believe that Scotty is anxious. Assuming the doctor has an opinion on the matter, the resident may conclude that the doctor believes that Scotty is not currently anxious.[12]

The transition from (22) to (23) above relied on the fact that the concept assigned to C_1 covered t_0. When we switch to an example where this is plausibly not the case (cf. the Klein example in the previous section), we lose the cessation implicature. Here's an example. Suppose that a month ago, Bob and Pat took their son Scotty to Paris for an appointment with a world-famous doctor. Recalling that visit, Bob utters:

(26) That famous French doctor believed-C_1 that Scotty was-C_1 anxious.

In this case Bob reports a belief held by the doctor one month ago and the belief concerned the goings on during the time the belief was held. This is captured by the following assignment to C_1:

(27) $g(C_1) = \lambda w \lambda t. \; t$ is a time during Bob's and Pat's visit to the famous French doctor in w.

Given the reasoning employed to this point, the key to understanding why no implicature arises in (26) lies in the present tense alternative given in (28) below:

(28) That famous French doctor believed-C_1 that Scotty is-C_1 anxious.

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[12] Sharvit & Gajewski (2008, 2012) point out that the apparent opinionatedness in *belief*-sentences is connected to the fact that *believe* is a neg-raising verb (Bartsch 1973, Horn 1978). Moreover, based on scalar implicatures in complements of non-neg-raising verbs, they argue in favor of a 'grammatical'—rather than a 'pragmatic'—approach to scalar implicatures (see Sauerland 2012 for an overview and Russell 2012 for a reply).

Except for the higher past tense on *believe*, this example is like our previous embedded PRES example, so we'll just use (21) above, adjusting the higher present meaning to PAST.

(29) $\lambda w_0.\exists t\,(t \prec s^* \,\wedge\, t \in \mathcal{C}_1(w_0) \,\wedge\, \exists t'(t' = s^* \,\wedge\, t' \in \mathcal{C}_1(w_0) \,\wedge\, s^* = \mathrm{f}(w_0, s^*)$
$\wedge\; \mathtt{believe(doctor}, w_0, t, \lambda t_0 \lambda w_0.\mathtt{be.anxious}(w_0, t_0, \mathtt{scott}))))$

Although the meaning of the embedded clause is the same in (21) and (29), the value for the reference time concept is different. In (29), like in the Klein example seen earlier, $t' \in \mathcal{C}_1(w_0)$ is false because $t' = s^*$ and the speech time is not a part of the visit to the doctor from a month ago in the context worlds. And so now, like in Klein's example, Gricean reasoning never advances to any conclusion about the state of Scotty's anxiety or beliefs about it.

The blocking of the cessation implicature in this case crucially depends on the fact that the English present tense is indexical and hence refers to the speech time. This leads to the following prediction:

(30)   In a language where the present tense is relative, cessation implicatures should arise even when the reference time concept excludes the speech time.

In the next section, we compare English to Hebrew and show that this prediction is borne out.

4.   Relative PRES in Hebrew and Cessation

Hebrew is one of many languages in which the present tense is relative (Sharvit 2003). One can see this in the following example:

(31) *ha-more   xašav   še avi acbani.*
      The teacher think-PAST that Avi PRES.anxious
      'The teacher thought that Avi was anxious'

Despite the use of the present in the embedded clause, the truth conditions of (31) are independent of any anxiousness, believed or otherwise, holding at speech time. The reported thought has to do with the time of thinking. If we now insert a past tensed copula in the embedded clause, cessation is triggered:

(32) *ha-more   xašav   še avi haya   acbani.*
      The teacher think-PAST   that Av PAST.be   anxious
      'The teacher thought that Avi had been anxious'

As the gloss in (32) suggests, when a past tensed copula is used in the embedded clause, the impression one gets is that the teacher had a thought he might have expressed by saying: "You were sick", insinuating cessation of sickness. This suggests that as in English, cessation implicatures in Hebrew can be triggered by a comparison with the present tense. In turn, we hypothesize that properties of the present tense in a given language will effect whether or not an

embedded past tense triggers a cessation implicature. With a reference time concept that includes the belief time but excludes speech time, the English embedded PAST has no viable PRES alternative and so it doesn't trigger cessation. The Hebrew embedded PAST, however, has a viable PRES alternative and so cessation is triggered.

5.   Simultaneous Readings

The just discussed cross-linguistic correlation between tense interpretations has been noticed before. But, it has been characterized in different terms. Sharvit (2003) correlates the type of present tense a language has with the possibility that a language would have what Enç (1987: 635) named the *simultaneous reading* of a past stative embedded under a past tense attitude verb. According to Enç, on a simultaneous reading of *John heard that Mary was pregnant*, "John hears at a past time that Mary is pregnant at the time of the hearing." According to Sharvit, if a language has an indexical present tense, it must have a mechanism for generating simultaneous readings. In light of our observations about the distribution of cessation implicatures, we have begun to wonder whether there truly is a simultaneous reading. We offer the conjecture in (33):

(33)   *Simultaneity conjecture*
       It is the perception of the absence of a cessation implicature that is reported as 'simultaneity' for PAST statives embedded under attitude predicates.

