Conditional sentences have been the focus of a great deal of attention on the part of both philosophers and linguists. One reason for this is that perhaps more clearly than any other syntactic construction, conditionals raise the question of how humans reason—in particular, how we reason from one situation or state of affairs to another. As a result, as noted by Nelson Goodman (1991[1947]:9) with reference to “counterfactuals” in particular, the problem of understanding conditionals and the circumstances under which we are willing to assert or accept them is essentially coextensive with the problem of understanding natural law, the process of confirmation and disconfirmation, and the philosophy of science in general (below, I will sometimes refer to this as "Goodman's problem"). Among conditional sentences, the distinction between “indicative” (If Shakespeare didn't write Hamlet, ...) and “subjunctive” (If Shakespeare hadn't written Hamlet, ...) types has been felt to be particularly relevant to the project of characterizing patterns of inference, with a long literature claiming or assuming that these two kinds of conditionals are evaluated in distinct ways (for a recent overview of the relevant philosophical literature, see Bennett 2003).

While taking the indicative/subjunctive distinction to signal a difference in the way conditionals are evaluated, philosophers have typically left unexamined the question of why the morphological distinction in question coincides (other than in the 1st and 3rd persons singular of the verb be) with the distinction between present and past tense. For linguists, in contrast, this morphological overlap, which is common crosslinguistically, has been a major explicandum, with a significant literature devoted to proposals regarding what temporal and conditional uses of tense morphology might have in common semantically (see e.g. Steele 1975, James 1982, and Iatridou 2000).

It is the goal of the present paper to explicate the semantics of indicative and subjunctive conditional morphology; I will assume for that purpose a syntactocentric model of grammatical description (essentially that of Chomsky 1995 and subsequent work), in which the link between sound and meaning, for syntactically relevant features, results from semantic and morphophonological interpretation of those features. In principle, either the claimed difference in mode of evaluation identified by philosophers or the overlap with tense morphology investigated by linguists could be relevant to this project. I will argue, however, that the difference in mode of evaluation does not in fact correlate reliably with the indicative/subjunctive distinction, and that insofar as our concern is with conditionals as morphosyntactic objects and with the semantic interpretation of their constituent morphemes, it is the overlap with tense morphology that we should pay attention to. While recognizing the intrinsic interest of both the philosophers’ and the linguists’ projects referred to above, then, I will argue that they should be sharply distinguished and will for the most part limit my attention to the latter.

The paper is organized in the following way. In section 1 I present a number of preliminary theses that I will assume in the remainder of the paper; these concern both the identity and the meaning of the morphemes we will be investigating. Section 2 presents two empirical criteria that I will claim an account of the semantics of conditional (or “modal”) tense morphology must meet, namely susceptibility to unification with the semantics of temporal tense morphology and ability to capture the overlapping distribution displayed by subjunctive and indicative conditionals as a function of the assumptions of the speaker regarding the proposition of the antecedent. Section 3 considers three previous proposals concerning the semantics of conditional tense morphology, arguing that each of them fails to meet one of those two empirical criteria. In section 4, I present a new account based on the opposition between distinctness and identity of speaker internal and
speaker–external reference points and argue that it meets both criteria. Section 5, finally, returning to the difference between the philosopher’s and the linguist’s approach to conditionals, situates the paper’s proposals in the context of a distinction between two types of semantic theory, essentially the “E-semantics” and “I-semantics” of Jackendoff (1996).

1. Preliminary Theses

1. The morphological distinction between “indicative” and “subjunctive” conditionals in English can be identified with the morphological distinction between present and past tense.

As we have noted, the distinctive morphology of conditional antecedents traditionally labeled “subjunctive” coincides in form with past indicative morphology except in the 1st and 3rd persons singular of the verb be, which preserve the distinction between past indicative was and past subjunctive were. Given that this marginal contrast, maintained at least in part by formal education, is not clearly part of the grammatical competence resulting from normal language acquisition, it seems safe, for English, to identify the indicative/subjunctive distinction with the present/past distinction. In fact, Iatridou (2000:263–264) has argued convincingly that the same is true even in European languages with a more robust indicative vs. subjunctive contrast than English. Her evidence is that crosslinguistically, the obligatory morphological element of a “subjunctive” conditional antecedent is past tense rather than subjunctive mood: if a language has a past subjunctive, that will be used in such conditionals, but if it does not, a past indicative will appear in preference to a present subjunctive. While continuing to use the traditional labels “indicative” and “subjunctive”, I will assume, then, that the distinctive morphology whose meaning in conditionals it is our task to investigate is identical to present and past tense morphology.

2. Indicative and subjunctive conditionals are differentiated, in the general case, by the tense morphology of their antecedents, and not by that of their consequents.

Thesis 2 is demonstrated by the fact that there is a set of indicative/subjunctive pairs with identical consequents, as illustrated in (1), but no such pairs with identical antecedents.

(1) a. If they got married before they left town, there ought to/should/might/could be a record of it at the courthouse. (Let’s go see if there is.)
   b. If they had gotten married before they left town, there ought to/should/might/could be a record of it at the courthouse. (Let’s go see if there is.)

In fact, although would in the consequent is often taken as a marker of a subjunctive conditional (Woods 1997:5, Bennett 2003:11), it seems quite clear that would (in addition to will) is acceptable, alongside the parallel past tense forms should, might, and could, in the consequent of the indicative (1a). The position that the morphological tense of a conditional antecedent is an independent variable rather than a function of the tense of the consequent (contrast Heim 1992:217 (fn.35), Ippolito 2002:56 (fn.18)) also has the advantage that it allows a maximally straightforward account of the fact that there are constructions displaying the indicative/subjunctive contrast that are closely parallel to conditional antecedents in both form and interpretation but which lack any counterpart of a consequent clause (Suppose they are/were still alive. If only they are/were still alive).

3. There are two components to the semantic difference between indicative and subjunctive conditional antecedents, only one of which is a plausible candidate for unification with the temporal meaning of tense morphology.
In both sentences of (1) above, the context indicates that the speaker is undecided concerning the truth value of the antecedent proposition (we will call such an antecedent and the corresponding conditional "open"). In this sense, the two sentences are paraphrases of each other. But there is a subtle difference between them, relating to factors like the speaker's estimation of the likelihood of the antecedent proposition and whether that proposition is new to the discourse or not (They probably got married. If they did/*had, ...). This is the distinction sometimes called "more/less vivid" when the time reference of the conditional is future, as in (2).

(2) a. If Sue gets the measles, she'll have to miss the school play.  
    b. If Sue got the measles, she'd have to miss the school play.

The content of the "vividness" distinction, which appears only when the speaker is undecided about the truth value of the antecedent and indicative and subjunctive conditionals are otherwise paraphrases of each other, is notoriously difficult to specify precisely. This is not true of a second semantic distinction between indicative and subjunctive conditionals, namely that when the speaker takes for granted that the antecedent proposition is true, only an indicative conditional is possible (Karttunen and Peters 1979:8), while when she takes it for granted that the antecedent proposition is false, only a subjunctive is (loc. cit., Stalnaker 1975[1999]:71). Calling an antecedent whose speaker takes its truth for granted "factive" and one whose speaker takes its falsity for granted "counterfactual" (as in e.g. Stalnaker 1975[1999]:68), we can say that factive antecedents are indicative and counterfactual ones are subjunctive; as we have seen, open antecedents, those that are neither factive nor counterfactual, may in general be either indicative or subjunctive.

