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Time and Tense

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1. Introduction

Humans conceive of time in terms of space, as shown by the language that we use to talk about temporal relations: we habitually speak of *stretching out* or *compressing* an activity, *heading toward* the future, *returning to* the past and so on (Whorf 1956, Lakoff and Johnson 1980, Binnick 1991:Chapter 1). When describing the meanings of the tenses, linguists have relied on a specific instance of the space-time analogy: the TIMELINE. The timeline is a line (or, equivalently, an ordered set of points) that is unbounded at both ends and segmented into three parts: the past, the present and the future. The points on the timeline may be times by themselves or times paired with events. While we can describe various relations among points on the timeline, only one type of relation counts as a tense relation: that which includes the time at which the linguistic act is occurring. As Lyons states (1977:682), "the crucial fact about tense […] is that it is a deictic category. A tensed proposition, therefore, will not merely be time-bound, […] it will contain a reference to some point or period of time which cannot be identified except in terms of the zero-point of the utterance".

The relationship between utterance time and the time of the situation described may be direct, as in the case of ABSOLUTE TENSES like the past tense, or indirect, as in the case of RELATIVE TENSES like the future perfect (e.g., *I will have left [by the time you read this letter*]), in which the leaving event is represented as in the past relative to a point that is in the future relative to utterance time (the point at which the letter is read). Like other linguistic reference points that are anchored in the 'here and now', the temporal zero-point can, under the appropriate conditions, be identified with times other than the time of speaking or writing. One such case is that in which a writer uses the time of message interpretation, rather than the time of message construction, as the zero-point (Declerck 1991:15). For example, a note writer may choose the formulation *I'm across the hall* rather than *I will be across the hall*. The shifting of the temporal zero-point also occurs in subordinate clauses, both temporal and conditional, as in, e.g., *When/if you have finished your test, [raise your hand]*. Here, a present-perfect predication is used despite the fact that its reference point is located in a (hypothetical) future rather than at the time of speaking (McCawley 1981).

When we talk about the 'location' of the temporal zero-point we are of course making use of the space-time analogy. But if the zero-point is a temporal landmark, what is being located relative to it? Comrie (1985:14) tells us that "tenses locate situations either at the same time as the present moment […], or prior to the present moment, or subsequent to the present moment". This definition appears transparent, in that it partakes of the logic of the space-time analogy, but in fact there is reason to question whether tense "locates situations". If the situation in question is an event, then it is certainly true, for example,

that a past-tense sentence like (1a) locates the cab ride prior to the time of speech, but do past-tense STATE predications, as in (1b), localize the situations that they denote in a similar way?

(1) a. I took a cab back to the hotel.
b. The cab driver was Latvian.

If a speaker makes the assertion in (1b) following that in (1a), no sensible hearer will respond by asking whether the cab driver is still Latvian now. This is presumably because the cab driver's Latvian identity is highly unlikely to desist following the cab ride. Why then has the speaker of (1b) chosen to 'locate' the cab driver's Latvian identity in the past? The answer, which the German logician Hans Reichenbach provided over fifty years ago, is that tenses do not express the relationship between the temporal zero-point and the time of the state of affairs described. Rather, tenses express the relationship between speech time and another interval of interest, which Reichenbach (1947) referred to as REFERENCE TIME(R). Reference time is in principle distinct from either the time of the utterance (which Reichenbach refers to as SPEECH TIME, or S) or the time of the situation that the speaker is describing (which Reichenbach refers to as EVENT TIME, or E). Reference time, according to Klein (1992:535), is "the time for which, on some occasion, a claim is made". In (1a), for example, R is a specific past time that both the speaker and hearer can identify, while in (1b) R is the time established by (1a): the time of the cab ride. What (1b) shows us is that when a speaker makes a past-tense stative assertion, she or he may vouch only for that portion of the state's tenure that coincides with the mutually relevant interval. In the following section, we will further explore the concept of reference time, its role in relative tenses like the past perfect, and the manner in which it relates to the two fundamental situation types, events and states.

The foregoing discussion has touched upon yet another questionable assumption about tense—that one can analyze it without reference to aspect. Certainly, as Comrie (1985:6-7) observes, the two notions are conceptually separable: aspect involves the internal temporal structure of a situation (e.g., whether or not it includes transitions) rather than its placement on the timeline relative to speech time. The view that tense and aspect are semantically distinct is a basic premise of compositional models of English verb morphology, like that of Klein (1992). Such accounts assume that each component of semantic interpretation is associated with a distinct component of morphology or syntax. For example, periphrastic forms like the present progressive are analyzed as having a tense component (expressed by the finite auxiliary verb) and an aspect component (expressed by the present participial complement). The separability of tense and aspect is assumed as well in logical approaches to temporal relations like that of Herweg (1991), in which tenses are represented as operators that have scope over aspectual operators like the progressive, and aspectual operators in turn have scope over predicate-argument complexes or, equivalently, tenseless propositions, e.g., *I take- a cab back to the hotel* in (1). However, as we have seen, states and events relate in distinct ways to the reference times for which they are asserted, and this fact alone suggests that tense and aspect "are […] intimately related, and interact quite extensively" (Hornstein 1991:9).

One such interaction is observed by Comrie (1985:7): "many languages have forms that include specification both of location in time and of internal temporal contour; thus Spanish *hablé* is both perfective aspect and past tense". Here Comrie is illustrating the phenomenon of ASPECTUAL SENSITIVITY, as described by De Swart (1998): tenses may select for specific aspectual classes, as the Spanish perfective past invokes the class of events and processes. While aspectual sensitivity is generally illustrated by reference to the imperfective and perfective past tenses of the Romance languages, aspectually sensitive tenses can be found in English as well. In particular, we will see that the English present tense is an aspectual-class selector, and that many of its uses can be ascribed to this property. As observed by Langacker (1991:259-260), Smith (1997:110-112) and others, the present (or—in Langacker's formulation—the event of speaking), is construed as a single moment. Events have heterogeneous internal structure (i.e., distinct subphases), and for this reason they take time. Accordingly, one cannot confirm that an event of a given type has occurred if one has access only to a single moment in the time course of that event. By contrast, states are effectively atemporal (Bach 1986): they can be verified on the basis of a single momentaneous sample. This entails that the present tense is semantically compatible only with state predications. This account, however, appears to leave us with no explanation of the fact that event verbs do indeed appear with present inflection, as in (2-3):

(2) The flight arrives at noon.
(3) My sister walks to work.

