

The conflict between future tense and modality: the case of *will* in English*

Anoop Sarkar
Dept. of Computer and Information Science
University of Pennsylvania
200 South 33rd Street,
Philadelphia, PA 19104-6389 USA
anoop@linc.cis.upenn.edu

Abstract

There have been differing views in the literature on what the semantics of *will* should constitute. Some consider *will* to be homonymous between a modal and a periphrastic future tense, while some deny that it is a future tense, indicating that its futurity is derived from its modality. This paper reviews the evidence for both views and draws a conclusion based on an empirical comparison.

1 Introduction

The debate about a semantics for *will* can be summarized as follows:

Can the use of *will* in sentences like *He will speak tomorrow* be part of the morphological tense-system of English, i.e. is *will speak* the periphrastic future tense of *speak* just as *speaks* is the present tense and *spoke* is the past tense. Or should sentences like *He will have left already* (epistemic *will*) be taken as evidence that *will* is part of the modal system, parallel to *He must/can/may/... speak*. Is *will* part of the tense system or the modal system or is it simply homonymous.

In this paper we will review the evidence for both sides and try to motivate the need for a unified semantics for *will*. We ask the following two questions and then evaluate various extant analyses of *will* to see if they can account for the data.

- Can the future be empirically shown to be different from the past?

* Thanks to Filippo Beghelli, Chung-hye Han, Matthew Stone and the two anonymous reviewers for valuable comments. This work was partially supported by NSF grant SBR8920230 and ARO grant DAAH0404-94-G-0426. Published in Penn Working Papers in Linguistics v5, no.2, pp. 91–117, 1998

- Is the future distinguishable from modality?

2 The Problem

Before embarking on a search for a semantics for *will*, we must motivate the desire to show that the different senses of *will* should in fact be unified. As (Kratzer (1977)) points out, nobody would claim that a semantic description of the word *will* should try to capture whatever is common to the meaning of the two instances of the word *will* in (1).

- (1) I will read your will at your death-bed.

This is an instance where the two *will*s are taken to be occurrences of two distinct words which just happen to look the same. Now consider the sentences in (2) with the interpretations given in parentheses with each sentence. The different interpretations of *will* in these sentences could be attributed to different *will*s: *will_a*, *will_b*, *will_c*.

- (2) a. It will rain for hours in Stockport. (*generic statement about a place*) (Haegeman (1983))
 b. John will have left already. (*epistemic*)
 c. John will leave right now. (*directive*) (Hornstein (1990))

However, by analogy to the argument presented in (Kratzer (1977)) for modals such as *must*, we can shift the meaning of *will* in (2) to the single temporal meaning of *will* in (3) by changing the context (given in emphasis). A theory that maintains ambiguous *will*s must also have an additional neutral sense of *will* for the sentences in (2). However, this neutral meaning of *will* (embedded in an appropriate theory) is what we need to unify the semantic description of *will* and to account for the sentences in both (2) and (3). This is why seeking a unified semantics for *will* is a worthwhile goal.

- (3) a. It will rain for hours in Stockport *tomorrow night due to a low pressure system moving into the area*. (future)
 b. John will have left *by eight o'clock tomorrow night*. (future perfect)
 c. John will leave *tomorrow*. (future) (Hornstein (1990))

3 Tense and modality

Before we look at the particulars of *will* we must clarify some notational issues. In the literature, the term *tense* or *tense system* are sometimes used to denote completely different things.

1. In one sense, the term *tense* is used to indicate the tense morphology of a language which refers (although not exclusively) to the temporal representation. Usually this notion is used to denote the grammatical category realized by the inflectional element I(NFL)¹. We shall refer to this sense as *tense* or *tense morphology* in this paper.

¹However this meaning is not the only one adopted in the literature. For instance, in (Hornstein (1990)),

2. In the other sense *tense system* is taken to mean the mechanisms of temporal interpretation common to all natural languages, for instance, a Reichenbachian tense diagram (Reichenbach (1947)) or a Priorian past tense operator (Prior (1967)). In this paper this sense is referred to as *temporal interpretation*.

These two definitions correspond to the grammatical (syntactic) tense distinction as opposed to the notional divisions of time represented in a natural language (Jespersen (1924))(p.255). The distinction is important because an approach that argues that *will* is not formally a tense morpheme does not preclude the notion of future temporal interpretation, however a theory could also deny future temporal interpretation in natural language altogether. In this paper, we will attempt to choose between these two theories that have been proposed to account for future time reference shown schematically in Figures 1 and 2 (where, **S** represents the speech or utterance time, bold lines represent events and **E** represents a future event distinguished by the utterance).

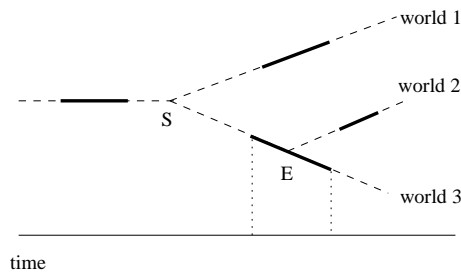


Figure 1: Possible worlds model

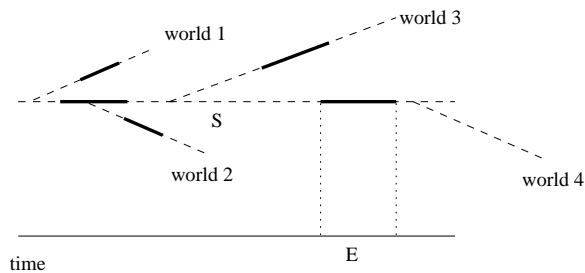


Figure 2: The modal-temporal model

The two models are:

- futurity as a corollary of modality in a Kripke model of possible worlds (actually entire histories of possible worlds) as pictured in Figure 1. This theory is enriched by a notion

tenses, modals, the perfect auxiliary and temporal modifiers are assigned the same temporal structures: Reichenbachian tense diagrams. He also assumes there is a one to one mapping between the tense morphology and his temporal structures.

of context dependence (Kratzer (1977); Kratzer (1991)). In this model, *will* is purely modal with the future being epiphenomenal.

- the modal-temporal model, where both future time reference and modality coexist as pictured in Figure 2. An argument for the notion of future temporal interpretation also has ramifications for ontological commitment in a theory of temporal knowledge representation, see (Steedman (1996)). In this model, *will* is ambiguous between receiving a modal and a future temporal interpretation.

Most of the discussion in the literature could be characterized as taking one of these two options in order to adequately describe the semantics of *will*.

Since several efforts at categorizing the nature of *will* are reviewed and compared here, and since many of these efforts do not share a common theoretical background, we have tried to remain theory-neutral throughout the following discussion.