Below, we will see that the factive/counterfactual distinction can be unified with the temporal present/past distinction. Given the evidence of tense agreement phenomena, the feature that codes the present/past distinction is arguably a formal feature, one manipulated by the syntactic computational system. The factive/counterfactual distinction as well will thus be represented by a formal feature. Such a treatment, however, is less plausible for the vividness distinction, for which there is no reason to assume syntactic relevance. This suggests that the vividness distinction is represented by a purely semantic feature, one which plays no role in the syntactic computation. In the distinguishing between formal and purely semantic features, then, the grammatical framework adopted here makes available a natural mechanism for treating separately the factive/counterfactuality contrast, on the one hand, and the vividness distinction, on the other. I will take the goal of the paper to be the explication of factivity and counterfactuality and the connection of that contrast with the temporal present/past contrast, and I will have no more to say about the content of the vividness distinction.

We have seen that when an antecedent is open, it may be either indicative or subjunctive, and have noted that the subjunctive is marked with respect to the indicative in this situation. At the same time, however, we have claimed that the content of the distinction between open indicative and open subjunctive antecedents is expressed by a feature distinct from that which will be our central concern. For our purposes then, indicative and subjunctive morphology can be taken to vary freely with each other in a conditional antecedent about whose truth value the speaker is agnostic. Given that counterfactual antecedents must be subjunctive, it follows that subjunctive antecedents may be either counterfactual or open in interpretation. Thesis 4 concerns the relation between these two readings.

4. There is no semantic or pragmatic reason to treat either the open or the counterfactual reading of subjunctive conditional antecedents as primary or unmarked with respect to the other.
Historically, there is a strong tendency to take the counterfactual reading of a subjunctive conditional to be the primary one: linguists as well as philosophers have yielded to the temptation to use counterfactual rather than subjunctive as the term opposed to indicative in discussions of conditionals (McCawley 1981 350-351, 528ff.) or to associate the term counterfactual with a characterization of the environment of subjunctive conditionals (Iatridou 2000:248), and scholars have frequently felt the need to bring to their readers’ attention the fact that subjunctives need not be counterfactual (Karttunen and Peters 1979:4-6) or credit someone else with impressing this fact upon them (Stalnaker 1975[1999]:70 (fn.10), Edgington 1997:99). Most crucially, both philosophers and linguists have made explicit proposals that some general principle operates to generate a counterfactual interpretation on the basis of the subjunctive morphology itself: in a well-known passage, Lewis (1973:3) writes, “the counterfactual constructions of English do carry some sort of presupposition that the antecedent is false. It is some sort of mistake to use them unless the speaker does take the antecedent to be false, …”, and Iatridou (2000:248) proposes a mechanism by which a (cancelable) implicature of counterfactuality is associated with a subjunctive conditional.

Nevertheless, it has been known at least since Adams 1951 that subjunctive antecedents need not be counterfactual. The two most frequently cited kinds of case (see e.g. Stalnaker 1975[1999]:70-71) are the modus tollens argument form of (3a) below, which aims to prove the antecedent false, and the argument form of (3b), which is parallel to (3a) but aims to prove the antecedent true.

(3) a. If Sue had done it, we would expect to find her fingerprints on the murder weapon. But since we don’t, the murderer must have been someone else.
   b. If Sue had done it, we would expect to find her fingerprints on the murder weapon. So the fact that we do gives us good reason to believe that she was the murderer.

Perhaps even more natural than such cases, however, are those in which the context makes it clear that the speaker is looking for evidence likely to bear on the truth of the antecedent proposition, thus suggesting that she is at the moment agnostic about it. We have seen an example of this sort involving a past event in (1b) above; (4b) is a parallel example involving a present state, paired, like (1b), with its indicative counterpart.

(4) a. If Jim knows where the fugitives are, he may have told Sue. (Let’s go ask her.)
   b. If Jim knew where the fugitives are, he might have told Sue. (Let’s go ask her.)

Finally, it is possible to construct subjunctive antecedents that are more-or-less completely neutral between the two interpretations. In (5) below, for instance, there will be no hint as to whether the speaker considers the proposition of the antecedent a counterfactual or an open possibility if the sentence is presented out of the blue (assume that the speaker is dating Sue and jealous of Jim’s former relationship with her).

(5) If Jim and Sue had gotten together last week, do you think they would have behaved themselves?

The speaker, that is, may be convinced that a planned meeting between Jim and Sue did not materialize and be interested simply in the abstract question of whether he can trust them together, or he may be worried about the possibility that a meeting has actually taken place. In light of examples like (3)-(5), I will assume that there is no semantic or pragmatic priority of the counterfactual over the open reading of an arbitrary subjunctive conditional antecedent.

5. The differences in mode of evaluation between indicative and subjunctive conditionals discussed
by philosophers do not in fact correlate in general with the indicative/subjunctive morphological contrast; the semantic representation of conditional tense morphology therefore does not refer to any such difference.

In illustrating thesis 5, I will for the most part restrict myself to a single representative and well-known pair of examples, those of (6), modified from the originals of Adams (1970:90) (cf. Lewis 1973:3):

(6) a. If Oswald didn’t shoot Kennedy, someone else did.
   b. If Oswald hadn’t shot Kennedy, someone else would have.

It is widely observed that anyone assuming that Oswald acted alone in assassinating Kennedy will tend to affirm (6a) and deny (6b), and this contrast in assertability is typically taken to imply that indicative and subjunctive conditionals must have distinct modes of evaluation. It is not hard to show, however, that there is an unexamined interpretive asymmetry between the antecedents of (6a) and (6b), and that once this is controlled for, paired indicatives and subjunctives have parallel assertability conditions after all. It is also clear that the difference in assertability observed between the examples of (6) depends on the nature of the event involved, additional evidence that the assertability difference is not an automatic consequence of the indicative/subjunctive distinction.

Examples (6) share with many others typically adduced to show that indicative and subjunctive conditionals have distinct modes of evaluation the characteristic of having negative antecedents (Bennett (2003:7-8), in introducing the topic, cites three pairs, all negative). The understood scope of negation, however, is not the same in the two examples (Abbott (2004) also observes that two distinct senses of negation are involved): while the indicative antecedent of (6a) is interpreted as inviting us to consider the possibility that X shot Kennedy is false for X = Oswald but presumably true for some X ≠ Oswald, the subjunctive antecedent of (6b), as we will see below, is interpreted as inviting to consider the possibility that no event of the relevant type took place at all. This is the interpretive asymmetry such that, when we control for it, the apparent difference in mode of evaluation disappears.

That the scope of negation in Oswald didn’t shoot Kennedy is ambiguous is shown by the discourses in (7) (there are of course additional scope possibilities as well).

(7) a. I have news. Oswald didn’t shoot Kennedy. Ruby did.
   b. I have news. Oswald didn’t shoot Kennedy. The whole thing was staged.

Let us call the negation of (7a) "agent negation" and that of (7b) "event negation"; the negative operator presumably binds an event variable in the latter case but not in the former. The scopal ambiguity in question extends to indicative conditional antecedents, although the requirement that indicative antecedents be consistent with current assumptions, combined with the general assumption that Kennedy’s assassination did occur, results in a strong tendency to favor the agent-negation reading, as in (6a). With focus on the clausal head T, however, the availability of the event-negation reading is clear, as in (8a).

(8) a. If Oswald DIDN’T shoot Kennedy, Kennedy may still be alive today.
   b. If Oswald HADN’T shot Kennedy, Kennedy might still be alive today.

The antecedents of examples (8) are identical to those of examples (6), but have entirely parallel
assertability conditions: both are assertable just to the degree that one believes there to be no clear factor other than Oswald that would have precluded Kennedy’s living to the age of 88.

