

As Time Goes By: Tense and Universal Grammar

Norbert Hornstein

(University of Maryland)

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This book consists of an analysis, solidly within the framework of Government and Binding, of tense and its interaction with adverbials, temporal connectives, and complementation. There is both good news and bad news about the book; parts of it are carefully worked out and are therefore a valuable resource for the computational linguist, while other parts are less clearly argued.

Like much current GB literature, Hornstein takes the goal of linguistic research to be the discovery of the nature of the innate language capacity; this is, of course, a laudable goal. Unfortunately, however, the argument that is presented takes a form that will no doubt prove bewildering to many. The argument, which pervades the book and forms the backbone of its first few chapters, resembles other arguments that have been presented within the same framework: a list of sentences is presented, some ungrammatical and starred; a formal model (one of many possible formal models) of some aspect of the structure of these sentences is presented, with rules for determining ill-formedness in the model and predicting ungrammaticality in the corresponding string; an argument is made that the nature of the formal model is such that it could not be acquired on the basis of primary data available to the child; and the claim is then made that the formal model that has been presented is (in fact, must be) a part of the innate linguistic competence that humans possess.

There are several problems with this sort of argument. First, there are often a number of nonequivalent formal models that are consonant with the same set of data. Some of these models are more appealing than others; coming up with one model that covers the data does not in itself constitute proof that that particular model is the one that is innate and should be adopted. Indeed, an appeal to innateness has an insidious consequence: it essentially obviates the need for criteria for distinguishing between possible formal models of the same data. If any formal model can be claimed to be part of the innate language apparatus, there is no need to search for a simpler or cleaner or more parsimonious model than the one that has been proposed; any model is as good as any other, since all models can be innate.

Second, the assumptions that are necessary to the claim that the model is unlearnable are not always thoroughly substantiated. In particular, Hornstein claims that "of the data theoretically available to the child, it is likely that only the *simple* sentences can be absorbed. . . . The child. . . is limited to an informationally restricted subset of the potentially relevant data" (p. 2). This claim is made without citation of substantiating psycholinguistic or language acquisition literature; Hornstein stipulates, in effect, that the system he proposes is innate since it could not be learned on the basis of the subset of data he admits as relevant.

Hornstein presents a 'neo-Reichenbachian' analysis of tense, by which he means past, present, and future tense as well as perfect aspect; other questions of the treatment

of aspect (in particular, progressive aspect) are not treated. The analysis resembles Reichenbach's in assuming a S(peech), R(eference), and E(vent) time for all tenses and in specifying the relations among these times in terms of two basic relations, one between the S and R times and one between the R and E times; a direct relation between S and E is not specified but can often be inferred. Hornstein spends some time justifying this position; surprisingly, although numerous references to Reichenbach's work are made throughout the book, no reference is made to his proposals on this point, in which just such an innovation was proposed (Reichenbach 1966, pp. 296ff).

The first chapters of the book are devoted to an exposition of the particular model of tense phenomena chosen by Hornstein. This model uses a single formal representation to encode two kinds of information: the semantic interpretation of tense, and the compatibility of main and subordinate clause tenses. This is a central point of the first few chapters: Hornstein speaks of "an opacity between the syntax of the system and its temporal interpretation," claiming that "the relationship between the syntax of tense and its temporal interpretation is not perfectly transparent. In other words, temporal interpretation is underdetermined by syntactic structure within this domain." The syntactic structure of which Hornstein speaks is the syntax of the formal model of tense that he proposes; unlike the Reichenbach model, this structure encodes more than just the meaning of the corresponding sentence. To take a specific example, the tense representation "S,R,E" indicates that the S, R, and E times are simultaneous; the representation "R,E,S" also encodes this information, but is nevertheless taken to be distinct from the first.

In particular, what is encoded over and above sentence meanings is intended to determine restrictions on combinations of tenses of main and subordinate clauses, both complements and adverbial clauses; as Hornstein points out, **John arrived before Bill will arrive* describes a plausible, semantically coherent situation, and the reason for its deviance must be unconnected to its interpretation. Tense compatibility is determined by drawing lines between elements of the representations of main and subordinate clauses and forbidding crossing lines; essentially, tenses are compatible if their S and R points appear in the same order. Additional restrictions forbid a situation where two points that are assumed to be temporally ordered are also required to be simultaneous by virtue of the associations between the two clauses. These rules encode, for example, the restriction that past tense main clauses are incompatible with future tense subordinate adverbial clauses, as in the example above.

Unfortunately, though the predictions made by this model are largely correct, incorrect predictions are also made; in particular, Hornstein predicts that future and future perfect subordinate clauses are possible with future or future perfect main clauses, though in fact these configurations are ungrammatical (**John will arrive after Bill will leave*). Though the system he proposes works well for cases in which the subordinate clause is not future or future perfect, these incorrect predictions make the system as it stands a poor candidate for inclusion in a natural language processing system; the incorrect predictions also make it a poor candidate as a model of the innate human language apparatus.

Another failing is that only portions of the wide range of available literature on the subject of time and tense have been cited. In particular, the work of Bennett and Partee (1978) rates only a footnote, and no mention at all is made of the work of Hinrichs (1986, 1987), Mathiessen (1984), Moens and Steedman (1987), Carlota Smith (1978), or Bonnie Webber (1987), or to the papers in Tedeschi and Zaenen (1981).

This said, it should be noted that there are many sections of the book in which solid and innovative claims are made and substantiated. The claim of Chapter 1 that preverbal modifiers modify the R point, while postverbal adverbs modify the E point

is interesting and well substantiated by the data Hornstein provides, including examples containing deictic adverbs such as *today* in contrast with non-deictic adverbs such as *a week ago*. Chapter 2 provides an analysis of the semantics of several temporal connectives, including *before*, which is argued to have both a factual and a counterfactual interpretation.

Chapter 4, on sequence-of-tense phenomena in complement clauses, provides a very clear treatment of sequence-of-tense. The separation of the phenomenon into its morphological and semantic aspects provides a description that is simpler than can be given on an account that does not make this separation. The analysis of infinitivals as lacking an S point and of gerunds as lacking S and R points is also well motivated.

Finally, the book has not been edited well. There are many annoying but harmless typographical errors and missing words (pp. 32, 68, 69, 96, 108, 112, 113, 161, 189); additionally, though, there are more confusing cases of incorrect references to numbered examples (pp. 21, 59, 98, 123, 144, 158).

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