4 The Data

As mentioned before, *will* is not uniquely used to refer to future time. *will* is also commonly used as a modal with reference to present or past time.

futurity

- (4)
 - a. Tomorrow morning I will wake up in this first-class hotel suite.
 - b. He will go to London tomorrow. (Boyd and Thorne (1969))
 - c. I'll be 21 next week. (Haegeman (1983))
 - d. Between 6 and 7 I'll be having my bath. (*duration*) (Haegeman (1983))
 - e. Well, I'll ring you tonight sometime. (*volition*) (Palmer (1986))
 - f. I will do it. (*volition*) (Haegeman (1983))
 - g. The queen will now hand the trophy to the captain. (*immediate future*) (Haegeman (1983))

epistemic modality

- (5)
 - a. That will be the milkman.
 - b. Tell him Professor Cressage is involved – he will know Professor Cressage. (Palmer (1979))
 - c. In the 1920s Wilkinson Sword introduced the stroppable razor and then the 'Empire' range which many people will remember. (Palmer (1979))
 - d. He will have read it yesterday. (Huddleston (1995))

dynamic modality

- (6)
 - a. John will get angry over nothing.
 - b. John will work one day and loaf the next.
 - c. Ed will lie in bed all day, reading trashy novels. (Huddleston (1995))

capability/generic

- (7) a. Nitric acid will dissolve zinc. (Boyd and Thorne (1969))
- b. Oil will float on water. (Haegeman (1983))
- c. Accidents will happen. (Elvis Costello)
- d. The French will be on holiday today. (Palmer (1979))
- e. In 20 years, cockroaches will prey on humans.
- f. According to predictions, typhoons will arise in this part of the Pacific.

directives

- (8) a. You will do as I say, at once.
- b. Will you please stop that racket?
- c. You will report back for duty on Friday morning. (Huddleston (1995))

Of course, these examples do not exhaustively cover the various modalities that *will* can participate in². Both (Palmer (1979)) and (Haegeman (1983)) attempt to give a more exhaustive list of contexts in which *will* can be used. For the purposes of this paper, we will simply try to distinguish the modal uses of *will* from its temporal use to refer to future time³.

5 Various analyses of *will*

There have been several first approximations towards giving a unified semantics for *will* (and such morphemes). (Comrie (1989)) refutes the conclusions drawn by such theories and we give a brief summarization of the arguments below:

- 1. Since the future is inherently less certain, future time reference is different from present or past time reference, and is thus inevitably modal (Jespersen (1931); Lyons (1977); Yavaş (1982); Palmer (1979); Palmer (1986)). However, statements about *next week* or *tomorrow* in examples like (9)a have more in common with past time reference in (9)b than the modality in (9)c. (Comrie (1989)) calls this the “conceptual non-argument”.

- (9) a. #It will rain tomorrow but it won’t rain at all.
- b. #It had rained yesterday but it didn’t rain at all.
- c. It must rain tomorrow but it might not rain at all.

It should be noted that this leaves open the possibility that a particular language might subsume future time reference under modality, thus making overt the lower degree of

²As the examples show, modal uses of *will* like other modals are sensitive to context. In (Kratzer (1977); Kratzer (1991)), Kratzer formalizes these contextual dependencies. We will return to this subject later when we discuss the temporal contribution of modals.

³We’ll make a simplifying assumption and not look at *shall* in this paper. With respect to our study, *shall* does not differ from *will* in any significant way. *shall* has a sense of obligation in contrast with *will*, however it shows a similar ambiguity between a future and a modal present time interpretation (see (Palmer (1979))p.62).

certainty usually associated with statements about the future. This is the case in Burmese (Comrie (1985))(p.50-51) where declarative sentences take either realis or irrealis particles. The irrealis particle subsumes possibility in the non-future, but also all future-time reference.

2. In terms of their syntactic distribution, the tokens *will* and *shall* are auxiliaries that distribute exactly with the modal auxiliaries. Hence they should have identical semantics (Palmer (1979); Coates (1983); Perkins (1983); Quirk et al. (1985)). However this view is not tenable. Consider the determiner *a* which distributes identically with *the*, *many*, etc. Non-specific uses of *a* however are not considered to be quantifiers like other determiners in some semantic theories (e.g. those in the DRT vein). (Comrie (1989)) also argues against this view and calls it a “formal non-argument” and shows that if considered cross-linguistically such a premise is neither a necessary nor a sufficient condition on a description of the data.
3. Since most natural languages seem to have future tense morphology ambiguous with respect to future temporal interpretation and modality this is an indication of a language universal. First of all, as (Comrie (1989)) points out, according to Haiman’s grammar of Hua (Haiman (1980)), verb inflections in Hua are solely used for future time reference. They are not used to express modal values with present or past time reference. Even if all languages had ambiguous future tense morphology, this does not rule out true ambiguity as a result of the morphological resources available to a language.

With the inconclusive approaches out of the way, the remaining sections lay out some evidence that will help us choose an analysis for *will*.

6 Future ≠ Past

In this section we look at empirical evidence that attempts to show that future time reference is different from past time reference.

6.1 Present/Future Ambiguity

(Zagona (1989)) points out that while ambiguity between present or future interpretations of an event is always possible, such a “shifting” between past and present is not. The following examples are taken from (Zagona (1989)).

As the comparison in (10) and (11) shows, unlike morphologically present sentences, morphologically past sentences cannot be construed as contemporaneous with the utterance time (the *now* in (11) crucially has to refer to utterance time for ungrammaticality) or to some future time.

- (10) a. *John sang now/tomorrow.
b. John is singing now/tomorrow.

- (11) a. *John was singing now/tomorrow.
 b. John sings now/tomorrow.

Also, non-past tense morphology does not admit a past adverbial as in (12). But, by contrast, non-past tense morphology can take future interpretation as in (13). (Zagona (1989)) also cites a similar ambiguity between past and non-past morphology in Spanish.

- (12) a. *Plácido sings yesterday.
 b. *Plácido is singing yesterday.
 c. *Plácido will be singing yesterday.

- (13) a. Juan sings tomorrow.
 b. Juan is singing tomorrow.

Thus, past and non-past morphology do not behave alike when it comes to temporal modification.

6.2 *The perfect*

In a Reichenbachian system, the past perfect is associated with the tense diagram **E-R-S**, where data such as (14) is explained by the fact that neither the **E** point nor the **R** point can be associated with the **S** point ((Hornstein (1990))).

- (14) a. John had eaten the cake yesterday. (Hornstein (1990))
 b. *John had left right now/at this very moment.
 c. *John had left tomorrow.