By controlling for the scope of negation, we have shown that conditionals based on the indicative and subjunctive antecedents of examples (6) need not have distinct assertability conditions or modes of evaluation. The antecedents of (8) show event negation; agent negation examples with parallel assertability conditions can be constructed as well. Consider the following scenario: following the assassination, an investigator has staked his reputation on the hypothesis that Oswald was the assassin, but after weeks of work, has not yet assembled conclusive evidence. Commenting on the situation, his assistant says either of (9).

(9) a. If after all this Oswald didn’t shoot Kennedy, we’ll really be up a creek, won’t we?  
    b. If after all this Oswald hadn’t shot Kennedy, we’d really be up a creek, wouldn’t we?

As in the case of examples (1), the subjunctive open conditional (9b) is marked with respect to its indicative counterpart, requiring the assumption that its speaker considers the antecedent proposition a marginal or negligible possibility (or is attempting to convey the impression that she does). The fact that aside from this difference the examples of (9) are in a paraphrase relation, however, shows again that indicative and subjunctive conditionals with the antecedents of (9) do not in the general case have distinct assertability conditions or modes of evaluation.

As we have noted, the antecedent of (6a) is normally interpreted as involving agent negation because of the requirement that an indicative conditional antecedent be consistent with current assumptions combined with the standard assumption that Kennedy was in fact assassinated. The antecedent of (6b), on the other hand, counterfactual for anyone assuming that Oswald did shoot Kennedy, is essentially impossible to interpret except as involving event negation. In verification of this, note that while (10a) (with focus on the agent intended to maximize the acceptability of agent negation) can be paraphrased by (10b), (11a) (itself acceptable only on the reading "hadn’t turned out to be" for hadn’t been) cannot be paraphrased by (11b).

(10) a. If the assassin wasn’t OSWALD, I wonder who it was.  (agent negation)  
    b. If OSWALD didn’t shoot Kennedy, I wonder who did.  (agent negation)

(11) a. If the assassin hadn’t been OSWALD, I wonder who it would have been.  (agent negation)  
    b. If OSWALD hadn’t shot Kennedy, I wonder who would have.  (*agent negation)

It is the fact that the scope of negation is understood differently in (6a) and (6b), then, that leads to the impression that indicative and subjunctive conditionals are evaluated in distinct ways.

Finally, there is another necessary condition for the apparent difference in mode of evaluation, one concerning the nature of the event that the conditionals of (6) are about. Note that, in contrast to Oswald didn’t shoot Kennedy, which of course presupposes no event of shooting, the negative Jim didn’t win presupposes, as much as the corresponding affirmative, an event in which, other things being equal, somebody did win. As a result, the event negation interpretation that we observed with if Oswald hadn’t shot Kennedy is not seen with if Jim hadn’t won. In contrast to the situation in (11), the sentences of (12) are paraphrases of each other, and in contrast to the situation in (6), the sentences of (13) have entirely parallel assertability conditions.

(12) a. If the winner hadn’t been JIM, I wonder who it would have been.  
    b. If JIM hadn’t won, I wonder who would have.
(13) a. If Jim didn’t win, someone else did.
    b. If Jim hadn’t won, someone else would have.

We see again, then, that the difference in assertability or mode of evaluation between (6a) and (6b) is not a simple function of the indicative/subjunctive distinction, but depends on a large number of factors. The complexity of Goodman’s problem is clear.

2. Two Empirical Criteria

In presenting the five theses of section 1, we have narrowed our subject considerably: in investigating the semantics of indicative and subjunctive conditionals, we will be considering the tense morphology of conditional antecedents, setting aside mood morphology (i.e. the subjunctive proper) and consequent clauses, which do not reliably distinguish the two types. Semantically, we will abstract away from the “vividness” distinction that differentiates otherwise synonymous indicative and subjunctive conditionals when the speaker is agnostic about the antecedent. Finally, we have claimed that there is no asymmetry between the counterfactual and open readings of subjunctive antecedents to be accounted for and noted that the differences in mode of evaluation that are often associated with indicative and subjunctive conditionals in the philosophical literature bear only an indirect relationship to the morphological contrast we are concerned with. In this section, we will examine the two empirical facts about conditional tense morphology that I claim any convincing account must capture, namely the coincidence with temporal tense morphology and the overlapping distribution the two types display with respect to the speaker’s assumptions regarding the proposition of the antecedent. We will start with the latter topic.

2.1 The Overlapping Distributional Pattern

There is general agreement that, as we have assumed so far, the interpretive contrast between subjunctive and indicative conditional antecedents relates to what the speaker assumes regarding the truth value of the antecedent proposition—that is, whether the speaker “regards” (Karttunen and Peters 1979:4) or “take[s]” (Lewis 1973:3) that proposition to be true, false, or indeterminate in truth value. Before looking more closely at the nature of this speaker assumption, let us summarize the data we have seen thus far concerning how the content of that assumption relates to the morphological form of the conditional antecedent.

As we observed in the discussion of thesis 3 above, when the speaker takes for granted that the antecedent proposition is true (i.e. when the antecedent is factive), only an indicative conditional is possible, while when she takes it for granted that the antecedent proposition is false (i.e. when the antecedent is counterfactual), only a subjunctive is. When she is agnostic about the truth value of the antecedent proposition, finally (i.e. when the antecedent is open), either the indicative or the subjunctive is possible. Abbreviating assumption of truth by “+”, assumption of falsehood by “−”, and the agnostic state by “0”, this distribution can be summarized as in (14), where the range of each morphological form is represented by a solid horizontal line (function is used loosely in (14), since the overlapping distribution means that there is in fact no function from assumed truth value to morphology).

(14) Subjunctive and Indicative Antecedent Morphology as a Function of Assumed Truth Value

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<tbody>
<tr>
<td>Subjunctive</td>
<td>-</td>
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<tr>
<td>Indicative</td>
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If there is anything controversial about (14), it is the top middle cell, that corresponding to subjunctive open antecedents. The existence of subjunctive open antecedents with future time reference is widely acknowledged; thus Lewis (1973:4) cites the fact that "subjunctive conditionals pertaining to the future, like 'If our ground troops entered Laos next year, there would be trouble' ... appear to have the truth conditions of indicative conditionals" as the primary reason for calling his monograph "Counterfactuals" rather than "Subjunctive Conditionals" ((2b) above is a parallel example). By his explicit mention of future time reference, Lewis invites the reader to infer (via the Gricean maxim of Quantity) that he believes there to be no subjunctive open conditionals relating to the present or the past. Such is not the case, however, as we have seen: subjunctive open conditionals with present and past time reference appeared above as examples (4b) and (1b), respectively; these are repeated here as (15).

(15) a. If Jim knew where the fugitives are, he might have told Sue. (Let's go ask her.)
    b. If they had gotten married before they left town, there ought to/should/might/could be a record of it at the courthouse. (Let's go see if there is.)

Such examples can be multiplied at will.

We have, of course, noted that subjunctive open conditionals are marked with respect to their indicative counterparts. Observing that the semantics of the relevant distinction are difficult to specify and unlikely to submit to unification with the temporal meaning of tense morphology, however, we have attributed the semantic content of this markedness to a feature separate from the one that captures the factive/counterfactual distinction; as a result, we are taking the distribution pattern of (14) at face value. It is worth noting that for the morphological representatives of what we are provisionally assuming to be the two values of a single inflectional feature, the overlapping distribution of (14) is unexpected and perhaps unique. A comparable situation would arise if there were contexts allowing, say, either past or nonpast (temporal) tense morphology or either first person or second person agreement morphology. To my knowledge, however, such situations are unattested. The distribution of (14) is thus a distinctive property of conditional tense morphology, and must be considered one of the central facts to be accounted for by an analysis of the semantics of that morphology.

