

**ADVERBIAL SUBORDINATE CLAUSES IN ENGLISH**

by

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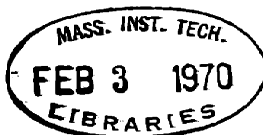
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## ABSTRACT

In this study, it is shown that adverbial where-, when-, and while- clauses are relative clauses whose antecedents have been deleted, that clauses introduced by before, after, until, and since are relative clauses whose antecedents and relative pronouns have both been deleted, but that if- and unless- clauses are noun complements. Thus, the traditional analysis that such clauses constitute a grammatically unique class of complement constructions and that words like where, before, and if are subordinating conjunctions is incorrect.

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## CHAPTER 1

## Introduction

In this study, I provide a syntactic analysis of Adverbial Subordinate Clauses in English. Some examples of sentences containing such clauses, with an indication of the classes they fall in, are given in (1) - (12) below.

## I. Independent Relative Clauses

## A. Clauses Introduced by Relative Pronouns

- (1) John lives where Harry said he did.
- (2) John will leave when Harry does.
- (3) John slept while Harry did the dishes.

## B. Clauses Introduced by Time Prepositions

- (4) John left before he said he would.
- (5) John will leave after Harry telephones.
- (6) John will study until Harry finishes the dishes.
- (7) John has lived here since he began graduate school.

## II. Nominal Complements

- (8) John will leave if Harry does.
- (9) John will leave unless Harry does.
- (10) John left because the beer ran out.
- (11) John smokes pot although he prefers beer.
- (12) John studied hard for he wants to pass.

According to most Traditional and Structuralist linguists, sentences like (1) - (12) consist of a main clause and a subordinate adverbial clause introduced by a conjunction. It is easy to see though that use of the term "conjunction" in this context is not at all appropriate. According to Curme (1947:29) "a conjunction is a word that joins together sentences or parts of a sentence: Sweep the floor and dust the furniture. He waited until I came". But, of course, until "joins together" the sentences he waited and I came quite differently from the way and "joins together" sweep the floor and dust the furniture. In the first place, until plus the clause it "introduces" are constituents of the predicate of the main clause. Thus he waited and I came are not co-constituents in Curme's example. Constituents conjoined by and, on the other hand, are always co-constituents. In the second place, and plays no internal grammatical role in either clause of conjoined sentences. But, as (13) shows, the possibility of occurrence of until as a "conjunction" is in part a function of the nature of the main verb of the main clause.

- (13) a. I waited until Harry arrived.  
 b. \*I arrived until Harry arrived. <sup>1</sup>

Some grammarians, of course, were aware of the difficulties with a definition like Curme's. Sonnenschein

(1916:par. 58) provides the following definitions:

- (1) A co-ordinating conjunction is a word used to connect parts of a sentence which are of equal rank.  
 (2) A subordinating conjunction is a word used to connect an adverb-clause or a noun-clause with the rest of a complex sentence.

The grammarian Sweet is even clearer about the distinction between co-ordinating and subordinating conjunctions. Sweet (1892:149 - 150) writes:

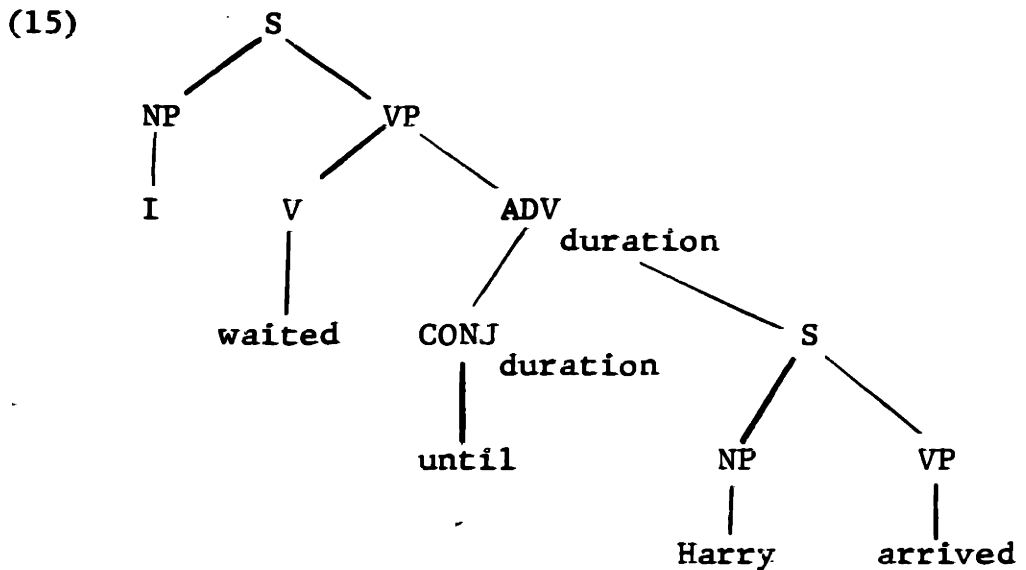
426. We have seen that such a conjunction as and does not logically subordinate the word or sentence it introduces to what goes before. Thus in such a sentence as he is tall and strong, strong is as much a predication - element as tall, neither adjective being, from a logical point of view, subordinated to the other, so that we can transpose them without affecting the sense: he is strong and tall. We call such conjunctions COORDINATIVE conjunctions, or, more shortly, CO-CONJUNCTIONS.  
 427. A SUBORDINATIVE conjunction, or SUB-CONJUNCTION, on the other hand, makes the word or sentence it introduces into a logical adjunct to what precedes. Thus the sub-conjunction if in if it is fine, I will go makes it is fine into an adjunct to I will go, and we cannot snift if from one clause to the other, as we could and, without altering the sense or making nonsense.