This conjecture is relevant for English, where cessation is absent with PAST under PAST but it is not relevant for Hebrew, where an embedded PAST does give rise to cessation and where correspondingly, simultaneous readings are not reported (cf. (26) vs. (32)).[13,14] The conjecture in (33) is likewise irrelevant for PAST embedded under PRES English (cf. (15)). There too the presence of cessation implicatures accompanies a lack of simultaneity claims.

One often sees hints of the connection between non-cessation and simultaneity in discussions of indirect discourse. For example, when drawing support for his view that past tenses can be semantically vacuous, Jespersen (1924: 293) considers Ginneken's (1907: 499) comment below, in (34). Here, cessation of being a particular kind of individual is not found and this fact is then commented upon.

(34)   *Je ne savais pas qui il était. Est-ce que je veux dire par-là qu'il est quelque autre maintenant? Nullement.*
       'I didn't know who he was. Do I mean by that that he is something else now? Not at all.'

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[13] The discussion by Bošković (2012) suggests that Russian, Polish, Czech, Serbo Croatian, Romanian, Japanese, Korean, Hindi, Turkish, Malayalam, Bangla and Angika similarly lack "simultaneous readings", while Dutch, Modern Greek, Spanish, French, German and Italian work like English. See Altshuler 2004, 2008, Khomitsevich 2007 and Grønn & von Stechow 2010 for more discussion about Russian; Ogihara 1996, Kusumoto 1999, Gennari 2001, Kubota *et al* 2009, Ogihara & Sharvit 2012, Sharvit, to appear for more discussion about Japanese.

[14] However, see Sharvit, to appear for a discussion of some Hebrew cases which have been reported as exemplifying simultaneous readings (see also Altshuler 2008 for Russian). Sharvit argues that these are special cases, derived by independent means, and distinguishes between "pure simultaneous" and "pseudo-simultaneous" readings.

Similarly, Sharvit (2008) uses the pair in (35)-(36) below to illustrate simultaneity in English versus in Hebrew.

(35)   Bill said that eight was an odd number.

(36)   *#Bill amar   še   šmone haya   mispar bilti zugi.*
   say-PAST   that eight be-PAST   number not even

Sharvit remarks that, unlike (35), (36) is strange because it would mean attributing to Bill the tacit assumption that being odd is a property that a number could have temporarily. Observe that this tacit assumption doesn't follow simply from the fact that at some point in the past, the number eight was in a state of oddness. It requires further that eight ceased to be odd at some point.

6.   Shifting of Tenses and the Temporal Profile of Statives

Jespersen (1924: 292ff) characterized the phenomena of interest here in terms of a shifting of tense from direct to indirect discourse. An utterance of *I am ill* can be reported as *He said that he <u>was</u> ill* and so Jespersen dubs the lower PAST an "indirect present". The correspondence between direct and indirect speech has been used as the basis of a challenge to the semantics of the past tense adopted here—a challenge that turns out to rely on an implicit rejection of the hypothesis in (1) concerning the temporal profile of statives.

Suppose that Dr. Spock says: "Scotty is ill" and this utterance gets reported with (37)b, whose semantics is given by (37)c:

(37)   a. Dr. Spock: "Scotty is ill"
   b. The doctor said that Scotty was ill.
   c. $\lambda w_0.\exists t\, (t \prec s^* \wedge t \in C_1(w_0) \wedge \mathrm{say}(\mathrm{doctor},\, w_0,\, t,\, \lambda t_0 \lambda w_0.\exists t'\,(t' \prec t_0 \wedge t' \in C_1(w_0)$
                    $\wedge\ \mathrm{be.ill}\,(w_0,\, t',\, \mathrm{scotty}))$

(37)c, so the argument goes, appears to fall short—it attributes to Spock a claim about an illness holding prior to her speech time, when (37)b contains no such claim. This argument relies on the assumption that one can claim that a state holds at a moment *m* without it also holding at a moment *m′* prior to *m*. But this is exactly what the hypothesis in (1) rules out.

One could of course wonder why, when a speaker intends to report (37)a, he does not make use of an utterance with an "embedded present meaning", viz. (38) below, instead of (37)c:

(38) $\lambda w_0.\exists t\,(t \prec s^* \wedge t \in C_1(w_0) \wedge \mathrm{say}(\mathrm{doctor},\, w_0,\, t,\, \lambda t_0 \lambda w_0.\, \mathrm{be.ill}(w_0,\, t_0,\, \mathrm{scotty}))$

The problem is that the English PRES is indexical. Were it not, PRES would have been the resource to use here and indeed, in other languages such as Hebrew, it is used for this purpose. Speakers of English are aware of this deficit and can take it into account when interpreting

utterances. Perhaps it is this compensation that encourages the idea that there are simultaneous readings.