Certainly, neither the flight's arrival nor an episode of my sister walking to work must overlap the time of speech in order for (2) or (3) to be truthful assertions. Therefore, these examples suggest that the present tense has functions beyond that of reporting situations ongoing at speech time; the majority of scholars of English tense indeed assume this to be the case (see Kucera 1978, Binnick 1991:247-251 and Dahl 1995 for discussion). However, as we will see in section 3, there is a way to analyze the functions exemplified in (2-3) that is highly compatible with the assumption that the present tense selects for the class of states. According to this view, both 'scheduled future' present predications like (2) and generic present predications like (3) are the products of COERCION, or, equivalently, implicit type shifting (De Swart 1998, Jackendoff 1999). Coercion can be illustrated in its application to the grammar of English nominal expressions. English determiners like the indefinite article select for nouns that denote countable entities, as in *an apple*. However, when the indefinite article is combined with a nominal that denotes a mass rather than a bounded entity, it forces an interpretation of that entity as a bounded quantity, as in, e.g., *a wine*, which denotes a portion or variety of wine. Here, as in the case at hand, the semantic requirements of the grammatical marker cause it to override intrinsic semantic features of the word with which it combines, resulting in a shift in what the word designates. Similarly, the present tense, as a state selector, can impose stative readings on any dynamic verb with which it combines, thereby resolving semantic conflict between the verb and the inflection that is attached to it. We will see that future and generic readings of present-tense predications can be analyzed as the products of this coercion mechanism.

In addition to interacting semantically, within a given grammatical construction, exponents of tense and aspect also interact within the system of time reference in English: aspectual constructions can express the same basic temporal relations that tense inflections do. These overlaps will be discussed in section 4. The English present perfect construction, e.g., *We've lost our lease*, is a notorious case of such a functional overlap. Theorists are not in agreement concerning the appropriate treatment of the English perfect construction; it has been analyzed as both a tense and an aspect (see Fenn 1987, Declerck 1991:10-13, Klein 1992 and Binnick, this volume, section 3.1, for discussion). However, as we will see, there are good reasons to regard the perfect as an aspectual construction, and in particular as a stativizing construction (Herweg 1991). This function reflects its history: it emerged in Old English as a resultative construction containing a passive participle in agreement with the direct object. Through subsequent reanalysis, the participle came to be construed as predicating an action of the individual to whom the subject refers (Bybee et al. 1994, Hopper and Traugott 1993:57-58). It is at this point that the present perfect and simple past tense come to be synonyms: as McCawley (1981) points out, it makes sense to refer to the past perfect as a 'past in past' form, but it makes much less sense to refer to the present perfect as a 'past in present', since this is exactly what the simple past is. By the same token, we cannot appropriately refer to the perfect as a relative tense, because the present perfect encodes the same temporal relation that the simple past does: anteriority of the denoted event to speech time. Thus, the simple past and the present perfect do not appear to be distinguishable at the level of semantics. Instead, as both Slobin (1996) and Michaelis (1998:Chapter 5) argue, the two forms of past-time reference are distinguished by their use conditions. The development of this discourse-pragmatic division of labor served to differentiate the two converging constructions.

Additional evidence that an aspectual construction may function as a tense without losing its aspectual properties is provided by the so-called future tense of English, a periphrastic construction whose head is the modal verb *will*. A number of scholars, including Binnick (1991:251-252) and Hornstein (1991:19-20), have argued that the modal future of English does not have future reference but rather present-time reference, as indicated by patterns of adverbial co-occurrence. This will lead us to conclude that modal-future sentences are in fact present-tense stative predications. As we will see in section 4, this analysis of the English modal future, combined with the analysis of the present tense developed in section 3, has a significant implication for our description of the tense system of English: this system, rather than being based upon a past-nonpast division, as many scholars (e.g., Comrie 1985, Van Valin and LaPolla 1997) have assumed, is in fact based upon the opposition between past and present.

2. Reference Time

The primary insight behind Reichenbach's (1947) model of tense is that the meaning of every tense can be represented as a sequence of the three time points mentioned above: E, R and S. In Reichenbach representations, these points are separated either by a line, which is used to indicate that the left hand point precedes the right hand point, or by a

comma, which is used to indicate that the two points are identical (i.e., not ordered with respect to one another). In the case of the simple tenses—past, present and future—R and E are identical: the time referred to is also the time of the state of affairs denoted by the sentence. By contrast, in the case of the relative tenses, e.g., the past perfect, E and R are distinct: the time that the speaker is referring to is a time that either precedes or follows the time of the state of affairs denoted by the sentence. Reichenbach's representations of the simple tenses and the three perfect 'tenses' are given in (4a-f). For each tense representation, an example sentence is given, along with specification of the R point (which may or may not be overtly referred to by a subordinate clause or adverbial expression):

(4) a. **Present**: E,R,S (e.g., *She's at home right now*; R =right now)

b. **Past**: E,R_S (e.g., *She was at home yesterday*; R=yesterday.)

c. **Future**: S_E,R (e.g., *She will be home this evening*; R= this evening)

d. **Present perfect**: E_S,R (e.g., *The crowd has now moved to plaza*; R=now)

e. **Past perfect**: E_R_S (e.g., *The crowd had moved to the plaza when the police showed up*; R=the time at which the police arrived)

f. **Future perfect**: S_E_R (e.g., *The crowd will have moved to the plaza by the time you call the polic*e; R=the time at which the police are called) or E_S_R (e.g., *That's Harry at the door; he will have bought wine*; R=the time of Harry's arrival)

Hornstein (1991) extends the Reichenbach framework in order to account for constraints on DERIVED TENSE STRUCTURES, which result either from adverbial modification or clause combining. According to Hornstein (1991:15), derived tense structure (DTS) must preserve the tense structure of the input sentence, which he refers to as the basic tense structure (BTS). He states two conditions under which BTS may be preserved:

(5) a. No points are associated in DTS that are not associated in BTS.
b. The linear order of points in DTS is the same as that in BTS.
(Hornstein 1991:15, (13))

Hornstein proposes (1991:17) that adverbial modification is a function that maps a BTS into a DTS that is identical to the BTS of the particular adverbial expression. For example, the BTS of the adverb *yesterday* is E,R_S, while that of *tomorrow* is S_E,R. Accordingly, the DTS of (6a) obeys (5) while that of (6b) violates (5):

(6) a. Harry arrived yesterday.
b. *Harry left tomorrow.