In an early Transformational study, Hall (1964) formalized the traditional analysis of adverbial subordinate clauses by postulating that English has phrase structure rules of the form

$$(14) \quad \text{ADV}_{\underline{x}} \quad \dashrightarrow \quad \text{CONJ}_{\underline{x}} \quad \text{S}$$

where x serves to indicate the type of adverbial and conjunction in question. According to this view, (13a) would have the underlying structure (15).





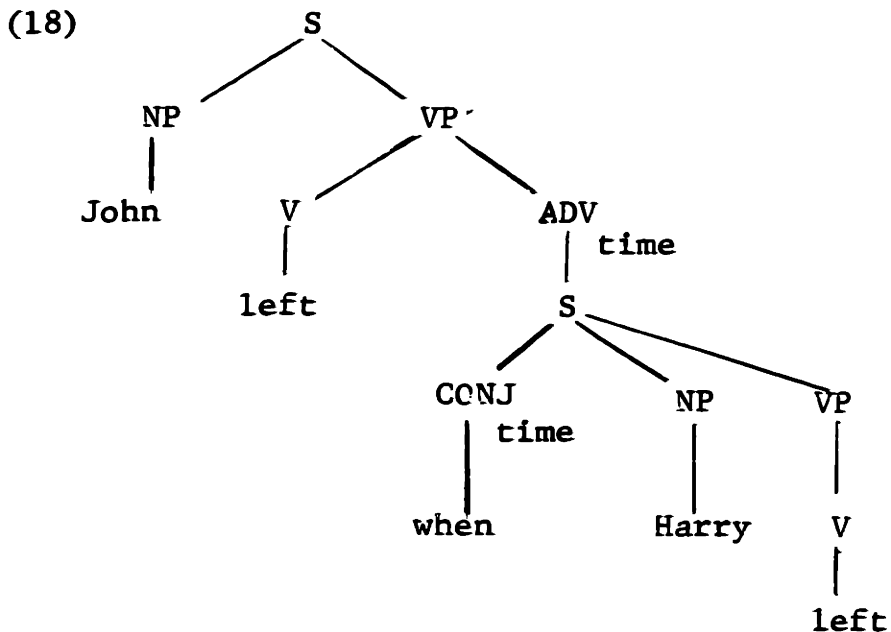
For any of the "conjunctions" of (4) - (12), such a surface structure (if we ignore details of labeling) is plausible. In the case of until, as the a and b forms of (13) serve to indicate, such an analysis is supported by the fact that the possibility of occurrence of until is governed by the main verb of the main clause. In light of this, it makes sense to say that until is a constituent of the main clause. Such a parsing is further supported by the fact that the clause introduced by until can be pronominalized, an indication that it constitutes a constituent. Consider, for instance, the sentence

(16) I waited until Harry arrived and Joe waited until then too.

(Why the adverbial then occurs as the pronominal reflex of until - clauses is, of course, a mystery,

given analysis (15)). However, if we take (16) as evidence in favor of parsing (15), we shall have to take (17) as evidence that when is a constituent of the clauses it introduces, that is that the left conjunct of (17) has the structure of (18).

(17) John left when Harry left and Joe left then too.



(Co-occurrence evidence parallel to (13) would support either a parsing like (15) or like (18)). Traditional grammarians either did not notice or were not bothered by such considerations.