The future perfect is given an analogous tense diagram: **S-E-R**. However, we can give the future perfect an interpretation where the **E** point can precede the **S** point (without invoking any modal behavior) as in (16). In order to analyze these cases, (Hornstein (1990)) gives the structure **(S-R) o (E-R)** to the future perfect and along with the future in past, **(R-S) o (R-E)**, it is the only tense diagram that does not compose to give a well-formed Reichenbachian tense diagram like the other tense diagrams do⁴.

- (16) John will have finished his manuscript by tomorrow. (see §7.4)

6.3 *Sequence of Tense*

Consider sentence (17): this sentence has two distinct readings, a “shifted reading” (Eng (1987)) in which John hears at a past time that Mary was pregnant at a time previous to that. It also has a “simultaneous reading” (the so-called *sequence of tense* reading) in which John

⁴Also, the present perfect combines happily with stage level predicates but the future perfect does not as in (15)b.

- (15) a. #He will have been available. (*future perfect reading*)
 b. He has been available.

Further discussion on the future perfect is given in §7.4.

hears at a past time that Mary is pregnant at the time of hearing. These two readings occur in languages like English which is a strict *sequence of tense* language (Steedman (1996)). See (Enç (1987); Abusch (1988); Hornstein (1990); Ogihara (1995)) for further discussion about this phenomenon.

(17) John heard that Mary was pregnant.

However, simultaneous readings are only available with stative complements as in (18) but not with eventive complements as in (19). The examples are from (Enç (1987)).

(18) a. You knew that I was upset about the results.
b. I heard that Sally was in London.

(19) a. John heard that Mary failed the test.
b. The gardener said that the roses died.
c. Sally thought that John drank the beer.

In the literature, the issue of whether sentences with *will* undergo sequence of tense phenomena has been debated. (Hornstein (1990)) argues that *will* does participate in sequence of tense, i.e. in (20) the complement clause is predicted to be co-temporal with the main clause.

(20) Mary will say that she will be tired. (Enç (1996))

However, as (Enç (1996)) points out, (Hornstein (1990))'s theory also must predict that the sequence of tense rule is optional and hence in a sentence such as (21) there must exist a reading in which the S point of the embedded clause is left free, and by default is identified at the utterance time. On this reading, the time of thinking and the time of being pregnant are both claimed to be after the utterance time, but they are not ordered with respect to each other. Among the non-ordered readings, the reading where the pregnancy precedes John's thinking does not seem to be available.

(21) John will think that Mary will be pregnant. (Hornstein (1990))

6.4 Aspect

We will consider four tests used by Vendler: (a) compatibility with adverbials like *for 15 minutes*, (b) *in 15 minutes*, (c) the entailment arising from the progressive and (d) compatibility with the perfect (see (Steedman (1996))(p.6)). We will only consider a category of events like *walking*, *climbing* and *writing* which Vendler called *activities* (as opposed to events which are *achievements* like *arriving*, *reaching the top* or *fishing* or events that are *accomplishments* like *writing a sonnet* or *flying to Paris*). Activities are extended in time and when the tense morphology is past, they can combine with *for*-adverbials but not with *in*-adverbials, that the progressive does carry a factive entailment, and that they are odd with the perfect. The following examples are from (Steedman (1996))(p.6).

- (22) a. Keats wrote for 15 minutes.
 b. #Keats wrote in 15 minutes.
 c. Keats is writing. (|= Keats will have written)
 d. #Keats has written.

Now consider *activities* with *will* instead of the past tense morphology.

- (23) a. Keats will write for 15 minutes.
 b. Keats will write in 15 minutes.
 c. Keats will be writing. (≠ Keats will have written)
 d. Keats will have written.

The examples in (23) show that there are some aspectual difference in future time reference and past time reference.

6.5 Conclusion

There is empirical evidence to believe that the future can be distinguished in terms of temporal interpretation from the past.

7 The Future and Modality

In this section we look at the various arguments presented in the literature that attempts to show that the *will* used for futurity can be empirically shown to be different from the *will* of modality.

7.1 Passivisation

In (Wekker (1976)) and (Davidson-Nielsen (1988)) the effect of passivisation on *will*-sentences is taken to be a formal device that shows the distinction between *will* as a future tense auxiliary and the volitional or a modal *will*. The argument is as follows: the sentences in (24) (from (Haegeman (1983))) are synonymous in their future reading, however in their volitional reading, (24)a means that John is the unwilling party, while in (24)b it is Mary who is unwilling.

- (24) a. John won't meet Mary.
 b. Mary won't be met by John.

This distinction in meaning was surprising in the context of the relation between active and passive sentences in earlier transformational grammar. Of course, the fact that future *will* is voice-neutral and volitional *will* isn't cannot be a litmus test for tense and modality because:

- epistemic *will* is voice-neutral as shown in (25).

- (25) a. John will have finished the job yesterday. (Haegeman (1983))
 b. =The job will have been finished by John yesterday.

- and the voice-neutral future *will* in (26) patterns like the past tense morphology and the modal auxiliary *may*.

- (26) a. The rain *delayed/may delay/will delay* the start. (Huddleston (1995))
 b. =The start *was delayed/may be delayed/will be delayed* by the rain.

7.2 Conditionals

(Wekker (1976)), (Davidson-Nielsen (1988)) and (Declerck and Depraetere (1995)) distinguish the future tense auxiliary from the modal auxiliary by reference to the non-appearance of the future tense *will* in the antecedents of conditionals. This is simply not true, as evidenced by the sentences in (27).

- (27) a. And I will greatly appreciate it if you will not tell your husband. (Brown corpus *cn19*)
 b. “And I am not sure that I have any cash – any money , that is – but if you will wait just a minute I will write you out a check if I can find my checkbook. Won’t you step into the living room , where it’s cozier”? (Brown corpus *ck22*)
 c. “I’ll have a drink , then , if you’ll have one with me”.
 “If you will promise to make it weak”. (Brown corpus *ck22*)

7.3 Adverbial modifiers and free choice any

(Hornstein (1990)) argues that the future tense *will* in English can be easily distinguished from the modal *will* by some simple empirical tests.

The first involves the modification of the present-tense adverb such as *now*. The claim is in (30) (from (Hornstein (1990))(p.33)) the modal *will*, but not the future tense *will* as in (30)a, is modifiable by a present-tense modifier.

- (28) a. That will be Max at the door now.

Accepting that this is true, let us take a case of a future tense *will* such as (30)a. Compare it with the sentence in (30)b. It seems that analogous to the argument given for *will*, *must* too is ambiguous between a sense compatible only with future-time modifiers like *tomorrow* and a sense compatible with a present-tense modifier like *now*. In fact, all the modals in (30)a seem to participate in this ambiguity. But (Hornstein (1990)) goes on to make crucial distinctions between modals like *must* which is assumed not to be ambiguous and *will* which is (see §7.4). Hence, sentences in (30) do not solve the problem of deciding whether *will* is ambiguous.