In (6a') and (6b') we see the BTS-DTS mappings that produce (6a) and (6b), respectively:

(6') a. E,R_S → E,R_S (yesterday)
|
yesterday

b. E,R_S → S_E,R (tomorrow)
|
tomorrow

Sentence (6a) is well formed because the adverb *yesterday* does not create associations that are not already present in the BTS of the base sentence (*Harry arrived*), nor does it alter the linear association of points within this BTS. By contrast, (6b') violates (5b): the adverb *tomorrow* alters the linear association of points within the BTS of *Harry left*: while this BTS places S after E and R, modification by *tomorrow* requires that S precede these two points.

Crucially, as Hornstein demonstrates (1991:Chapter 2), the constraints on temporal modification given in (5) scale up to more complex constructions, in particular those that contain finite subordinate clauses headed by temporal connectives like *when*, *while*, *after* and *before*. In describing such constructions, Hornstein capitalizes on the basic insight, mentioned above, that "S may be anchored to times other than the moment of utterance" (Hornstein 1991:126). The particular constraint on temporal embedding that he proposes is as follows: "a sentence that modifies another sentence [must] share its S point and its R point" (Hornstein1991:44). The linking of the respective S and R points must preserve the BTS of both the subordinate and main clause. In (7a-b) we see two examples of complex clauses, the first of which obeys (5) and the second of which violates it:

(7) a. Harry will leave when Sam has arrived.
b. *Harry will leave when Sam arrived.

The grammaticality contrast in (7a-b) is explained according to the representations of these sentences in (7a'-b'), respectively. In these representations, the respective S and R points of the main and subordinate clauses have been associated.

(7') a. S_1_R_1,E_1 (Main clause: *Harry will leave*)
| |
E_2_S_2_R_2 (Subordinate clause: *Sam has arrived*)

b. S_1_R_1,E_1 (Main clause: *Harry will leave*)
| *
R_2,E_2_S_2 (Subordinate clause: *Sam arrived*)

Hornstein assumes that the linking of S_2 to S_1 occurs first, followed by the linking of R_2 to R_1 (1991:43). He thus states the constraint on clause combination as follows (ibid): "The movement of R_2 to a position associated with R_1 must obey [the constraints stated in (5)]". Thus, once S_1 and S_2 are associated in (7a'), R_1 and R_2 can be associated without requiring reorderings in either of the two input representations. (Notice that while the association of R1 and R2 requires breaking of the association between R2 and S2, neither clause of (5) prevents this.) By contrast, once S_1 and S_2 are associated in (7a'), the association of R_1 and R_2 can occur only if the order of R_1 relative to R_2 is altered as shown. Since this reordering would violate (5b), Hornstein correctly predicts that (7b) is semantically anomalous.

It is not clear, however, that the constraints on derived tense structures also apply to MODAL uses of absolute and relative tenses, in which tenses are used to express speakers' judgments either about the degree of likelihood or the factuality status of an event denoted by the subordinate clause of a conditional sentence (Fleischman 1989). These examples include those in which the present tense, the past tense and the past perfect appear in the subordinate clauses of future, hypothetical and counterfactual sentences, respectively:

(8) a. If she **arrives** before midnight, she will catch the shuttle.
b. If she **arrived** before midnight, she would catch the shuttle.
c. If she **had arrived** before midnight, she would have caught the shuttle.

In (8a), present tense is used in the subordinate clause to denote a future event; in (8b), past tense is used to denote a future event that is presumed by the speaker to be relatively unlikely; and in (8c), the past perfect is used to denote an event that is presumed by the speaker not to have occurred. Clearly, these subordinate tenses do not denote the relationship between E and S, or E and R, that is shown in the representations in (4). Hornstein argues (1991:73-79) that while the constraints on derived tense structures do not predict the particular tense uses in (8), they do not rule them out either. All such sentences meet the conditions on derived tense structures "on the assumption that simple modals are in the present tense, whereas *modal + have* are past-tense forms" (p. 77). We will return to the question of why the modal or *will* future is generally barred from the subordinate clauses of futurate conditionals like (8a) in section 4 below.

Another problem of clause embedding that is widely discussed in the literature on tense is that of SEQUENCE OF TENSE (Comrie 1986, Enç 1987, Declerck 1991:157-191, Hornstein 1991:Chapter 4). Sequence of tense phenomena involve the BACKSHIFTING of the tense of a present, past-tense or future predication when that predication is the complement of a past-tense verb of speaking or thinking. Examples involving indirect speech are given in (9); the sentences in parentheses beside each example show the direct-speech counterparts of each embedded clause:

(9) a. Debra said she **liked** the wine. ("I like the wine")
b. Debra said she **had brought** a bottle of wine. ("I brought a bottle of wine")

c. Debra said she **would bring** some wine. ("I will bring some wine")

The tenses in the embedded clauses of such sentences are relative tenses, because they do not relate the situation denoted (e.g., Debra's liking the wine or having brought a bottle of wine) directly to speech time; instead the S point of the embedded clause is identified with the event time of the matrix clause—the time of the event of speaking. To model sequence of tense, Hornstein proposes a SOT (sequence-of-tense) rule, which shifts the S of the embedded clause and associates it with E of the matrix clause (Hornstein 1991:137). The position of the E and R points of the embedded representation relative to S of the matrix clause in the derived tense structure predicts the form of the backshifted tense in the embedded clause. An example of the application of the SOT rule, as applied to (9b), is given in (10):