While traditional grammarians did call such words as where, until, and if conjunctions when they occurred in sentences like (1) - (12), they were by no means unaware of their similarity to grammatically mere basic

occurrence of these words. Locutions like "where is a relative adverb used as a conjunction" or "before is a preposition used to introduce a clause" abound in the literature. In a particularly interesting and, I think, insightful passage, Jespersen (1961 II:15) writes:

1.18 The term "CONJUNCTION" is regularly used of such words as because, that, after, when they serve to introduce a clause and connect it with the rest of the sentence, and we may retain that term, though we cannot count conjunctions as a special "part of speech", but must look upon them as adverbs in a special function, namely that of having a clause as their object. We do not call believe one part of speech when it has no object, another when it has a word as object, and a third when it has a clause as its object; neither should we do so with after, as the cases are really parallel; compare for instance:

- (1) I believe in a Supreme Being / Jill came tumbling after.
- (2) I believe your words / Jill came tumbling after Jack.
- (3) I believe that you are right / he came after we had left.

Compare also: (They have lived happily) ever since / ever since their marriage / ever since they were married.

In this passage, Jespersen is clearly saying that subordinating conjunctions play no systematic role in grammar. His argument is, if I understand it, based on two considerations. The first is that there are no formal -- I interpret him to mean merely "inflectional" by his use of "formal" -- differences between adverbial, prepositional, and conjunctive occurrences of words like after and since. The second,

a somewhat more speculative interpretation, is that he views the role played by prepositions -- he would say adverbs -- in adverbial phrases to be exactly parallel to that played by verbs in verb phrases. There is, I think, a good deal to be said for such a point of view, as we shall see in Chapter 4 below.

In this study I shall show that within the framework of transformational grammar, subordinating conjunctions play no systematic role. I shall show that where, when, and while are relative pronouns in sentences like (1), (2), and (3). By this I mean that (1) - (3) are derived in essentially the same way that (19) - (21) are derived, with the difference that a rule of Antecedent Deletion deletes the heads of the relative clauses of (1) - (3).

(19) John lives at the dormitory where Harry said he did.

(20) John will leave at the moment when Harry does.

(21) \*John slept during the time while Harry did the dishes.<sup>2</sup>

I shall further show that before, after, until, and since in sentences like (4) - (7) occur at an abstract level of structure with objects -- the clauses these prepositions introduce are relative adjuncts to their (ultimately deleted) objects. By this I mean that (4) - (7) are derived in essentially the same way that (22) - (25) are derived, with the difference that

Antecedent Deletion and a rule of Relative Pronoun Deletion apply in the derivation of (4) - (7).

- (22) John left before the moment at which he said he would.
- (23) John will leave after the time at which Harry telephones.
- (24) John will study until the moment at which Harry finishes the dishes.
- (25) John has lived here since the day on which he began graduate school.

I shall go one step further in my analysis of sentences like (4) - (7) and (22) - (25). There is evidence of a syntactic nature that before and after are derivative of underlying compared adjectives. This evidence points to the view that (22) and (23) (and derivatively (4) and (5)) are derived in essentially the same way as (26) and (27), respectively.

- (26) John left at a moment which was earlier than the moment at which he said he would leave.
- (27) John will leave at a moment which is later than the moment at which Harry telephones.

I shall further argue that until and since are derived from verbs semantically like end and begin, respectively.

According to this analysis, sentences (24) and (25) (and, derivatively, (6) and (7)), are derived from structures like (28) and (29), respectively.

- (28) John will study for all the time which ends at the moment at which Harry finishes the dishes.
- (29) John has lived here for all of the time which

began on the day on which he began graduate school.

Although I am convinced that the adverbial clauses of (8) - (12) do form a class, distinct from these of (1) - (7) in all but the superficial respect that some relatively exotic word or phrase seems to "introduce" them, I shall provide a detailed analysis of only if- and unless-clauses. I shall show that the widely accepted view that unless is the "negative counterpart" of if is untenable on syntactic grounds. Instead, I shall show that (8) and (9) are derived from structures similar to (30) and (31), respectively.

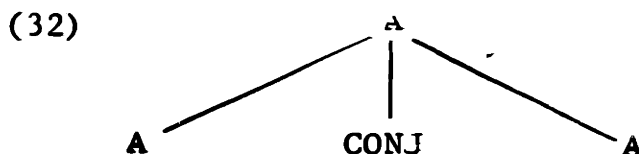
(30) John will leave in the event that Harry does.

(31) John will leave in any event other than that Harry leaves.

I shall argue that if is derived from an adverbial like in the event and that unless is derived from an adverbial like in any event other than. It is, moreover, clear that clauses introduced by if and unless (and those of (10) - (12)) are not relative clauses, but, instead, are nominal complements. It is the demonstration that the clauses of (1) - (7) and (8) - (12) are special cases of two different types of complement constructions which constitutes the final ruination of the traditional analysis of adverbial subordinate clauses.

My arguments, if sound, are of two-fold theoretical

significance. In the first place, they lead us to the conclusion that the categorial vocabulary made available by linguistic theory does not include the category "Conjunction", or, if we wish to say that and or or is dominated by the category Conjunction, that linguistic theory contains a constraint that conjunctions occur only in co-ordinate structures, i.e., structures like (32).