- (29) a. George will leave now.
 b. Suzie will go to sleep now.
 (30) a. Tomorrow, John will leave for Paris in a week.
 b. Tomorrow, John must leave for Paris in a week.

- a. John *could/should/might/may/can/must* go to school *now/tomorrow/ *yesterday*.
- b. Go to school *now/tomorrow/ *yesterday*.

(Hornstein (1990))(p.202n38) also claims that free choice (FC) *any* can be used to detect modal uses of *will* from the temporal future sense. The contrast is given in (31) (from (Hornstein (1990))(p.202)).

- (31) a. Leave this instant on any available flight.
- b. John will leave this very instant on any available flight.
- c. *John left yesterday on any available flight.
- d. You will leave tomorrow on any flight. (*directive*)
- e. ??*I simply believe that you will leave tomorrow on any flight.*

The argument is that (31)e is odd because of a lack of directive force which is seen in (31)d. Consider (32)a which has *will* in a complement clause where it is impossible to get imperatives in English. The use of FC *any* seems to be grammatical. Also the emphasized segment of the discourse in (32)b seems to me difficult to reconcile with an imperative use of *will*, but it clearly has a FC *any* under its scope.

- (32) a. John told/assured me that Mary will catch any available flight tomorrow in order to reach the meeting on time.
- b. “Information is hereby given that Mr. Timothy Palmer of Newburyport, Mass. has agreed to take charge of the concerns of the Patentees of the Chain Bridge, in the states of Massachusetts, New Hampshire, Vermont, Rhode Island, and Connecticut, so far as relates to the sale of Patent rights and the construction of Chain Bridges
“Mr. Palmer will attend to any applications relating to bridges and if desired will view the proposed site , and lay out and superintend the work, or recommend a suitable person to execute it.
 John Templeman
“Approved, Timothy Palmer”.
 (Brown corpus *ce18*)

7.4 The future perfect

(Hornstein (1990))(p.38) cites the future perfect as evidence to support the view that the future tense acts quite differently from the modal *will*. The assumption is that in English the two senses of *will* have the Reichenbachian tense diagrams given in (33).

- (33) a. future perfect *will have* := S-E-R
- b. modal + have *will have* := E, R-S

The tense diagram for (33)b is that of the simple past. This tense diagram is shared with all other modals such as *must*, etc. but crucially (Hornstein (1990)) gives evidence to

show that other modal verbs with *have* do not get the tense diagram for the future perfect in (33)a. The reason is the contrast between the examples of modal verbs with *have* in (34) and the sentences with *will have* in (35) (taken from (Hornstein (1990))(p.39)).

- (34) a. John must have eaten at 3 pm.
b. John should have eaten at 3 pm.
c. At 3 pm, John must have eaten.
d. At 3 pm, John should have eaten.

- (35) a. John will have left the office at 3 pm.
b. At 3 pm, John will have left the office.

The sentences in (35) can be interpreted with John's leaving occurring either at or before 3 pm (i.e. either modifying the E or the R point, (Hornstein (1990)) shows that sentence initial time adverbials tend to modify the R point easier than the E point). The sentences in (34) show no such ambiguity. This is striking evidence since this tries to show that *will have* has a R point which can be modified (which is distinct from the E point), and existence of a temporal R point is strong evidence that we are dealing with a tense interpretation of *will* rather than a modal one.

To verify this evidence, we should test whether the particular choice of modal has anything to do with the judgments seen in (34). Consider the examples in (36) and (37). They seem to allow modification of the R point more readily than the examples in (34).

- (36) a. John might have eaten his lunch at 3 pm.
b. John may have eaten lunch at 3 pm.
c. At 3 pm, John might have eaten his lunch.
d. At 3 pm, John may have eaten his lunch.

- (37) a. The train must have left by now.
b. The train may have left by now.
c. The train will have left by now.

Also, as seen in the sentences in (38) (if my judgments are correct) the modification of the R and the E point in *will have* sentences is not as robust as in the cases with *will*.

- (38) a. Now we'll be broke at the end of the month.
b. ??At the end of the month, we will have been broke on the 15th.
c. Tomorrow, John will leave for Paris in week. (Hornstein (1990))
d. ??Day after tomorrow, John will have left for Paris at 3 pm tomorrow.

If (Hornstein (1990))'s story about *modal have* and *will have* sentences is not the right one, what could account for the data presented in this section. Consider the simplest answer: the underlying tense in all the *modal have* sentences including the *will have* sentences is the present perfect E-S, R. The range of adverbs that the present perfect can take in English is limited. As (Hornstein (1990)) points out it is odd to say "John has left yesterday".

If this simplistic analysis can be justified, then all modals always have present tense which combines with the perfect auxiliary *have* to give us the present perfect. The tense diagram of the present perfect allows us to explain the objection in (Comrie (1985))(p.71) (see (Hornstein (1990))(p.200n15)) that (39) has an interpretation where E is prior to S. In order to analyze these cases, (Hornstein (1990)) gives the structure (S-R) o (E-R) to the future perfect and along with the future in past, (R-S) o (R-E), it is the only tense diagram that does not compose to give a well-formed Reichenbachian tense diagram like the other tense diagrams do.

(39) John will have finished his manuscript by tomorrow. (Hornstein (1990))

Such an analysis also predicts why the sentences in (37) allows the modification of the R point by *now*. The interaction of modality with the present perfect (see §7.4) can be used to explain cases like (40) where the R point in a Reichenbachian tense diagram is not associated with the E point.

- (40) a. If you remember how we were and how we lived, then we will have lived again.
 b. By 1965, several or all of these systems will have been fully tested and their reliability established. (Brown corpus *ch21*)

7.5 Conclusion

This section reviewed the evidence presented in the literature to show that future tense and modality in English can be shown to be different. We saw that there seems to be no good argument *against* a unified treatment of *will* as a modal⁵. There is also evidence that diachronically *will* and *shall* have modal origins in English (Jespersen (1931); Comrie (1989)) and (Haegeman (1983))(p.39-40).

8 The modality of prediction

Having shown in §7 that the futurity of *will* is not incompatible with a modal semantic interpretation let us look at some implementations of this idea.

Verbs that express desires or demands evaluate their complements in a future time relative to their own event time. According to (Boyd and Thorne (1969)), (Palmer (1979))⁶, (Haegeman (1983)) and (Enç (1996)) the futurity of *will* is a consequence of its interpretation as a modal of prediction and hence *will* can unambiguously be taken to be a modal.

According to this view the futurity in (41)c and (41)d is a consequence of the modality of *will* analogous to the futurity in (41)a and (41)b being a consequence of the lexical semantics of the verbs *expect* and *want*.