(10)
$$\begin{array}{lcl} E_1,R\_S_1 & \text{SOT} & E_1,R\_S_1 \\ & \rightarrow & | \\ E_2,R\_S_2 & & E_2,R\_S_2 \end{array}$$

In the derived tense structure that is output by the SOT rule, shown on the right side of the arrow, the association of the embedded clause's S point with the matrix clause's E point has caused the embedded clause's E point to precede both the matrix R point and the matrix S point. Since, as shown in (4e), the schema E_R_S corresponds to the past perfect, the SOT rule correctly predicts that the backshifted form of the past tense will be the past perfect. At the same time, however, not all theorists of tense presume the existence of a backshifting rule for sequence of tense. Declerck (1991,1995) and Declerck and Depraetere (1995) argue that sentences like (9a) simply illustrate two distinct uses of the past tense: the verb *said* illustrates the absolute use, in which the past tense indicates anteriority of R to S, while the verb *liked* illustrates a relative use, in which the past tense indicates simultaneity of the situation to a reference time that is in the past relative to S. This analysis is based on the observation that the use of the past tense to indicate simultaneity is attested independently of SOT contexts—for example, in coordinate sentences like *I danced and my sister played the recorder*. Here, the first sentence establishes a past reference time and the second an activity that overlaps this past reference time (see Binnick, this volume, section 6, for discussion of rhetorical relations in temporal discourse).

Thus far we have seen some of the properties of Reichenbach's framework that are responsible for its enduring appeal: it not only provides an elegant way of representing the meanings of the tenses, but can also be used to capture constraints on the embedding of one tensed clause in another. Several failings of the Reichenbach framework, including its inability to distinguish between events and states and its overly restrictive view of temporal-adverb reference, are discussed by Declerck (1991:224-232). An additional problem, recognized by a number of discourse theorists starting in the 1980s, is that Reichenbach's conception of R is static; he argues, for example, that assertions in a narrative must share a reference point (Reichenbach 1947:293). This view is difficult to

square with the fact that narratives depict a time course. We now turn to attempts by discourse theorists to expand the Reichenbach conception of reference time in order to describe the temporal sequencing of events in narrative.

In the prototypical case, a narrative is a sequence of past-tense assertions. For this reason we will focus here on the semantic representation of such assertions. Logical accounts of the meaning of the English past tense can be divided into two general types. In both types of accounts, the past-tense marker is viewed as an operator, e.g., *Past*, that has scope over a tenseless proposition. The truth of the resulting proposition is evaluated at speech time. The first type of account, associated with Prior (1967), is that in which a proposition of the form *Past* (*A*) is judged to be true if and only if the tenseless proposition *A* is true at a time *t-1* earlier than speech time, *t*. In the second type of account, advocated by Reichenbach (1947), a past-tense sentence is interpretable as true or false only relative to specific past interval, reference time. Partee (1984) observes that under Prior's view, the truth of an assertion in the simple past depends on the truth of the base sentence at SOME point in the past, whereas under Reichenbach's view, the truth of a past-tense assertion depends on the truth of the base sentence at THAT time in the past. Most modern accounts of past-time reference follow Reichenbach's view rather than that of Prior. One reason for this is that there is evidence to suggest that reference-time specification must be part of the truth conditions of past-tense sentences. For example, a speaker who makes the assertion *I took out the garbage* will be viewed as lying if he completed the denoted action merely at *some* point in the past (say, a month ago) rather than at the time that he knows the hearer has in mind, say, this morning.

The idea that R is an interval that is mutually identifiable to speaker and hearer underlies Partee's (1984) claim that the past tense sentences 'refer back' to an already established reference time, as in the narrative passage in (11):

(11) Police have arrested a suspect in last week's string of convenience store robberies. They apprehended the suspect as he left a downtown Denver nightclub. He was taken into custody without incident.

In (11), the present-perfect 'lead sentence' establishes a past reference time (the time of the arrest), while the two following past-tense sentences evoke that same past interval as they elaborate the circumstances of the arrest. It is in this sense that we may say that the two past-tense sentences in (11) are anaphoric: like pronouns, they rely on the interpreter's ability to recover the identity of a discourse-active entity, in this case, a past interval. However, as Partee (1984) and Hinrichs (1986) point out, past-tense sentences need not receive the anaphoric interpretation that they have in (11). As described by Binnick (this volume, section 6), there is another narrative mode, which Dowty (1986) refers to as TEMPORAL DISCOURSE, in which the sequence of sentences in the narrative matches the real-time structure of the world that is being described. The passage in (12) provides an example of temporal discourse:

(12) Sue began to walk out. She paused for a moment and then turned around to face her accusers once again. The room was silent except for the ticking of the wall clock. She began to speak, shook her head and hurriedly exited.

In (12), for example, the time at which Sue paused is not the same interval as that during which she began to walk out of the room; the latter interval follows the former. Thus, the past-tense sentence *She paused for a moment* does not 'refer back' to the reference time of the prior past-tense sentence (*Sue began to walk out*); rather, it refers to a time *R+1*. This means that in a temporal discourse like (12) there must be some procedure for updating R during the course of the narrative (Partee 1984, Hinrichs 1986, Dowty 1986). Approaches to this problem within formal semantics have typically relied on some version of Discourse Representation Theory (Kamp and Reyle 1993). Whether formal or informal, however, models of tense use in texts must acknowledge the central role played by sentence aspect in the identification of reference time. To see this, let us return to the passage in (12). Here, we can notice that while the event assertion *[Sue] turned around to face her accusers* induces us to advance R, the state assertion *The room was silent* does not. Rather, we interpret the state of silence as holding at the same point that Sue turned around to face her accusers.