When Stowell (2007: 448) introduces "the so-called 'simultaneous' interpretation", he notes that it arises "with stative predicates, and with habitual, progressive, and perfect predicates, which behave like statives in this respect". Why should that be? Leaving aside perfects and habituals, one possibility is that progressives behave like statives because they are statives (Parsons 1990: §12.3.1, Gendler Szabó 2004, Moens & Steedman 1988, Kamp & Reyle 1993, among many others).[15] Alternatively, we may adopt Bennett and Partee's analysis of the progressive (see footnote 1) according to which it has the same temporal profile as a stative, regardless of whether progressives are statives in all other respects. On either approach, we have a way to understand what happens in the example below from Abusch (1988; 1997), which has often been cited to argue in favor of a mechanism that derives the putative simultaneous readings.[16]

(39) John decided a week ago that in ten days at breakfast he would say to his mother that they were having their last meal together (after Kamp & Rohrer 1983).

The past tense on *were having* indicates that breakfast eating goes on prior to the sayer's now (times compatible with where the sayer temporally locates himself at the time of the statement). The lack of a felicitous present tense alternative to *were having* means that no cessation implicature is triggered.[17] And so if the basis for (39) is a decision by John to utter: "we are having our last meal" then, given the hypothesis in (1), (39) is true. The lack of a cessation implicature makes it an adequate rendering of that decision and the interpretation is likely to be described as simultaneous.

In addition to example in (39), Heim (1994: 159) cites two other examples that allegedly provide evidence in favor of a mechanism that derives simultaneous readings. The first example in (40) is from Ogihara (1989) and the second example in (41) is from A. Santisteban (p.c.):

(40) He said he would buy a fish that was still alive.
(41) He decided to jump before they fired.

Ogihara's example uses a past tensed stative *was alive* and hence it works like other examples discussed to this point. The example in (41), on the other hand, is different from the other examples discussed thus far because it uses a temporal adjunct clause. Such clauses are

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[15] Perfects and habituals are also often analyzed as being statives or stative-like (see, e.g. Moens & Steedman 1988, Kamp & Reyle 1993, de Swart 2007, Bittner 2008).

[16] See Heim (1994: 159), Ogihara (1996: 121), Kusumoto (1999: 75), Schlenker (1999: 42), Kuhn & Portner (2001: 61), Sharvit (2004: 319-320), Stowell (2007), Arregui (2008: 43), Schulz (2012: 5), among many others.

[17] In this example, a present tense alternative is simply ungrammatical for many speakers. Elsewhere, when a past tensed verb is replaced with a present tensed counterpart in the scope of a past tensed attitude predicate, a double access interpretation results (Smith 1978, Comrie 1985, Ogihara 1989, 1995, 1999, Abusch 1997, among many others). This interpretation appears to require a reference time concept that includes the speech time. As such, the result could not be a scalar alternative to the past tensed utterance in many cases – more than just the tense is changed. A more extensive discussion of this and other uses of the present tense is clearly needed.

ultimately critical for the evaluation of the conjecture in (33) above. Given the scope of this paper, however, we limit ourselves to a remark in the spirit of the approach in Kubota et al. (2011).[18] Heim comments that in (41) the time of firing isn't ordered before either the utterance time or the evaluation time for any other part of the sentence, which constitutes a challenge to the semantics of PAST assumed here. This challenge rests on the idea that "A before B" describes an A-time that precedes a B-time. In that case, the potential firing time would have to follow the jumping and the deciding, as Heim says. However, Krifka (2010) argues that "A before B" describes a time t at which A is true and such that there is no (relevant) time t' **prior to** t at which B is true. On that view, the subordinate clause in (41) could be interpreted with the PAST meaning proposed here, where t_0 would be bound by the verb *decide*.

5.   Summary

We began with the following hypothesis: if a stative tenseless clause is true at a moment m, it is true as well at a moment that precedes m. If this is so, then for any stative clause φ, the proposition expressed by PAST φ in a given context is logically weaker than the one that would have been expressed by PRES φ, its present tensed alternative. And then by Gricean reasoning, a use of a stative PAST φ will implicate that PRES φ is false. If the reference time for the tense includes the speech time, the falsity of PRES φ entails that no state of the kind described by φ holds. We called this a cessation implicature. Cessation implicatures can arise in embedded past tense clauses, in addition to matrix ones. This happens in languages whose present tense is relative and it happens in languages whose present tense is indexical as long as the reference time concept for the embedded tense includes the speech time. If it does not, then no cessation implicature is triggered and we suggest that it is this absence of cessation that speakers/linguists associate with a simultaneous interpretation of PAST under PAST. Throughout we assume a univocal, anteriority meaning for PAST. We show that a common objection to this assumption is at odds with the hypothesis recalled at the beginning of this paragraph.

We hope to have offered the reader a new and interesting perspective on the semantics and pragmatics of the past tense. We cautiously note that we have limited ourselves to linguistic contexts in which it was possible to make two assumptions: (a) the English present tense is always indexical, essentially referring to speech time and (b) cessation implicatures are pragmatic and not grammatical.

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[18] We are aware of two other recent papers on this topic which we need to address: Grønn & von Stechow 2011, and Sharvit, to appear.

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