⁵This section did not consider other less principled arguments put forward (citing evidence from negation, replacement by *shall* in indirect speech, alternation with *I think* and *probably* and combination with a simple present tag, like *does s/he?*) to show that the future *will* differs distributionally from the volitional or the modal *will*. See (Haegeman (1983); Huddleston (1995)) for counter-examples to these arguments.

⁶No specific proposal is made (see (Palmer (1979)) p.11).

- (41) a. I expect to win the race. (Enç (1996))
 b. “He wants me to go with him tomorrow”, she told Kate.
 (Brown corpus *ck15*)
 c. I will win the race.
 d. “That critter will be back tomorrow”, predicted George Rust, “and he’ll bring fifty of his kind back with him. Blue Throat won’t stand for this. He’ll shoot up the town”. (Brown corpus *cn26*)

However this cannot be an adequate theory if *will* is the only modal that displays futurity due to the modality of prediction. (Enç (1996)) gives the examples in (42) to show that other forms of modality show the same effect of futurity. (42)a and (42)b are examples of deontic modality⁷ and (42)c is an imperative⁸.

- (42) a. You must do fifty push-ups. (Enç (1996))
 b. Sally may go to the party if she finishes her work. (Enç (1996))
 c. Do fifty push-ups. (Enç (1996))

The time of doing push-ups in (42)a and (42)c and the time of going to the party in (42)b are required to be after the utterance time. However, the futurity is not conclusively the result of the intensional expressions in the above examples. For instance, the sentences in (43) are identical to the sentences in (42) except that the intensional expressions are replaced with some appropriate context to elicit a reading in which the time of doing push-ups and the time of going to the party are after the utterance time (analogous to (42)). The sentence in (45) is the real-life counterpart of the constructed examples in (43). As (43)b shows, the prediction of *will* is not at the utterance time. Rather, the prediction holds at a time specified by the *when* clause. The examples in (43) and (45) give evidence against (Enç (1996))’s implicit assumption that English does not have any present tense interpretation that cannot be collapsed to the utterance time, and a sentence like “John must leave.” does not project tense (Enç (1996))(p.354).

- (43) a. You do fifty push-ups and I’ll give you your money.
 b. When you do fifty push-ups, I’ll give you your money.
 c. Sally goes to the party only if she finishes her work.
- (44) a. You’ll do fifty push-ups and I’ll give you your money.
 b. When you’ll do fifty push-ups, I’ll give you your money.
 c. Sally will go to the party only if she will finish her work.

- (45) But come the next session of Congress, State can expect only that its summer guest will bite its hand *when it goes to the Capitol asking money for diplomatic*

⁷Deontic modality denotes the feasibility and permissibility of the core proposition, and ability and obligation of the agent (see (Palmer (1986))).

⁸This example is relevant under the assumption that imperatives have an intensional expression associated with their semantics.

entertaining expenses abroad or for living expenses for its diplomats. (Brown corpus *cf46*)

The futurity in the present tense sentences (43) and (45) could be claimed to be derived from an implicit *will* present in those sentences (as explicitly show in (44)). We will show in §9 that this cannot be true.

Note that all we are arguing for here is that while *will* can be treated as a modal of prediction, it does not always have the utterance time as its reference point.

The examples in (43) also show why the analysis in (Boyd and Thorne (1969)) leads to difficulties. (Boyd and Thorne (1969)) attempt to give an analysis of modals using the notion of a speech act. They see the difference between the sentences in (46) as reflected in their illocutionary force as characterized by the sentences in (47)

- (46) a. He goes to London tomorrow.
b. He will go to London tomorrow.
- (47) a. I state He goes to London tomorrow.
b. I predict He goes to London tomorrow.
- (48) a. He will go to London now/tomorrow.
b. I predict He goes to London now/tomorrow.
c. I direct He goes to London now/tomorrow.

However, this approach does not explain the temporal interactions of the various illocutionary uses of *will*. For example, in (48) the illocutionary forces of a *prediction* and a *directive* can both be interpreted at utterance or future time (see (49)c for a more convincing example of the temporal interpretation of (48)b as the utterance time). (Palmer (1979)) also points out other problems with this approach.

Modals like *must* and *may* also have interpretations where no shift to future time takes place. This is also true of *will*. It is important to note that examples (49)a and (49)b although predicated of the present time are cases of deontic modality, while (49)c although predicated of the present time is, however, a case of prediction.

- (49) a. Sally *must* be in her office now. (Enç (1996))
b. Go home, your mother *may* be worried.
c. Go home, your mother *will* be worried.
d. Sally will be in her office now.

Until the precise nature of the temporal contribution of modals is resolved the analysis of the futurity of *will* being derived from the modality of prediction cannot be conclusive. We will return to the notion of the temporal nature of modality in §11.

(Haegeman (1983))'s analysis of *will* is one in which it is neither exclusively a modal nor tense morphology, rather it is given a more general meaning from which both its interaction with tense and modality is predicted based on contextual and epistemic facts about

the discourse. The particular lexical meaning given to *will* is as follows (from (Haegeman (1983))(p.162)):

1. non-factuality, i.e. time-based objective uncertainty
2. actuality, speaker-based subjective certainty
3. event-time orientation

(Haegeman (1983)) tries to provide *will* with one basic contribution towards a discourse model, with a wide range of contextually and situationally defined specifications which express under which conditions in a discourse which particular sense of *will* is appropriate. However, the crucial point of future time reference is resolved via ascribing to the basic meaning of *will* the ability to shift the event time (see (3)). While the basic meaning attributed to *will* is that of a modal of prediction (“a modal of conditionality indicating maximal likelihood”), the analysis presupposes an *intention* towards future-time specification in order to distinguish the future from the modal.

(Enç (1996)) gives a reasonable answer within possible world semantics to the temporal contribution of modals. The assumption is that possibility and necessity is over world-time pairs. You could equivalently assume that quantification is over entire histories of possible worlds (as in Figure 1). The interpretation given to modals that refer to future time is given in (50).

- (50) MODAL[S] is true at $\langle w, i \rangle$ iff in every world w' accessible to w there is an interval i' such that $i < i'$ and S is true at $\langle w', i' \rangle$. (Enç (1996))

Here, *will* is considered one of the modals that can be interpreted by (50), and the futurity is derived due to the fact that the worlds are ordered as histories. Crucially, there is a particular sense of *will* that has an interpretation as in (50). The *will* that is used, say, in *John will leave*. However, there is also the *will* that is used in *Sally will be in her office now* which will get an interpretation that is given by (51) (as far as we can tell, the epistemic *will* with *now* does not *have* to be evaluated with respect to the current world). Notice that this interpretation is still consistent with considering *will* as a modal of prediction.