There is, however, another reading of the predication *The room was silent* in which silence was a consequence of Sue's action. This reading clearly does require updating of R: the room's silence began at a reference time following that of the sentence *[Sue] turned around*. On this latter reading, in fact, the assertion *The room was silent* denotes not a state but an event—the event of the room's becoming silent. Partee (1984) captures these two distinct interpretations by means of the following generalization: if the situation denoted is an event, R includes the event, and elapses with its cessation; if the situation denoted is a state, R is included within that state, and does not elapse (i.e., it remains the reference time for the next assertion). Dowty's (1986) Temporal Discourse Interpretation principle is a similar generalization, although Dowty assumes, contra Partee (1984), that state predications, like event predications, move reference time forward in temporal discourse. Dowty (1986) proposes that pragmatic inferences concerning possible overlap relations determine whether the situation denoted is interpreted as holding at both the new reference time and prior reference times. He argues (1986:48) that

> the inferences we draw in a narrative about which events or states overlap with others in the narrative [are] not really a consequence of the times sentences are *asserted* to be true, but rather also in part a consequence of the times at which we *assume* that states or events actually obtain or transpire in the real world, intervals of time which may in some cases be greater than the intervals of time for which they are simply asserted

Dowty goes on to point out that since a state assertion may be true for an interval that include the interval for which the actual assertion is made, state predications can always be understood to extend 'backwards' in the time line of the text to include previously invoked reference times. In making this observation, however, Dowty has implicitly acknowledged that direction of inclusion is not a contextual implication but a semantic

property of state predications. It is in fact the same property that leads Comrie (1976) Langacker (1986) and Smith (1997), among others, to the observation that perfective aspect, as in (13a), encodes an 'external viewpoint' while imperfective aspect, as in (13b), encodes an 'internal viewpoint' (see Binnick, this volume, section 3):

(13) a. Sue went home at noon.
b. Sue was home at noon.

In (13a), noon is interpreted as an interval during which the act of Sue's going home occurred. In (13b), by contrast, noon is interpreted as a point within the span of time that Sue was at home. By assuming that state predications include their references times, we can also account for the fact that the situations denoted by stative predications are always temporally extensible: a stative assertion that is true at a given reference time may also be true at a superinterval that includes that reference time (Herweg 1991). This means that one can always follow an assertion like (13b) with a 'proviso' that suspends the inference that (13b) invites:

(14) In fact, she is still home now.

Sentence (13b) triggers the inference that Sue was not home during any intervals that include the noon interval; had she been, the reasoning goes, the speaker would have made a stronger assertion, involving that larger interval. The fact that this inference, which is based upon Grice's first maxim of quantity ('Say as much as you can'), can be preempted indicates that states are unconfined by the reference times for which they are asserted; they are, as Bach (1986) says, temporally ill founded. Direction of inclusion can also be used to account for ambiguities that arise in adverbially modified predications containing state verbs, as in (15):

(15) Sue was in Cleveland yesterday.

Sentence (15) has both a stative interpretation and an episodic (event) interpretation. In the former case, the reference time named by *yesterday* is included within the time that Sue was in Cleveland. In the latter case, the daylong interval exhausts Sue's stay in Cleveland. What this shows is that aspectual construal does not depend on the inherent aspectual semantics of the verb, but rather on the direction of inclusion selected by the interpreter.

The mere fact that past-tense predications like (15) are ambiguous between state and event readings provides evidence against the traditional model of the English past tense, in which it "express[es] an explicit temporal relation, that the narrated events occurred before the moment of speech" (Bybee et al.1994:152). Such definitions are sufficient for past-tense *event* predications, but it is only by examining past-tense *state* predications as well that we can arrive at a sufficiently general definition of the past tense. As we have seen, the past tense merely locates R before S; it is the aspect of a predication that determines whether it denotes a situation that ended prior to speech time. In the next

section, we will examine another tense-aspect interaction, which occurs when reference time and speech time coincide.

3. The Present Tense as State Selector

The present tense, according to Bybee et al. (1994:152), "carries no explicit meaning at all; it refers to the default situation from which other tenses represent deviations". Because of its neutral semantics, they argue, the present tense can "absorb the meaning inherent to normal social and physical phenomena, and this meaning if described and broken down explicitly, consists of habitual occurrence and behavior as well as ongoing states" (ibid). The analysis raises more questions than it answers. First, why should ongoing states be more "normal" than ongoing events? Second, why should a meaningless construction require a disjunctive definition, involving both ongoing states and habituals? But even leaving these concerns aside, it is apparent that one could not describe the aspectual constraints that the present tense exhibits, or the coercion effects that it triggers, if one did not view it as meaning something. As discussed in the Introduction, the present tense can be viewed as an aspectually sensitive tense operator that selects for the class of states. As we saw, this selection behavior comes from the logical relationship between time depth and the conditions of verification upon event reports. It is this selection behavior that yields habitual and gnomic construals of sentences that combine present-tense inflection with an intrinsically dynamic verb like *smoke* or *float*, as in (16-17), respectively:

(16) Ally smokes.
(17) Oil floats on water.

Many aspectual theorists, including Krifka et al. (1995), conflate habitual and gnomic sentences (statements of general principles) under the general rubric of GENERIC sentences. In accordance with Krifka et al. (1995) and Bybee et al. (1994:152), we will assume that the differences between habitual sentences (which Krifka et al. refer to as CHARACTERIZING SENTENCES) and gnomic sentences (which Krifka et al. refer to as REFERENCE TO TYPES) can be traced to characteristic properties of nominal reference. Nominal expressions in gnomic sentences have attributive reference, leading to contingency readings. For example, one can paraphrase (17) by means of a conditional sentence: if there is something that counts as oil, it will float on whatever substance qualifies as water. Habitual sentences like (16) do not have contingency readings, since they attribute properties to specific individuals. However, habitual and generic sentences both differ from episodic sentences in that they entail iteration of the denoted event and express nonincidental facts about the world.

In a typological survey of the generic-episodic distinction, Dahl (1995) suggests that although all languages use grammatical markers to distinguish between generic and episodic sentences, no language dedicates grammatical resources exclusively to this function (p. 425). One can reach an even stronger conclusion when considering English data, because in English there does not appear to be *any* grammatical marking of the

generic-episodic distinction. Dahl has assumed that there is a single marker of genericity in each of the languages in his study, taking the present tense to be the 'generic marker' for English. This appears to be a mistake, however, as generic statements can be expressed by a number of other tense-aspect combinations. These include the simple past and past progressive, as exemplified in (18-19), respectively:

(18) Dogs chased cars in those days,
(19) During that summer parents were keeping their children indoors.