Let us close this section by considering the nature of the speaker assumption whose correlation with indicative and subjunctive morphology is displayed in (14). In particular, let us ask whether this assumption is appropriately considered a presupposition of the morphology in question, in the sense that a linguistic element e presupposes proposition p i f f e can be used felicitously only in contexts whose common ground entails p (cf. Chierchia and McConnell-Ginet 2000:352, 361; alternatively, we could speak of speaker presupposition, identifying the latter with membership in the common ground (Stalnaker 1999[1975]:67)).

Taking up first the subjunctive, consider a speaker who asks "If Bush had been re-elected, would you be happy?" in a context where it is part of the common ground that Bush was in fact re-elected. The factive (since assumed true) subjunctive antecedent of this utterance is clearly infelicitous, and its use produces the perceived truth-value gap that is one of the traditional hallmarks of presupposition failure. That a conditional antecedent is not factive, then, is indeed a presupposition, in the sense introduced above, of subjunctive morphology. On the other hand, we noted in connection with example (5) above that a subjunctive antecedent may be entirely neutral between the two remaining possibilities—that is, between open and counterfactual readings. This means that in the general case, the "assumptive state" of the speaker with respect to the antecedent proposition, rather than being tied to the conversational context, is an internal state inaccessible
to others.

Parallel comments hold of the indicative. Assuming again that Bush’s re-election is part of the common ground, the question “If Bush wasn’t re-elected, will you be happy?”, with a counterfactual indicative antecedent, is infelicitous. On the other hand, if you walk into a room and hear someone saying, “If the concert is at seven, we have to leave in ten minutes”, you will be unsure whether the speaker has just found out that the concert is at seven and is taking that for granted or is still in doubt about whether that is the correct time. Again, then, the assumption of the speaker concerning the truth value of the antecedent is not in general accessible to her interlocutors and cannot be considered a presupposition in the sense defined earlier. Below, I will continue to use the term “assumption” for the speaker attitude in question on the understanding that we are concerned with an internal cognitive state. The speaker’s assumption concerning the truth value of the antecedent proposition typically reflects the speaker’s belief state but may of course instead represent a stance that is contrary to belief but convenient for purposes such as politeness, persuasion, or irony.

2.2. The Temporal Meaning of Tense Morphology

The second central empirical fact that we are assuming must be accounted for by any analysis of conditional tense morphology, one that provides an important clue as to the meaning of that morphology and sharply restricts the space of plausible analyses, is that morphology’s strictly temporal function. Unless we assume that conditional and temporal tense morphology are unrelated homophones of each other, it will be incumbent upon us to propose an analysis of the former that can be integrated with what we know about the latter. In this section, I will summarize the assumptions I will make about the strictly temporal interpretation of tense morphology, for the most part following the well-known exposition of Reichenbach (1947:287-298).

Reichenbach’s theory of tense has two major characteristics that will be important to us here. The first is that it generalizes to all tenses the temporal reference point R, patently necessary for the interpretation of the past and future perfect because it is distinct in those tenses both from speech or speaker time (S) and from event(uality) time (E). The second is that it interprets absolute tense (past or future) as expressing the relationship between S and R and relative tense (anterior or posterior) as expressing the relationship between R and E (Reichenbach 1947:297). The relationship between S and E, in contrast, is not taken to correspond to any linguistic category, and is claimed by Reichenbach (1947:296) to be “usually irrelevant” (but see Johnson 1981 on Kikuyu).

These two points can be illustrated by the following examples. First consider (16), where the (a) sentence is minimally different from the (b) sentence in including perfect *have*.

(16) a. At three o’clock, Jim will have finished writing the letter.

     b. At three o’clock, Jim will finish writing the letter.

The increment of meaning added by *have* is that $E < R$ (i.e. the time of finishing precedes three o’clock); in its absence, as in (16b), E and R are interpreted as simultaneous. *Will*, common to the two examples, might appear to situate E in the future with respect to S, so that $S < E < R$, but when we reflect that (16a) is actually consistent with E’s being in the past with respect to S (Comrie 1981:26), it becomes clear that this cannot be the case: the meaning of *will* is not $S < E$, but $S < R$. With *have* establishing $E < R$ and *will* establishing $S < R$, the temporal relation between E and S is left undefined, as is appropriate.
Similarly, we must take the meaning of past tense in the examples of (17) to be that R (and not E) is in the past with respect to S.

(17) a. At three o'clock, Jim had finished writing the letter.
    b. At three o'clock, Jim finished writing the letter.

This is because, given that *have* in (17a) again means E < R, if past tense meant E < S, the temporal relationship between R and S would be left indeterminate, like the temporal relationship between E and S in (16a). Since the interpretation of (17a) entails that R < S, however, this is impossible. Past tense must mean R < S, so that E < R < S in (17a); E < S follows in this case from the transitivity of the precedence relation.

Tense morphology, then, appears to express the relationship between R and S. If this true in general, R must be present whenever a tense is. There are other reasons to assume the generality of R: Reichenbach’s best-known argument (1947:290 (fn.1)) is that R clarifies the distinction between the simple past and the present perfect, in both of which E < S. Specifically, R coincides with E in the simple past and with S in the present perfect, as confirmed by the adverb possibilities of examples (18) on the assumption that an adverbial element associates with R in the unmarked case.

(18) a. Jim finished *now/yesterday.
    b. Jim has finished now/*yesterday.

Hornstein (1990:90–103 and *passim*) further argues for R as a crucial component of a universal theory of tense. Below, as indicated, I will assume that R, like S, is an element of any tense, and that temporal tense morphology concerns the relationship between those two elements. I will also assume, following Iatridou (2000:246), that the core temporal meaning of tense morphology is nondirectional—that is, that it abstracts away from the asymmetry of the flow of time. More specifically, I will take the core meaning of the marked member of a tense opposition to be simply that R is distinct from S. If we assume further, following Comrie (1985:50), that the range of a natural language tense must be continuous, the distinctness of R from S will mean either that R precedes S (past tense) or that R follows S (future tense); the disjunctive possibility “R either precedes or follows S” will be excluded. The variation between [±Past] and [±Future] contrasts in the languages of the world is then naturally attributed to a parametric choice.

In closing this section, let us look a little more closely at the nature of S and R. R is a reference time by virtue of the fact that relative tense (e.g. English *have*) orients the eventuality time E, otherwise temporally unanchored, with reference to R. But the deictic element S is the ultimate temporal anchor of the clause, and is also a reference time in that absolute tense orients R with respect to S. More specifically, while R is a speaker-external reference time, S is a speaker-associated or speaker-internal reference time. It is important here to note that in the general case, S is not associated with the speech act itself; narration of past events in the historical present shows that S is rather associated with the speaker in the sense of narrative role (for discussion and exemplification, see Hornstein 1990:11–12). Below, I will refer to S and R, respectively, as “internal reference time” and “external reference time”.

3. Previous Accounts of Conditional Tense Morphology

In the present section, we will turn to explicit proposals concerning the meaning of that morphology. We will look at three such proposals, those of Stalnaker 1975, Karttunen and Peters 1979, and Iatridou 2000, concentrating on whether they meet our two standards of empirical adequacy, ability to capture
the overlapping distribution of (14) and possibility of unification with the strictly temporal meaning of tense morphology.

Stalnaker's proposal is made against the background of two definitions and one pragmatic principle, which I paraphrase in (19)-(21).