- (51) MODAL[S] is true at $\langle w, i \rangle$ iff in every world w' accessible to w there is an interval i' such that $i = i'$ and S is true at $\langle w', i' \rangle$.

Considering the interpretation available to the epistemic *will* in *John will have left yesterday*, yet another interpretation has to be made available, namely the one in (52) (assuming that the **R** temporal point for the perfect can be handled appropriately in some compositional way).

- (52) MODAL[S] is true at $\langle w, i \rangle$ iff in every world w' accessible to w there is an interval i' such that $i > i'$ and S is true at $\langle w', i' \rangle$.

Hence, such a view has to derive all the possible temporal interpretations of the modal *will* via ambiguous models.

We will come back to the notion of *will* as a modality of prediction in §11.

9 The futurate

In many cases (cf. §8), the reference to future time in sentences containing *will* is compared to what is termed as the futurate construction (Smith (1983)), e.g. (53).

(53) Tomorrow, the Yankees play the Red Sox. (Vetter (1973))

An argument can be made (as in (Lakoff (1971))) that this evidence is not relevant since one can hypothesize an implicit *will* in sentences like (53) hence explaining why they refer to a future time. However, as (Vetter (1973)) points out using the examples in (54), the futurate behaves differently from sentences with an explicit *will* in many contexts.

- (54) a. Tomorrow, the Yankees will play well.
b. #Tomorrow, the Yankees play well.
c. Tomorrow, the astronauts will splash down safely.
d. #Tomorrow, the astronauts splash down safely.
e. The Yankees will have played the Red Sox next Thursday.
f. #The Yankees have/had played the Red Sox next Thursday.

This tells us two things:

- An analysis of the futurate construction cannot be collapsed to that of *will*.
- Reference to future time is not uniform. The futurity of *will* is somehow distinct from the futurity displayed in the futurate construction.

Some consider the simple present tense in sentences like (54) to be the “true” future tense in English (Steedman (1996)), while others like (Vetter (1973); Huddleston (1977); Smith (1983)) consider the futurate to be formally in the present and making a modal statement (a schedule or plan) about the current time⁹.

(Steedman (1996)) (citing (Isard and Longuet-Higgins (1973))) points out that the past tense demands that its past reference point (the R point) be explicitly established, either by a modifier, such as a *when* clause, or by preceding discourse. Thus (55)a is inappropriate as the first utterance of a discourse (except under cases where a temporal reference is *accommodated*), while (55)b is fine.

- (55) a. #Chapman breathed a sigh of relief. (Steedman (1996))
b. When Nixon was elected, Chapman breathed a sigh of relief.

⁹Also (Binnick (1971); Binnick (1972); Palmer (1979); Haegeman (1989)) give evidence to support the view that other “periphrastic futures” in English such as *be to*, *be about to*, *be going to* are also modal in character.

The futurate too, is anaphoric, like the past with the same need for an “anchored” reference point. Hence, (56)a is inappropriate when discourse-initial, whereas the suitably anchored (56)b is fine. (Steedman (1996)) gives this as evidence that the present tense morphology (or the pure future tense interpretation) is a true tense since it behaves analogous to the past tense. Given the evidence in (56)a and (56)b an explanation of the present tense morphology as being under-specified with respect to temporal interpretation might be a better alternative. This can also help us explain cases of the “dramatic present” (also called the historic present) in (57) where the present tense is bound in some discourse by a past tense (sometimes immediate past) interpretation.

- (56) a. #Harry moves to Philadelphia. (Steedman (1996))
 b. Next Tuesday, Harry moves to Philadelphia.

- (57) But Voltaire perseveres. He goes to the chief himself. “At what university did you study”? He asks. He refuses to believe that the bandit chief never attended a higher institution. “To have become so corrupt”, he says, “surely you must have studied many arts and sciences”. (*dramatic present*) (Brown corpus *ck08*)

We shall see in §11 that *will* too shows anaphoricity but of a somewhat more complicated nature.

10 The evidence from *would*

Certain syntax-semantic reasons have been given to show that *would* is synchronically related to *will*, i.e. *would* = *woll* + PAST¹⁰

Recall the discussion of sequence of tense from §6.3. Now consider the view that *would* = *woll* + PAST. Then embedded clauses in past tense with *would* in the matrix clause should also show sequence of tense effects. Both (Abusch (1988)) and (Ogihara (1995)) argue that this is true. The argument is that sequence of tense in English ensures that for a clause to be co-temporal with its complement clause which has past tense morphology, the clause itself has to carry past tense morphology. For instance, in (58)a John’s talk with his mother is co-temporal with their meal together and in (58)b the time of saying is the same as the time the predicate “Stalin and Molotov being less reliable defenders of Russia” holds.

- (58) a. 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. (Abusch (1988))
 b. The White Russians and the Ukrainians *would* say that Stalin and Molotov *were* far less reliable defenders of Russia than Curzon and Clemenceau. (Brown corpus *cj36*)

Replacing *would* with *will* in (59) only gives the shifted reading¹¹(see (Ogihara (1995))).

¹⁰PAST indicates past tense morphology. Note that this conclusion is not as obvious as it seems. (Hornstein (1990)) for instance, does not give *would* such a representation.

¹¹The judgment is from (Ogihara (1995)). Some speakers seem to get the co-temporal reading in (59)a,

- (59) a. John decided a week ago that in ten days at breakfast he *will* say to his mother that they *were* having their last meal together. (Ogihara (1995))
 b. The White Russians and the Ukrainians *will* say that Stalin and Molotov *were* far less reliable defenders of Russia than Curzon and Clemenceau.

Also, the co-temporal reading vanishes when the complement clause is an event as in (60) where only the shifted reading is available. Thus (given that the above judgments are valid) clauses with *would* pattern with other clauses with a morphological past tense with respect to sequence of tense phenomena.

- (60) a. Few months' later, John would hear that Mary failed the test.
 b. Few months' later, the gardener would say that the roses died.
 c. Sally would think that John drank the beer.

There are, however, cases where *would* in an embedded clause can be modified by future adverbials and are not co-temporal with the higher clause as in (61)a. But ordinary past tense morphology also shows this behavior as shown in (61)b.

- (61) a. Phoebe didn't realize that the Yankees would play the Red Sox the next day (so she agreed to fly to Mauritius with Henry Kissinger).
 b. Phoebe didn't realize that the Yankees played the Red Sox the next day. (Vetter (1973))

It is important to note that we have not made any commitment towards a particular interpretation for the PAST tense morphology. However, a unified interpretation might be given for cases where *would* can take on a modal interpretation as in (62) where a counterfactual reading is obtained. This can be summarily explained by referring to the theories which have linked the morphological past tense to the modality of counterfactuals (Isard and Longuet-Higgins (1973); Isard (1974); Iatridou (1996))¹².

- (62) Mary would have finished the book.