These examples show, as Langacker observes (1996:292), that generic predications can denote situations which hold "for either a bounded or an unbounded span of time, i.e., their validity has a temporal *scope*" [emphasis in original]. Therefore, we cannot define generic sentences as either a class of state sentences or a class of present-tense sentences: as shown in (18-19), past-tense sentences and progressive sentences can also be used to make generic assertions. However, we can say that generic sentences are highly likely to be expressed by the present tense, and that speakers are highly likely to use the present tense when called upon to produce a generic sentence. This correlation suggests that genericity is not only a contextual inference but also one that is based upon a semantic prototype. The generic-episodic distinction is a contextual one because it hinges on inferences about the size of the relevant time scales. If the intervals separating instances of the iterated event are judged to be small, as in (20), the predication will be judged as episodic; if the iterated events are judged to be widely dispersed through time, as in (21), the predication will be judged generic:

(20) The light flashed
(21) The Catholic mass was recited in Latin.

But there is still a sense in which (21) is not a 'true' generic sentence, because the situation reported is not ongoing at speech time. It is this intuition that leads us to conclude that genericity is a prototype-based concept. The best examples of generic sentences not only invoke large time scales but also denote situations that hold at speech time. Why should this be? When a situation is reported as including the reference time, as states are, nothing preempts the inference that this situation also holds at times prior to and subsequent to the reference time. An interpreter who is placed 'inside' a situation in this way is therefore free to conclude that the situation is a fact about the world rather than merely incidental. Now, certainly (21) could be construed as a state sentence, since the situation that it denotes could be understood to include an already evoked reference time (e.g., the 16th century). However, (21) also has a 'closed', episodic interpretation in which, e.g., the Catholic mass was recited in Latin only prior to the Second Vatican Council. This is because the past tense is aspectually neutral: as seen in the previous section, past-tense sentences may be ambiguous between event and state readings. Sentence (15), repeated here as (22), is a past-tense sentence that is ambiguous in exactly this way:

(22) Sue was in Cleveland yesterday.

The present tense, however, is not aspectually neutral. Present-tense sentences are intrinsically state sentences, and for this reason the present tense is more strongly correlated with the generic construal than is the past tense. Observe, for example, that (23) has only a generic construal:

(23) The Catholic mass is recited in Latin.

As mentioned, generic sentences describe multiple instances of a given event, e.g., recitation of the Catholic mass. But how can a present-tense sentence denote an event, repeated or otherwise, when, as we saw above, present-tense sentences denote states? Certainly, a repeated event does not necessarily qualify as a state: iterated-event sentences like (20) are event sentences rather than state sentences. The problem can be framed as follows: if the present tense is a state selector, it must find a state within the semantic representation of the tenseless proposition with which it combines. In the case of (23), for example, this tenseless proposition is *The Catholic mass be- recited in Latin*. The semantic representation of this proposition does in fact contain selectable states: an event sequence must, by definition, contain periods of stasis, or, equivalently, RESTS, which hold between adjacent subevents (Michaelis 2004). This is equivalent to saying that every transition has both an anterior, onset, phase and a posterior, offset, phase (Bickel 1994). The present tense, as a state selector, can select that rest which includes the reference time (i.e., speech time).

Of course, every event, whether iterated or not, has both an anterior state (the state that holds before the event occurs) and posterior state (the state that holds after the event has occurred). This observation leads naturally to a coercion-based account of the so-called futurate present in English. This construction is exemplified in (3), repeated here as (24):

(24) The flight arrives at noon.

Since arrival has an extended temporal profile that cannot fit inside the present moment, that event must be 'flipped' onto either one side or the other of the present partition in order for the semantic conflict between the tense inflection and the verb to be resolved. Thus (24) denotes the state that lasted until the event of arrival. While in many languages the equivalent of (24) can be interpreted as a perfect predication (via selection of the state phase *following* the denoted event), in English, as a matter of linguistic convention, coercion selects the state phase that *precedes* the denoted event. These observations point to the conclusion that the specific coercion effects triggered by a given aspectually sensitive form, e.g., the present tense, may vary from language to language, while the aspectual-selection properties of that form do not.

By viewing the present tense as a state selector, we can address a long-standing puzzle concerning temporal reference in English: why isn't the English present tense used for event reporting? Notice, for example, that (25-26) are ungrammatical if construed as reports of events ongoing at speech time:

(25) *Look! Harry runs by the house!

(26) *They finally fix the sidewalk!

As evidence that the ungrammaticality of (25-26) is due to the impossibility of overlap with the moment of speech, consider that similar effects occur in reported speech, in which, as described in section 2 above, a matrix verb of cognition or speech provides a surrogate speech time for the subordinate-clause predication. If the subordinate clause contains a stative verb, the sentence is ambiguous: we do not know whether the speech act reported upon was originally in the present tense or past tense (Declerck 1991:26-27,1995). Sentence (27) exemplifies this ambiguity:

(27) Sue said that she preferred white wine.

If Sue's speech act is to be reconstructed as a stative predication, i.e., *I prefer white wine*, it includes the time at which she uttered it. If, alternatively, Sue's speech act is to be reconstructed as an event predication, i.e., *I preferred white wine*, the situation described by Sue must precede the time of her speech act. Notice, however, that if we were to replace the subordinate-clause verb *preferred* with an event verb, e.g., *drank*, Sue's original speech act could only be reconstructed as a past-tense predication. In other words, an event cannot be construed as overlapping speech time, whether speech time is the time at which the speaker is speaking or a surrogate speech time—the time at which someone is depicted as speaking.