(19) Context Set (CS): the set of "possible worlds not ruled out by the presupposed background information." (1999[1975]:67)

The context set, in other words, is the set of epistemically accessible worlds relative to the "presumed common knowledge ... of the participants in the discourse." (1999[1975]:67)

(20) Selection Function: \( f(p, W_0) \rightarrow W \) (function from ordered pairs of propositions and worlds to worlds), where \( W \) is the closest world to the reference world \( W_0 \) in which \( p \) is true.

In the typical case, \( p \) will be the proposition of a conditional antecedent and \( W_0 \) will be the real world; \( W \) will then be the closest antecedent world, the one relevant to evaluation of the conditional.

(21) Principle: if \( W_0 \in CS \), then \( W \in CS \) when possible

Principle (21) says that if the reference world is epistemically accessible, the closest antecedent world should be epistemically accessible as well.

Given (19)-(21), Stalnaker characterizes subjunctive morphology as "a conventional device for indicating that presuppositions are being suspended, which means in the case of subjunctive conditional statements, that the selection function is one that may reach outside of the context set." (1999[1975]:70) The meaning of subjunctive conditional morphology, in other words, is that the closest antecedent world may be epistemically inaccessible, in violation of principle (21). It follows that with indicative conditional morphology, (21) is inviolable: the closest antecedent world must be epistemically accessible. Abbreviating "closest antecedent world" as "CAW", the relative distribution of indicative and subjunctive conditionals according to Stalnaker's account is as in (22).

(22) Distribution of Subjunctive and Indicative Conditionals by Epistemic Accessibility of CAW (Stalnaker 1975)

<table>
<thead>
<tr>
<th>Subjunctive</th>
<th>CAW Accessible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicative</td>
<td></td>
</tr>
</tbody>
</table>

Let us now evaluate how Stalnaker's account fares with regard to our two standards of empirical adequacy. With regard to distribution, (22) captures a large part of the information expressed in (14) and is by that measure relatively successful (while it does not differentiate between the two subcases of "closest antecedent world epistemically accessible" corresponding to our "open" and "factive", I will not pursue that point here). Stalnaker does not of course deal with temporal tense morphology, but it is nevertheless possible to evaluate his account in terms of its potential for unification with what we know about that morphology. In this regard, it must be said that because of its possibility operator may, the formulation "the closest antecedent world may be epistemically inaccessible" would seem a weak candidate, not only for unification with an account of temporal tense morphology, but for the expression of a formal feature more generally. The hypothesis that
some piece of natural language morphology could express a meaning like "reference time may (or may not) precede speaker time" or "the object may (or may not) be second person", that is, can probably be excluded in principle.

Let us move to our second account, that of Karttunen and Peters 1979. The strong and weak points of this account are roughly parallel to those of Stalnaker's: Karttunen and Peters capture the distribution of (14) in full detail, but they do it with two features or parameters rather than one, precluding any straightforward unification with an account of temporal tense morphology. Where A is the proposition of the conditional antecedent, Karttunen and Peters' two parameters are "A is epistemically possible" and "¬A is epistemically possible", where "A proposition p is epistemically possible just in case its negation does not logically follow from the set of propositions which are regarded as true." (1979:8) These parameters are held to characterize "indicative mood" and "subjunctive mood", respectively, so that, abbreviating "epistemically possible" as "EP", the distribution of the two conditional types with respect to Karttunen and Peters' two parameters is as in (23).

(23) Distribution of Subjunctive and Indicative Conditionals by Epistemic Possibility of Antecedent (Karttunen and Peters 1979)

- | + | + | + | [ A EP]
+ | + | + | - | [¬A EP]

Subjunctive Indicative

Examination of the three cells of (23) reveals that that diagram is a notational variant of our (14): when A is not epistemically possible for the speaker and ¬A is, A will be counterfactual, as we have characterized the term; when both A and ¬A are epistemically possible, A will be open; and when A is epistemically possible and ¬A is not, A will be factive.

As in the case of Stalnaker's account, while Karttunen and Peters do not touch on temporal tense morphology, it is immediately apparent that there is little hope for a unified treatment in terms of their parameters. This is because there is no obvious way to combine those parameters, and either one of them individually will encounter the problem that we identified for the parameter of Stalnaker. In particular, "A is epistemically possible" is essentially equivalent to Stalnaker's "the closest antecedent world is epistemically accessible", so that differentiation of indicative and subjunctive along these lines will require us to say that the subjunctive is consistent with (but does not require) a negative value for this parameter, while theindicative is inconsistent with a negative value. Differentiating subjunctive and indicative conditionals in terms of the parameter "¬A is epistemically possible", on the other hand, will encounter a mirror image of the same problem: in this case, the indicative will be consistent with (but not require) a negative value, while the subjunctive will be inconsistent with a negative value.

The third and final account of conditional tense morphology we will consider is that of Iatridou (2000). In contrast to those of Stalnaker and Karttunen and Peters, Iatridou's account is specifically designed to capture the common semantic elements of temporal and conditional tense morphology, and we will see that on the conceptual level, it is apparently successful in that project. The question we will want to concentrate on, then, is how it fares with respect to the distributional pattern of (14).

With respect to temporal tense morphology, Iatridou (while not referring to Reichenbach) adopts
a variant of the Reichenbachian framework in which R is characterized as "topic time" (Klein 1994). Interpreting speaker time, topic time, and eventuality time as sets, she then hypothesizes that while temporal tense morphology concerns the relations among these three sets of times, conditional tense morphology (her "fake past") concerns the relations among three corresponding sets of possible worlds. The sets in question are (a) the set of worlds epistemically accessible to the speaker, corresponding to speaker time (see Iatridou 2000:247 (fn.21)); (b) the set of all worlds in which the proposition of the conditional antecedent is true, corresponding to eventuality time; and (c) the proper subset of (b) consisting of the maximally "local" antecedent worlds, those that differ minimally from the actual world, corresponding to topic time (for the latter two sets, see Iatridou 2000:248). Iatridou’s (2000:246) hypothesis about the meaning of tense morphology, temporal and conditional, is then that the marked value of this morphology (temporal past or conditional past = "subjunctive") realizes a feature value whose interpretation is that topic X excludes speaker X, where X ranges over times and worlds. (Below, I assume a feature \([±\text{Excl}}(\text{usional})]\) for this interpretation; Iatridou writes "ExclF".)

Conceptually, Iatridou’s hypothesis has many appealing features. At the same time, however, her characterization of temporal and conditional tense morphology in terms of set-theoretic exclusion (disjointness) would appear to raise an empirical problem: since \([±\text{Excl}]\) morphology (past/subjunctive) will be licensed when topic X and speaker X are disjoint and \([-\text{Excl}]\) morphology (present/indicative) will be licensed when topic X and speaker X are overlapping, the two types of morphology will be predicted to be in complementary distribution as a function of the feature in question. In the case of temporal tense morphology, this prediction is borne out: past tense morphology appears when topic time and speaker time are disjoint (in particular, when the former precedes the latter), and present tense morphology appears when topic time and speaker time overlap. In the case of conditional tense morphology, however, we have seen abundant evidence that the two types of morphology are not in complementary distribution with respect to the parameter counterfactual/open/factive, as well as noting that this fact is reflected in the analyses of Stalnaker (1975) and Karttunen and Peters (1979). Let us take a more detailed look at the distribution of subjunctive and indicative conditionals with respect to this parameter that is predicted by Iatridou’s proposal.