Also, (Huddleston (1995)) gives the following examples (63) and (64) to show the temporal contrast of *would* with *will*. These examples can be explained easily if *would* has a morphological past tense but are problematic for theories that treat *would* as being systematically ambiguous (as in (Hornstein (1990))).

- (63) a. I have no money on me but he won't lend me any. (*volitional*)
 b. I had no money on me but he wouldn't lend me any. (*volitional*)
 c. In a few months' time their love will change to hate.
 d. Only a few months' later their love would change to hate. (*past reference time*)

but get only the shifted reading in (59)b. Perhaps the higher verb *decided* is to blame, although this would be unexpected given that sequence of tense is considered to be local in nature (Hornstein (1990); Enç (1987)).

¹²Also see the discussion in (Palmer (1986))(p.200-215).

- (64) a. It will rain before we get home.
b. You said it would/*will rain before we got home.

Hence, there seems to be good evidence to show that *would* = *woll* + PAST tense morphology.

11 Thesis

In previous sections we have laid out a fairly comprehensive survey of the various viewpoints and related empirical facts cited in the literature on what semantics should be assigned to *will*. We also explored some additional facts such as the futurate and the use of *would* which were related to the use of *will*. In this section, we see if we have enough evidence to answer the question that was posed at the beginning of the paper: Is *will* part of the tense system or the modal system or is it simply homonymous?

First, let us encapsulate the conclusions from the previous sections:

- Future temporal interpretation in sentences with *will* have distinct effects on temporal modifiers, aspectual markers and sequence of tense when compared with past temporal interpretations.
- There was no convincing argument against the treatment of *will* as a modal.
- While *will* can be suitably treated as a modal of prediction, the prediction does not always have the utterance time as the reference point.
- *would* can be thought of as a modality of prediction plus PAST tense morphology.

After reviewing several arguments presented for and against the two sides of this question, we are led to the conclusion that the question is ill-posed since neither alternative alone could account for the empirical facts. However, there are some additional facts considered here which might shed some new light on the problem.

- We have seen in §9 that the PRES tense morphology can take various temporal interpretations,
- The arguments presented in §7.4 can be used to justify *will have* as having the present perfect as a temporal interpretation,
- The PRES tense morphology can also be bound by a generic operator, giving us the future generics in (7).

This leads us to the conclusion that a semantics for *will* can be always decomposed into a composition of the semantics given to a modal contribution and the temporal contribution of the PRES tense. It is important to note that both of these components can contribute to the temporal interpretation of *will*. Hence, the semantics for *will* is not exclusively modal as argued by one camp, neither is it ambiguous between a tense and a modal as argued by the

other camp, but rather each instance of *will* seems to be simultaneously a modal and a tense morpheme. That is, *will* equals the modality of prediction plus PRES tense morphology¹³.

This is implicit in the various analyses in §10. Let us take *would* to be *woll* + PAST and analogously *will* to be *woll* + PRES (borrowing the notation from (Abusch (1988))).

But given that both the modal and the temporal parts of *will* can be anaphoric in nature, it would mean that *will* can be anaphoric in two dimensions simultaneously. Is this property empirically observed? The remainder of this section will attempt to show that such a property for *will* has been attested.

As (Binnick (1972)) points out sentences with *will* that are out of context seem elliptical. Sentences such as the ones in (65) require some context to be felicitous.

- (65) a. The rock'll fall. (Binnick (1972))
b. In fact, she'll die.

(66) is not elliptical in the same way.

- (66) The rock'll fall if you pull the wedge out from under it. (Binnick (1972))

There are two kinds of anaphoric reference being considered here. The first is exemplified by the sentence in (67).

- (67) Don't pull the wedge out from under that boulder, you nitwit! The rock'll fall.
(Binnick (1972))

The *will* in (67) is making reference to an *argument* (in the sense of (Stone (1994))), where in this case *will* has an epistemic meaning. It is important to note that in (67) *will* is not necessarily temporally bound to a future time.

In conditionals, this also explains why *will* can shift into the future twice as in (68). The fact that Tommy cries or Eric drops out of school is a *consequence* of the antecedent in both the conditionals in (68) and hence in those worlds where Sally wins the race, Tommy's crying is *predicted* to hold at those worlds.

- (68) a. If Sally wins the race, Tommy will cry. (Enç (1996))
b. If Eric fails the test, he must drop out of school.

The other kind of anaphoric reference is when the PRES tense morphology in *will* gets its temporal interpretation from discourse (see (Partee (1973); Muskens (1995); Muskens (1996)) for other forms of temporal anaphora in discourse) shown in the examples in (69) via a co-indexation between the PRES tense in *will* and the location in discourse where the temporal interpretation is located.

- (69) a. When the sun sets_{*i*}, we'll_{*i*} be frozen. (Binnick (1972))
b. Someday_{*i*} Americans will_{*i*} be able to visit Albania.

¹³The distinction between futurity in *will* and that in the futurate is now explicit. Whereas in the futurate only PRES tense morphology exists, in *will* there is both the modality of prediction and the existence of PRES tense morphology.

c. Now_i Salomé will_i do her world-famous Dance of the Seven Ostrich Feathers.

Any semantic analysis of *will* must account for these two cases of anaphoric reference.

This analysis also extends to account for *would* as pointed out in (Stone (1996)), when we take *would* to be *woll* + PAST tense morphology which was argued for in §10.

(70) Only a few months' later their love would change to hate.

(71) My neighbours would kill me. (Stone (1996))

As sentences such as (63)d repeated as (70) show, the temporal reference point for *would* is strongly anaphoric. This patterns with the anaphoric modal uses of *would* (Stone (1996)) in (71) uttered while looking at a high-end stereo in an electronics store. The anaphoric (or accomodated) context is one in which the speaker bought the stereo and played it at its natural volume. Analogous to this, the PAST tense morphology of *would* in (63)d makes anaphoric reference to a past temporal point where two people are in love, with respect to which love changes to hate in the future (a few months' later).

12 Conclusion

In this paper, we began with the following question: Is *will* part of the tense system or the modal system or is it simply homonymous? After reviewing several arguments presented for and against the two sides of this question, we were lead to the conclusion that the question was ill-posed since neither alternative alone could account for the empirical facts. Any semantics for *will* must account for a simultaneous contribution from the modal as well as the tense system. Note that this is distinct from stating that *will* is ambiguous between a modal and a future tense. In comparison to existing analyses, by increasing the dependence on contextual information a much simpler account for the semantics of *will* can be afforded.