Cooper (1986) argues that the English Present is "exotic" in requiring a higher degree of coincidence between speech time and situation time than does present-tense inflection in other languages: "the semantic location of the present in other languages requires the discourse [time] to temporally overlap the event [time] rather than be identical with it" (p. 29). However, it appears that what makes the English present tense idiosyncratic in comparison to the present tenses of other languages (e.g., the Romance languages) is that it is not a general-purpose stativizer. Those type shifts which the English present tense fails to perform are those which are performed by periphrastic stativizing constructions—specifically, the perfect and progressive constructions. The emergence of these two constructions, via possessive and a locative periphrases, respectively, increased the overall transparency of the type-shifting system in English, but contrary to what we might expect, these newly developed stativizers did not merely narrow the functional range of the present tense. When the perfect obtained a continuative meaning in Early Middle English, as exemplified in (28), it in fact took over a function previously performed by the PAST tense, exemplified in (29-30):

(28) Ant ye, mine leove sustren, **habbeth** moni dei **icravet** on me after riwle.
'And you, my beloved sisters, have for many days desired a rule from me.' (*Ancrene Wisse*, c. 1220)

(29) A Ic wite **wonn** minra wraecsitha.
'Always I [have] suffered the torment of my exiles.' (*The Wife's Lament*, c. 970)

(30) For that sothe **stod** a than writen hu hit is iwurthen.
'For that truth [has] remained always in writing, about how it happened.' (Layamon's *Brut*, c. 1200)

Unlike the perfect, whose current use conditions were largely in place by the 13th century (Carey 1994), the progressive is a relatively recent innovation (Joos 1964). As of Shakespeare's time, the alternation between the present tense and the present progressive was apparently conditioned only by metrical considerations (Dorodnikh 1989:107), as when the present tense is used to convey progressive meaning in Romeo's question *What light through yonder window breaks?*. According to Joos (1964:146) the progressive attained its current usage only in the 19th century, when it came to be used in passive predications, e.g., *The lamps were being lighted*, as against the earlier middle form, *The lamps were lighting*. Again, however, it would be shortsighted to analyze this development as having occurred at the expense of the present tense alone, as when Bybee, et al. (1994:144) state that "the Progressive appears to have been taking over some of the functions of the Present for several centuries". Indeed, as we saw in (25-26), simple present-tense predications in English, unlike those in, e.g., French, lack progressive readings, but so do simple PAST-TENSE sentences, as shown by (31):

(31) When I entered the church, they recited the mass in Latin.

Sentence (31) does not have a reading in which the recitation of the mass was ongoing prior to my entering the church. In order to achieve this 'overlap' interpretation, the past progressive (i.e., *They were reciting the mass in Latin*) would be required. Thus, we can hypothesize that the introduction of the progressive construction in English narrowed the functional range of BOTH the present and past tenses, and not merely the present tense. The progressive replaced tense-based coercion as the means of denoting overlap between an event and the currently active reference time.

4. Functional Overlaps between Aspect and Tense

While the preceding section concerned implicit type-shifting, or coercion, an interpretive process through which the meaning of a verb is shifted in order to resolve semantic conflict between a verb and its grammatical context, the present section will concern EXPLICIT type-shifting, in which verbal aspect is shifted through grammatical means, in particular through the use of periphrastic, auxiliary-headed constructions (Herweg 1991). Several of these constructions have meanings that are indistinguishable from those of specific tenses, and this is why they are of interest to us here. In type-shifting constructions, the auxiliary verb denotes the output type (a state) while the nonfinite complement denotes the input type (an event). In English, these constructions include the perfect, the progressive and the modal (or 'will') future. These constructions are not uniformly viewed as stativizers in the literature, and so it is worthwhile to look at the evidence that they are. One line of evidence comes from stativity tests like Vlach's (1981) *when*-test: if the situation denoted by the main clause can be construed as overlapping an event denoted by a temporal clause introduced by *when*, it is a state. If,

alternatively, the main-clause situation cannot be construed as overlapping the *when*-clause event, but must instead be construed as following that event, it is an event. Using this test, we can show that progressive sentences are state sentences. In (32-34), the verbs whose aspectual properties are being diagnosed are shown in boldface:

(32) **State**: When Harry met Sue, she **preferred** white wine.
(33) **Event**: When Harry met Sue, she **drank** a glass of white wine.
(34) **Progressive state**: When Harry met Sue, she was **drinking** a glass of white wine.

In (32), just as in (34), we see that the main-clause situations (Sue's preferring white wine, Sue's drinking a glass of white wine) overlap the event of Harry's meeting Sue. That is, the progressive predication in (34) has the same overlap interpretation as the stative predication in (32), indicating that progressive predications are appropriately viewed as state predications. Together, (32) and (34) contrast with (33), in which the main-clause situation (Sue's drinking a glass of white wine) cannot be construed as overlapping the event of meeting. What type of state is the progressive state? According to Michaelis (2004), it is a state derived via selection of an intermediate state or 'rest' between two transition points in the temporal representation of an activity. In the case of the progressive predication in (34), this intermediate state might be the period of stasis between two swallows of wine. By viewing the progressive as an intermediate-state selector, we can account for the fact that progressive predications report upon events that are ongoing at R. Analogous observations can be made about the perfect aspect:

(35) **State**: When Harry met Sue, she **preferred** white wine.
(36) **Event**: When Harry met Sue, she **drank** a glass of white wine.
(37) **Perfect state**: When Harry met Sue, she had **drunk** a glass of white wine.

The application of the *when*-test in (37) is somewhat less straightforward than that in (34), so some further explanation is required. In (37), we construe the event of Sue's drinking a glass of white wine as having preceded the event in which Harry met her. What does precedence have to do with overlap? The two notions amount to the same thing in the case of the perfect construction, since perfect predications can be said to denote a state of aftermath following the occurrence of that event denoted by the participial complement (Herweg 1991). It is this state of aftermath which overlaps the event denoted by the subordinate clause in (37). Thus, while perfect predications, e.g., *The Eagle has landed*, are state predications, they also count as event reports, since they assert a past event by means of asserting its resultant state (see Binnick, this volume, section 3.3 for discussion of the various uses of the perfect aspect). It is therefore no surprise that a periphrastic present-perfect construction may take over the functions formerly served by a morphological past-tense construction, as in modern spoken French. In English, however, the opposite development appears to have occurred: the present perfect currently has more restrictive use conditions than the past tense. These conditions, described by Fenn 1987 and Michaelis 1998, among others, include the prohibition against specification of event time (38), and against use of the present perfect in information questions that presuppose the occurrence of a unique past event, as in (39):

(38) *I have woken up at dawn this morning.
(39) *When have you woken up?