The epistemic status of the antecedent proposition p is mirrored in Iatridou’s framework by the relation between speaker worlds (epistemically accessible worlds) and eventuality worlds, or p-worlds. When the antecedent proposition p is counterfactual, first of all, no p-world will be epistemically accessible; speaker worlds and eventuality worlds will be disjoint. Since topic worlds are a subset of eventuality worlds, speaker worlds and topic worlds will be disjoint as well. Disjointness of speaker worlds and topic worlds is the meaning of \([±\text{Excl}]\), the specification whose morphological realization is the past tense morpheme. When p is counterfactual, then, only subjunctive conditionals will be licensed.

Let us next consider what morphology will be licensed when p is open. In this case, both p-worlds and non-p-worlds will be included in the set of epistemically accessible worlds; similarly, both worlds that are epistemically accessible and worlds that are not will be included in the set of p-worlds. The sets of speaker worlds and eventuality worlds, then, will overlap, but neither will include the other. Where will the topic worlds, the maximally close p-worlds, be situated under these assumptions? The open status of p, again, means that at least some p-worlds will be epistemically accessible. But if any p-worlds are epistemically accessible, those that are maximally close to the actual world should be. This suggests that when p is open, the topic worlds will be included in the speaker worlds.
We can verify this conclusion by asking how it could fail to be true. The only way for a world not to be epistemically accessible is for some proposition that is true in it to be counterfactual—that is, contrary to speaker assumption. What proposition of a topic world could be counterfactual when the antecedent proposition $p$ is open? $p$ is non-counterfactual by hypothesis. Nor can any entailment of $p$ be counterfactual, since by modus tollens, $p$ would then be counterfactual as well. But apart from $p$ and (by implication) its entailments, topic worlds are defined as being maximally similar to the actual world. This means that no proposition other than $p$ or an entailment thereof that is true in a topic world can be counterfactual either. The topic worlds must then be epistemically accessible, with the result that speaker worlds and topic worlds will overlap. And since overlapping of speaker worlds and topic worlds is the meaning of $[-\text{Excl}]$, the specification whose morphological realization is "present tense", it follows that when $p$ is open, only indicative conditionals will be licensed.

When $p$ is factive, finally, every epistemically accessible world will be a $p$-world, and speaker worlds will form a proper subset of eventuality worlds. Topic worlds, in turn, will form a proper subset of speaker worlds by the reasoning of the last paragraph, and, as in the case where $p$ is open, only indicative conditionals will be licensed.

Our conclusions concerning (a) the relationships among the speaker, topic, and eventuality worlds of Iatridou’s system and (b) the distribution of subjunctive and indicative conditionals thereby predicted are summarized graphically in (24) and (25), respectively; both the relationships among the three types of worlds and the distribution of the two types of conditionals are expressed as functions of the epistemic status of the antecedent proposition. In (24), speaker, topic, and eventuality worlds are abbreviated as "W(s)”, “W(t)”, and “W(e)".

(24) Relationships Among Speaker, Topic, and Eventuality Worlds (Iatridou 2000)

\[
\begin{array}{c|c|c}
\text{a. } p \text{ counterfactual} & \text{b. } p \text{ open} & \text{c. } p \text{ factive} \\
W(s) & W(e) & W(t) \\
W(s) & W(e) & W(t) \\
W(s) & W(e) & W(t)
\end{array}
\]

(25) Predicted Distribution of Subjunctive and Indicative Conditionals (Iatridou 2000)

\[
\begin{array}{c|c|c|c}
\text{CF} & \text{Open} & \text{Factive} \\
+ & - & - \\
\text{Subjunctive} & \text{Indicative} & W(s) \cap W(t) = \phi
\end{array}
\]

We see, then, that Iatridou’s account of the semantics of conditional morphology has the opposite problem to that displayed by the accounts of Stalnaker (1975) and Karttunen and Peters (1979): while it presents an attractive characterization of the element of meaning common to conditional and strictly temporal tense morphology, it fails to capture the overlapping distribution of subjunctive and indicative conditionals documented here and reflected in the two other accounts. In section 4 below, our task will be to propose an analysis of the meaning of tense morphology that meets these two empirical conditions simultaneously.
In this section, we will see that a simple account of conditional tense morphology that meets both of the empirical criteria presented in section 2 is attainable. After establishing conditional counterparts of the temporal reference points R and S, we will examine the mechanism by which the form-meaning correspondence is realized for both kinds of tense morphology.

Let us abbreviate "internal reference time" and "external reference time" as "RTi" and "RTe", respectively. The temporal meaning of marked tense morphology (i.e. /d/) is then "RTi ≠ RTe" (alternatively, [RTi ≠ RTe] = 1), while the temporal meaning of unmarked tense morphology (i.e. φ ~ /z/) is "RTi = RTe" (or [RTi ≠ RTe] = 0). In pursuing the goal of establishing a conditional counterpart of this temporal meaning, let us abstract away temporarily from the overlapping distributional pattern of (14) and consider only the semantic range over which marked and unmarked conditional tense morphology are in complementary distribution—the range, that is, defined by the antecedence proposition p being non-open for the speaker. Over this range, the conditional meaning of marked tense morphology is "counterfactual", and the conditional meaning of unmarked tense morphology is "factive". What we need to ask, then, is whether there are entities associated with a conditional sentence if p, q that are naturally interpretable as speaker-external and speaker-internal standards or reference points and for which counterfactuality represents their distinctness and factivity their identity.

In fact, it is intuitively clear that the assumption represented by the antecedent clause if p, on the one hand, and the speaker's own assumption concerning (the truth value of) p, on the other, fit these requirements quite closely. Concerning the latter, we noted at the outset that a speaker may assume that p is true, assume that it is false, or (in the possibility that we are temporarily abstracting away from) make no assumption concerning p's truth value. Concerning the former, we may note that the intuition that if p introduces an assumption is reflected rather directly in standard accounts of the meaning of conditionals. For example, Kratzer's (1991:648) principle of semantic interpretation for conditionals takes the form (26), where f is the modal base (= "epistemic conversational background" (Kratzer 1991:644)), a function that assigns to a world the set of propositions known or assumed in that world, and g is an ordering source, a distinct conversational background that establishes a partial ordering, according to degree of accessibility, of the worlds accessible from w.

\[
\text{(26) } [\text{if } \alpha, \text{must } \beta f,g = [\text{must } \beta f,g, \text{ where for all } w \in W, f'(w) = f(w) \cup \{ [\alpha] f,g \} }
\]

In (26), if is treated as syncategorematic: while its presence affects the interpretation of the conditional sentence as a whole, it is not itself assigned a semantic value. It is clear, however, that the interpretive effect of the conditional clause if a is that [α] is added to f(w), the set of propositions assumed in w. In Kratzer's formulation, in other words, if functions to identify its syntactic complement, the proposition of the conditional antecedent, as an assumption.

I will assume, then, that in if p, q, if p establishes an "external reference assumption" concerning the truth value of the antecedent proposition p that is suitable for comparison with the "internal reference assumption" of the speaker with respect to the truth value of that proposition. By analogy with the abbreviations "RTi" and "RTe" for internal and external reference time, let us designate the assumption of the speaker with regard to p as "RAi(p)" and that of the antecedent clause as "RAe(p)". Again by analogy with the temporal case, we then expect the conditional meaning of marked tense morphology to be Ri(p) ≠ RAe(p) (or [RAi(p) ≠ RAe(p)] = 1) and the conditional meaning of unmarked tense morphology to be RAi(p) = RAe(p) (or [RAi(p) ≠ RAe(p)] = 0). And over the semantic
range we are considering, that over which \( p \) is non-open for the speaker, this expectation is borne out: over this range, as we have noted, the conditional meaning of marked tense and morphology is "counterfactual" and the conditional meaning of unmarked tense morphology is "factive"; these correspond precisely to \( [RA_i(p) \neq RA_e(p)] = 1 \) and \( [RA_i(p) \neq RA_e(p)] = 0 \), respectively.