References

- Abusch, D. (1988) "Sequence of Tense, Intensionality and Scope," in *Proceedings of WCCFL 7*, Stanford, 1–14.
- Binnick, R. I. (1971) "Will and Be Going To," in *Papers from the Seventh Regional Meeting, Chicago Linguistic Society*, Chicago, Chicago Ling. Soc.
- Binnick, R. I. (1972) "Will and Be Going To II," in P. M. Peranteau, J. N. Levi, N. Judith, and G. C. Phares, eds., *Papers from the Eighth Regional Meeting, Chicago Linguistic Society*, Chicago, Chicago Ling. Soc.
- Boyd, J., and J. P. Thorne (1969) "The Semantics of Modal Verbs," *Journal of Linguistics* 5, 1–192.
- Coates, J. (1983) *The Semantics of Modal Auxiliaries*, Croom Helm, London.
- Comrie, B. (1985) *Tense*, Cambridge University Press.

- Comrie, B. (1989) "On Identifying Future Tenses," in W. Abraham and T. Janssen, eds., *Tempus – Aspekt – Modus: die lexikalischen und grammatischen Formen in den germanischen Sprachen*, Niemayer, 51–63.
- Davidson-Nielsen, N. (1988) "Has English a future?: remarks on tense," in I. Lindbad and M. Ljung, eds., *Proceedings from the Third Nordic Conference for English Studies*, volume 1, Stockholm, Almqvist and Wiksell, 53–59.
- Declerck, R., and I. Depraetere (1995) "The Double System of Tense Forms Referring to Future Time in English," *Journal of Semantics* 12:3, 269–310.
- Enç, M. (1987) "Anchoring Conditions for Tense," *Linguistic Inquiry* 18, 633–657.
- Enç, M. (1996) "Tense and Modality," in S. Lappin, ed., *The Handbook of Contemporary Semantic Theory*, Blackwell Reference, Oxford, UK ; Cambridge, Mass., 345–358.
- Haegeman, L. M. (1983) *The semantics of will in present-day British English : a unified account*, Verhandelingen van de Koninklijke Academie voor Wetenschappen, Letteren en Schone Kunsten van België, Klasse der Letteren. Jahrg. 45, nr. 103, Paleis der Academien, Brussel.
- Haegeman, L. M. (1989) "Be Going to and Will: A Pragmatic Account," *Journal of Linguistics* 25, 291–317.
- Haiman, J. (1980) *Hua: a Papuan language of the Eastern Highlands of New Guinea*, J. Benjamins, Amsterdam.
- Hornstein, N. (1990) *As Time Goes By: Tense and Universal Grammar*, MIT Press, Cambridge, Mass.
- Huddleston, R. (1969) "Some observations on tense and deixis in English," *Language* 45, 777–806.
- Huddleston, R. (1977) "The futurate construction," *Linguistic Inquiry* 8, 730–736.
- Huddleston, R. (1995) "The Case against a Future Tense in English," *Studies in Language* 9:2, 399–446.
- Iatridou, S. (1996) "Fakes?" presented at GLOW '96.
- Isard, S. (1974) "What would you have done if . . .," *Theoretical Linguistics* 1, 233–255.
- Isard, S., and C. Longuet-Higgins (1973) "Modal Tic-Tac-Toe," in R. J. Bogdan and I. Niiniluoto, eds., *Logic, Language, and Probability*, D. Reidel, Dordrecht-Holland, 189–195.
- Jespersen, O. (1924) *Philosophy of Grammar*, W. W. Norton (publ. 1965).

- Jespersen, O. (1931) *A Modern English Grammar on Historical Principles. Part IV: Syntax. Third Volume: Time and Tense*, (Various Editions).
- Kratzer, A. (1977) "What 'must' and 'can' must and can mean," *Linguistics and Philosophy* 1, 337–355.
- Kratzer, A. (1991) "Modality," in A. von Stechow and D. Wunderlich, eds., *Semantics: An international handbook of contemporary research*, de Gruyter, Berlin, 639–550.
- Lakoff, G. (1971) "Presupposition and Relative Well-formedness," in D. Steinberg and L. A. Jakobovits, eds., *Semantics*, Cambridge University Press, Cambridge.
- Lyons, J. (1977) *Semantics I*, Cambridge University Press, Cambridge.
- Muskens, R. (1995) "Tense and the logic of change," in *Lexical Knowledge in the Organization of Language*, volume 114 of *Current Issues in Linguistic Theory*, John Benjamins, Philadelphia, 147–184.
- Muskens, R. (1996) "Combining Montague semantics and discourse representation theory," *Linguistics and Philosophy* 19:2, 143–186.
- Ogihara, T. (1995) "The Semantics of Tense in Embedded Clauses," *Linguistic Inquiry* 26:4, 663–679.
- Palmer, F. R. (1979) *Modality and the English modals*, Longman, London.
- Palmer, F. R. (1986) *Mood and Modality*, Cambridge University Press.
- Partee, B. H. (1973) "Some structural analogies between tenses and pronouns in English," *Journal of Philosophy* 70, 601–609.
- Perkins, M. R. (1983) *Modal Expressions in English*, Frances Pinter, London.
- Prior, A. (1967) *Past, Present and Future*, Oxford University Press.
- Quirk, R., S. Greenbaum, G. Leech, and J. Svartik (1985) *A Comprehensive Grammar of the English Language*, Longman, London.
- Reichenbach, H. (1947) *Elements of Symbolic Logic*, Reprinted in 1966 by Free Press.
- Smith, C. S. (1978) "The Syntax and Interpretation of Temporal Expressions in English," *Linguistics and Philosophy* 2, 43–100.
- Smith, C. S. (1983) "The Temporal Reference of the English Futurate," in L. Tasmowski and D. Willems, eds., *Problems in Syntax*, Studies in Language. Series No. 2, Ghent, 273–288.
- Steedman, M. (1996) "Temporality," in J. van Benthem and A. ter Meulen, eds., *Handbook of Logic and Language*, Elsevier North Holland.

- Stone, M. (1994) "The Reference Argument of Epistemic *must*," in *Proceedings of the International Workshop on Computational Semantics*, 181–190.
- Stone, M. (1996) "The Anaphoric Parallel Between Modality and Tense," ms. University of Pennsylvania.
- Vetter, D. C. (1973) "Someone Solves This Problem Tomorrow," *Linguistic Inquiry* 4, 104–108.
- Wekker, H. (1976) *The expression of future time in contemporary British English*, North-Holland, Amsterdam.
- Yavaş, F. (1982) "Future Reference in Turkish," *Linguistics* 20, 411–429.
- Zagona, K. (1989) "On the Non-Identity of Morphological Tense and Temporal Interpretation," in C. Kirschner and J. DeCesaris, eds., *Sel. Papers from 17th Ling. Symposium on Romance Langs. (XVII LSRL), Rutgers Univ., 27-29 Mar. 1987*, Studies in Romance Linguistics, Benjamins, Amsterdam.