As Comrie (1976) observes, there is no reason in principle that (38) could not be used as a response to a question like 'Why do you look so tired?'. Certainly, in such a context the present-perfect predication would describe a state of aftermath, as required by its semantic analysis. Nor is there any logical reason that (39) could not be used as an inquiry into the time of rising of someone who is currently awake. The constraints illustrated in (38-39) instead appear to be consequences of the development of a discourse-pragmatic opposition between two nearly synonymous forms of past-time reference, one a tense construction, the past tense, and the other an aspectual (stativizing) construction, the present perfect (Slobin 1994). According to Michaelis (1998: Chapter 5), this opposition involves temporal anaphora: while the present perfect establishes a reference time, the past tense, as described in Section 2, either establishes or evokes a previously established reference time.

The degree of functional overlap between exponents of tense and aspect becomes particularly clear when one considers the English modal future. Unlike other languages, English has no morphological future tense, but only a periphrastic construction containing the auxiliary *will*, a form derived via semantic bleaching from a stative verb meaning 'want'. While this construction is a stativizer, that function is somewhat more difficult to establish by means of the *when*-test than were the stativizing functions of the progressive and perfect constructions. The reason is that *will* has no unambiguous past tense: the past-tense forms of modals, e.g., *would*, have subjunctive functions rather than unambiguous past-time reference (Fleischman 1989, Langacker 1991:Chapter 6). There are, however, other ways of establishing that a clause denotes a state, one of which involves temporal reference. Present-time adverbials, including *now* and *at this moment* are compatible only with stative predications, for the reasons outlined in Section 3: the present is conceived as a moment, and only states are verifiable on the basis of a single momentaneous 'sample'. Given the fact that present-time adverbials are compatible with modal-future predications, as exemplified in (40-41), we have reason to conclude that modal-future predications are in fact state predications:

(40) My daughter will now play the clarinet for you.
(41) I will fill out the form right now.

The state denoted by modal-future predications is an anterior state, i.e., the 'preparatory phase' preceding an event. The behavior of morphological future tenses, in those languages which have them, is very much different. As pointed out by Hornstein (1991:19-20), for example, French future-tense predications are not compatible with present-time adverbial reference:

(42) *Je donnerai une conférence maintenant.
I give:1SG:FUT a lecture now
'I will now give a lecture.'

If the English modal future in fact has present-time reference—that is, if its temporal representation is not S_E,R, as shown in (4c), but S,R_E, the mirror image of the present-perfect representation given in (4d)—we have a potential explanation for the tendency for subordinate futurate clauses, as in (43), to lack the modal:

(43) a. *When the Prime Minister will arrive, they will play the national anthem.
b. When the Prime Minister arrives, they will play the national anthem.

Nieuwint (1986) proposes that the modal future in English expresses a prediction, and therefore that sentences like *They will play the national anthem* predicate a state of the present time (e.g., that the appropriate preparatory conditions for the event in question exist). On this understanding, sentences like (43a) are semantically anomalous: they appear to reverse the order of events intended by the speaker. If the playing of the national anthem occurs during the time when the Prime Minister is about to arrive, then the playing precedes his arrival rather than following it. On Nieuwint's account, therefore, the preemption of the modal future in subordinate-clause contexts like that in (43b) follows from the fact that the English modal future associates S and R (see Declerck and Depraetere 1995 for an alternative proposal).

While many scholars, including Hornstein, have observed that English lacks a true future tense like that of French, there is disagreement about the implications of this fact for the tense system of English. Many, including Comrie (1985), view English as having a past-nonpast tense distinction. The rationale for this analysis comes from the supposition that the English present tense does not denote present time, since it is also used to express future events and temporally unbounded situations, in particular generic ones. However, as we saw in Section 3, both futurate present and generic predications can be seen as the products of stative coercion triggered by the aspectual selection properties of the present tense. It is therefore reasonable to conclude that the English tense system is based instead upon a past-present distinction: English lacks a future tense but has both a past tense and a present tense. Each of these tenses can combine with the auxiliary head of a periphrastic aspectual construction, including the progressive, the perfect and the modal future. In specific grammatical contexts, as we have seen, each of these constructions may stand in for a tense: the progressive replaces the present tense when an event is being reported as ongoing at speech time, the past tense replaces the perfect when the speaker is referring to a specific past interval, and the present tense replaces the modal future in the subordinate clause of a futurate conditional sentence, These interactions need not, however, be taken to imply that the perfect, progressive and modal-future constructions are tenses. As we have seen, tenses fix the location of R with respect to S, while the periphrastic constructions that we have looked at in this section do not: their auxiliary verbs, when finite, can be inflected either for present tense or past tense.

5. Conclusion

In this brief survey of English tense, we have discussed a number of misconceptions about tense. One of these is that tense locates situations. In fact, as we have seen, tense merely locates reference time, while aspect determines the manner in which the denoted situation relates to reference time. Another misconception about tense is that the present tense is meaningless or, at the very least, identifies a far broader interval than the present interval alone. This view is based upon the observation that the present tense combines with both state verbs and event verbs. As we have seen, however, the ability of the present tense to combine with event verbs need not be viewed as evidence of its lack of semantic restrictions; such combinatory freedom can instead be viewed as evidence of the aspectual sensitivity of the English present tense and its consequent ability to shift the aspectual type of verbs with which it combines. As a state selector, the present tense is capable of selecting state phases within the temporal representations of events. The importance of aspect to an understanding of the English tense system is underscored by the fact that, as we have seen, certain auxiliary-verb constructions with tense-like functions, e.g., the perfect construction, also function as stativizers. In such constructions, the state denoted by the tensed auxiliary verb is ordered relative to the event denoted by its complement in a way that resembles the ordering relations encoded by tense. For this reason, type-shifting constructions like the perfect aspect are often functionally indistinguishable from tense constructions like the past tense.

Throughout this survey, we have gained insight into the semantics of tense by examining the interaction of tense and aspect, both within a given grammatical construction and within the system of temporal reference in English. The frequency of these interactions should not, however, be taken as evidence that tense and aspect are inextricable at the level of semantics. Rather, it is only by carefully distinguishing the functions of tense markers from those of aspectual markers that we can say anything rigorous about the interplay between the two systems.

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