How can the above account be extended to the case in which \( p \) is open? Since \( p \)'s being open means that the speaker is agnostic about \( p \), \( RA_i(p) \) will be nonexistent or undefined in this case. As a result, \( [RA_i(p) \neq RA_e(p)] \) will be undefined as well. Just as we say neither that two people disagree about the truth of proposition \( p \) nor that they agree about it when only one of them has an opinion concerning \( p \), in other words, \( RA_i(p) \) and \( RA_e(p) \) will be neither distinct nor identical when there is no \( RA_i(p) \). Below, I will express the undefined status of \( [RA_i(p) \neq RA_e(p)] \) by writing "\( [RA_i(p) \neq RA_e(p)] = \# \)", using the standard symbol for the third truth value of a three-valued propositional calculus.

Given that both marked ("subjunctive") and unmarked ("indicative") tense morphology are possible when the antecedent proposition is open for the speaker, the morphosemantic correspondences that we are postulating for conditional tense morphology can be shown as in (27), where I use \( \phi \) as the representative of unmarked tense morphology, abstracting away from the variation between \( \phi \) and third person singular /z/.

(27) Form-Meaning Correspondences for Conditional Tense Morphology

\[
\begin{array}{c|c}
/d/ & [RA_i \neq RA_e] = 1 \\
& [RA_i \neq RA_e] = \# \\
\phi & [RA_i \neq RA_e] = 0
\end{array}
\]

On the basis of (27), we might expect that the meaning of both marked and unmarked conditional tense morphology would take the form of a disjunction, and if the interpretations in question were to be associated with the morphemes /d/ and \( \phi \) as lexical properties, this conclusion would presumably be inescapable. The syntactocentric model of grammatical description referred to in the introduction, however, will allow us to pursue the hypothesis that the association of the interpretation \( [RA_i \neq RA_e] = \# \) with both members of the morphological opposition is the result of a default mechanism and need not be specified in the lexical representations of the relevant morphemes, clearly a more desirable position if it can be maintained. Specifically, I will assume, in accordance with the discussion of formal features (FF) in section 1 (thesis 3) above, a feature \([D(istinct)]\) which can remain unvalued in addition to assuming the values "+" and "-" and which mediates between the morphological and semantic elements of (27) as indicated in (28).

(28) Form-Meaning Correspondences for Conditional Tense Morphology as Mediated by FF \([D]\)

\[
\begin{array}{c|c}
/d/ & [+D] [RA_i \neq RA_e] = 1 \\
& [D] [RA_i \neq RA_e] = \# \\
\phi & [-D] [RA_i \neq RA_e] = 0
\end{array}
\]

(While lack of a value is assumed to correlate with uninterpretability in the framework of Chomsky 2001, and an unvalued feature that reaches an interface is assumed to cause a crash, I will assume that nothing bars an interface interpretation being specified for an unvalued feature, and that no problem arises if such an interpretation is available.)
According to (28), there are two sets of correspondences to specify, those between the values of \([D]\) and the indicated semantic interpretations, on the one hand, and those between the values of \([D]\) and the indicated morphophonological forms, on the other. Regarding the former, let us assume that the interpretation \([RA_i \neq RA_e] = 1\) is associated with the specification \([+D]\) by an interface interpretive rule and that the interpretations for \([-D]\) are the result of general conventions for the interpretation of \([F]\) and \([-F]\) given an interpretation for \([+F]\), where \([F]\) is an arbitrary feature). Regarding the latter, more detailed comment is in order.

With Halle and Marantz (1993, Halle 1997), I will assume that phonological features are added to the terminal nodes (TNs) of syntactic representations (at least insofar as inflectional morphology is concerned) by an operation of vocabulary insertion that takes place in the morphological component. A vocabulary item (VI), correspondingly, consists (at least) of a phonological representation and a representation, in terms of morphosyntactic features, of permissible environments for insertion. Insertion of VIs into TNs is governed by the Subset Principle, whose two goals are to ensure that (a) VI can be inserted into TN only when the set of feature values specifying VI’s environment is a subset of TN’s set of feature values; and (b) when multiple VIs satisfy (a), the one inserted is that whose overlap with TN’s feature values is greatest.

The hypothesis on which we are proceeding is that the association of both /d/ and \(\phi\) with the interpretation \([RA_i \neq RA_e] = #\) in (27) is the result of a default mechanism rather than the result of lexical specification. In terms of the correspondences of (28), what this means is that association of /d/ and \(\phi\) with the unspecified feature \([D]\) results from a default mechanism, and that those morphemes need only to be specified for insertion into terminals having the specifications \([+D]\) and \([-D]\), respectively. On this hypothesis, the vocabulary items corresponding to these two morphemes will be as in (29).

\[(29)\]
\[
a. /d/ \leftrightarrow [+D] \\
b. \phi \leftrightarrow [-D]
\]

We have said that the first requirement of the Subset Principle is that a vocabulary item VI can be inserted into a terminal node TN only when the set of feature values specifying VI’s environment is a subset of TN’s set of feature values. On this basis, TNs that include the specification \([+D]\) will accept only the vocabulary item (29a), and TNs that include the specification \([-D]\) will accept only the vocabulary item (29b). Our goal is to predict the insertability of both of those items into a node that includes unspecified \([D]\).

The desired result may be obtained in terms of the following version of Halle’s (1997:428) Subset Principle (see also Halle and Marantz 1993:121-122; for the notion of distinctness appealed to in (30a), see Chomsky 1965:81):

\[(30)\]
\[
a. Vocabulary item VI is a candidate for insertion into terminal node TN iff VI’s environment is nondistinct from a (proper or improper) subset of the features of TN. \\
b. Candidate VI for insertion into terminal node TN is a winning candidate iff no other candidate matches TN in more feature values than VI does.
\]

Since the environments of both (29a) and (29b) are nondistinct from the feature \([D]\), both vocabulary items will be candidates for insertion into a node containing that feature. And since neither matches \([D]\) in more feature values than the other (they both match in zero values), both will be winning candidates as well. In effect, (30) provides that when a TN includes a morphosyntactic feature that lacks a specification, a VI specified positively for that feature and a VI specified
negatively for it will be in free variation as realizations of that TN.  (In the present case, while free variation is not strictly observed, we are attributing departures from it to a separate feature that, unlike the formal feature \([D]\), is purely semantic.)

It is in this way, then, that licensing of both types of tense morphology when the feature \([D]\) is unspecified can be explained without writing the environment "\([D]\)" into either of the vocabulary items in question. Since \([D]\) means that \([\text{RA}_i \neq \text{RA}_e]\) is undefined, and since the only way for this to obtain is for \(\text{RA}_i\) to be undefined, the association of both types of tense morphology with the situation in which the speaker is agnostic about the truth of \(p\), as indicated in (27) above, will be guaranteed.

We have said little so far in this section about temporal tense morphology. Above, we claimed that the interpretation \([\text{RA}_i \neq \text{RA}_e]\) = 1 is associated with the specification \([+D]\) by an interface interpretive rule, but outside of conditional clauses, the interpretation of \([+D]\) will in fact be the temporal correlate \([\text{RT}_i \neq \text{RT}_e]\) = 1—in Reichenbachian terms, the distinctness of \(R\) from \(S\). This does not mean, however, that we can say that (conversely) if forces the conditional interpretation of \([+D]\) to the exclusion of the temporal one (Ippolitou 2004:368)—after all, if \(\text{Jim had money}\) is ambiguous, out of context, between a “past indicative” and a “present subjunctive” reading. Rather, since conditional clauses are finite, and since the head \(T\) of every finite clause bears a temporal tense specification, either \([+D]\) or \([-D]\), the \(T\) of a conditional clause will have two values of \([D]\), a conditional tense specification in addition to the temporal one. In what can be seen as an instance of the Agree operation of Chomsky 2000, the temporal tense specification of \(T\) agrees with a temporal adverb, so that if \(\text{Jim had money yesterday}\) is interpreted as past indicative and if \(\text{Jim had money right now}\) is interpreted as present subjunctive. There is reason, in other words, for keeping the two tense specifications separate; let us assume, taking literally the “layer” metaphor employed in this context by Iatridou (2000) and others and adopting the feature layering formalism of Anderson (1992:94), that when temporal and conditional tense specifications co-occur on \(T\), they occupy inner and outer layers, respectively, of a complex feature (specification). Since conditional \([D]\) occurs unvalued as well as with a positive or negative specification, there will be six possibilities for such a complex feature, listed with sample realizations in (31).

(31) a. \([[-D] -D]\) if Jim has money     d. \([[+D] -D]\) if Jim had money (then)
b. \([[-D] +D]\) if Jim had money (now)     e. \([[+D] +D]\) if Jim had had money
c. \([[-D] D]\) if Jim has money     f. \([[+D] D]\) if Jim had money (then)
    if Jim had money (now)                    if Jim had had money

The semantic interpretation of the six items of (31) is straightforward: in the presence of an “internal” (i.e. inner layer) specification for the same feature, \([+D]\) is interpreted with the marked value \(A\) of the variable \(X\) in the interpretation schema \([\text{RX}_i \neq \text{RX}_e]\) = 1 (i.e. conditionally/modally); otherwise it is interpreted with the unmarked value \(T\) of that variable (i.e. temporally). On the morphophonological side, the central fact is that in spite of the double specification for \([D]\) displayed by the items of (31), no clause ever shows double tense morphology, whether of the marked or the unmarked variety. “Readjustment rules” are thus needed at some point in the transition from the syntax to the morphology; these turn out to be independently motivated.

One of the readjustment rules necessary converts a \([+D]\) specification to perfect have in the presence of another \([+D]\) specification, resulting in the past perfect, as in (31e). This is a general rule of English morphology, responsible, for example, for converting the embedded past tense of (32a) to the past perfect of (32b) when the (optional) rule shifting an embedded clause to past tense in agreement with the past tense of a matrix clause is applied.
a. Jim says that City Hall was rebuilt last year.

b. Jim said that City Hall had been rebuilt last year.

The second readjustment rule needed can be seen to be exemplified in (32) as well, since if tense agreement can apply in (32b), there would seem to be no principled reason for excluding its application in (32a). On this account, the embedded T of (32a), in addition to the [+D] specification it bears in agreement with the adverb last year, optionally bears a [-D] specification in agreement with matrix T. The latter, of course, has no phonological reflex, and more generally, [-D] has no phonological reflex in the presence of another specification for that feature. The relevant readjustment rule, then, can be formulated as "freely delete [-D]", with the qualification that it may apply only once to any given syntactic terminal. This rule will apply to the four representations (31a-d), leaving [-D] in (31a), [+D] in (31b) and (31d), and unspecified [D] in (31c).

The only apparent problem with the account of "readjustment" in (31) based on the two rules just proposed is posed by (31f), since before vocabulary insertion it will be indeterminate which of the two readjustment rules needs to apply to that terminal. I will therefore assume that the readjustment rules in question operate subsequent to vocabulary insertion (but before elimination of morphosyntactic features), freely deleting φ in association with any value for [D] (in practice, negative or null) and converting /d/ in association with [+D] to have in the presence of a /d/ that is, similarly, associated with any value for [D] (in practice, positive or null). According to this revision, then, readjustment operates as much in terms of concrete morphological material as in terms of the associated feature specifications.

The aim of this section has been to show that a simple account of conditional tense morphology that meets both of the empirical requirements introduced in section 2 is attainable. The requirement that an account allow a unified treatment of the semantics of conditional tense morphology and the semantics of temporal tense morphology has been met by showing that both interpretations of the specification [+D], realized as the marked tense morpheme /d/, are expressible as instances of the schema $\{RX_1 \neq RX_2\} = 1$, where setting $X = A$ gives the conditional interpretation and setting $X = T$ gives the temporal interpretation (the interpretations of [-D] and unspecified [D] were claimed to be derivable from that of [+D] by general convention). The requirement that an account capture the overlapping distribution displayed by subjunctive and indicative conditionals as a function of speaker assumption has been met by showing that the association of both marked and unmarked tense morphology with unspecified [D] can be seen as the result of a default mechanism, allowing a maximally simple statement of the morphosyntactic environment into which the tense morphemes in question are inserted (see (29) above). The goal set for the paper at the outset, then, has arguably been achieved.

5. Conclusion

Theories of semantics can be divided into those according to which meanings of linguistic expressions are speaker-internal cognitive representations and those in which meanings are speaker-external items to which the linguistic expressions are held to refer (for an illuminating introductory discussion, see Chierchia and McConnell-Ginet 2000:11-17). Following Jackendoff (1996) and ultimately Chomsky (1986), let us call semantic theories of the first sort "I-semantics" and semantic theories of the second sort "E-semantics". It is arguable that a full understanding of meaning will have to incorporate both I-semantic and E-semantic considerations. Nowhere is this clearer, perhaps, than in the area of conditionals. From the outset, we have distinguished our I-semantic topic, namely the morphosemantics of the distinctive "tense" morphology of conditional
antecedents, from "Goodman's problem", the E-semantic project of determining the truth or assertability conditions of conditionals, coextensive with the problem of elucidating (dis)confirmation and natural law. There is no question that a great deal of the meaning of conditionals, in the broadest sense of the term, lies in the domain of E-semantics; even the limited consideration we have been able to give to the relevant issues in thesis 5 of section 1 is sufficient to suggest why philosophers have always found the most interesting problems involving conditionals to lie in this area.

While E-semantic issues are clearly central to the investigation of conditionals in the broadest sense, one of the themes of the present paper has been that they can be sharply separated from the I-semantic problem we have considered here. Thus, while the philosophical literature distinguishes two types of conditionals in terms of their truth or assertability conditions and identifies the split in question with the indicative/subjunctive distinction, we saw in thesis 5 of section 1 that the two oppositions fail to correlate in the general case, leading to the conclusion that the assertability condition split plays no role in the semantics of conditional tense morphology. Similarly, while the concept "closest antecedent worlds" has been central to an analysis of conditional truth conditions since Stalnaker 1968 and Lewis 1973 and is presumably a crucial component of an answer to Goodman's problem, its range of applicability does not correlate with the set of conditional sentences, and we have not appealed to it here: on the one hand, closest antecedent worlds are not relevant to the evaluation of conditionals that express exceptionless generalizations (If an applicant was over 18, she was admitted); on the other, the same considerations that motivate appeal to closest antecedent worlds in accounting for the truth conditions of a conditional (e.g. If you come any closer, I'll shoot) are relevant as well to equivalent non-conditional formulations (Stay back or I'll shoot). In conclusion, I would like to suggest that the separation of I-semantics from E-semantics and pragmatics that we have observed here probably constitutes a productive research strategy not only in the area of conditionals but more generally. Only time will tell, of course, whether that hypothesis can be maintained.

References


McCawley, James. 1993. *Everything that Linguists have Always Wanted to Know about Logic but were Ashamed to Ask*, 2nd. ed. Chicago: University of Chicago Press.