This result thus serves to limit the class of grammars of natural languages.

The traditional analysis of adverbial subordinate clauses, including Jespersen's, implies that such clauses constitute a special class of complement constructions -- a special way of forming complex sentences. My analysis, on the other hand, is that where-, when-, and while-clauses and clauses introduced by before, after, until, and since are special cases of the independently motivated class of restrictive relative clauses, and that clauses introduced by if and unless are special cases of the independently motivated class of nominal complements. Thus, the second consequence of my analysis is that linguistic theory need

contain no provision for an otherwise unmotivated class of complement constructions (which would be notable more for its irregularities than its regularities) in order to account for adverbial subordinate clauses.

At the present time, there is a considerable difference of opinion among transformational grammarians concerning the nature of the relationship between syntax and semantics. In Chomsky's original conception of transformational grammar, Chomsky (1957), it was argued that syntax is autonomous of semantics. Later studies, notably Katz and Fodor (1964), Katz and Postal (1964), and Chomsky (1965), refined and articulated this fundamental theoretical assumption until the following picture of the organization of grammar emerged: there exists a set of context-free phrase structure rules which provides an infinite class of underlying syntactic structures which contain all of the categorial (and, derivatively, all of the functional) information required for semantic interpretation, a set of syntactic transformations which map underlying syntactic structures onto surface syntactic structures, a lexicon which contains all of the idiosyncratic syntactic, semantic, and phonological information for each word in the language, a set of semantic rules which map underlying syntactic structures with lexical



items inserted onto a set of semantic structures which represent the meaning(s) each sentence of the language has, and a set of phonological rules which map surface syntactic structures onto phonetic representations. It was necessary, in order to guarantee that all semantic information be determined by rules operating only on underlying syntactic structures with lexical items included, that transformations be "meaning preserving". This model of grammar I shall call the "Aspects" theory.

In Chomsky (1965), it was supposed that selectional relations are syntactic. Given this point of view, arguments based on selectional information were sufficient to justify certain kinds of decisions about underlying syntactic structure. We note, for illustration, that the verb annoy exhibits the same selectional relations in each of the following pairs of sentences.

(33) (a) John was annoyed at the girl.

(b) The girl was annoying to John.

(34) (a) \*The rock was annoyed at the girl.

(b) \*The girl was annoying to the rock.

Since there are no categorial differences between the a and b forms of (33) and (34), one must rely on selectional information to establish a transformational relationship between them. Although, initially, evidence such as that provided in (33) and (34) was construed as

evidence of a direct transformational relationship (cf. G. Lakoff (1965)) it is now clear that all one can legitimately infer is that the verb and subjects of the a and b forms of (33) must be identically represented at the point co-occurrence relations are stated (cf. Postal (1969:37)) -- at the level of underlying structure in the case of the Aspects theory.

Since the publication of Chomsky (1965), McCawley (1968) has shown that selectional relations are semantic. Given such a demonstration, we are forced to adopt either of two postures with respect to the basic assumption that syntax is autonomous of semantics. We may maintain this assumption with the result that shared selectional relations cannot serve as the basis for inferences about underlying syntactic similarities. Instead, one must, I think, opt for the view espoused in Chomsky (to appear (a), to appear (b)) that the selectional relationship exhibited by (33) and (34) should be dealt with by a lexical redundancy rule. Alternatively, we may reject the assumption that syntax is autonomous of semantics and continue to allow evidence from shared selectional relations to serve as the basis for inferences about underlying similarities. However, underlying structures can no longer be construed as purely syntactic. Adoption of the latter alternative quite naturally leads to the point of

view of generative semantics (cf. G. Lakoff (to appear)) a model in which the phrase structure rules generate an infinite class of semantic structures; and lexical items are inserted after certain transformations have applied -- perhaps after the operation of the rules in the transformational cycle.

This study originated within the framework of the standard theory, but, as long ago as 1964, it became clear to me that my results did not make such sense within a framework in which lexical insertion takes place at the level of underlying structure. The following issue presented itself. There is evidence of a purely syntactic nature which shows that before and after are derived from underlying compared adjectives. Comparatives are, of course, very poorly understood, but at least this much seemed clear: to say that before and after are inserted in base trees is to say that they are not formed by the syntactico-morphological rules --- among them might be the rule that turns more than ADJ into more ADJ than -- which all other comparatives are formed by. Thus, while the view that before and after are comparatives would seem to lead to an insightful simplification of the grammar with respect to formulation of the rule (restricted to comparatives) that deletes all traces of verbal elements in comparative clauses, as

in (35), it would seem to lead to an un insightful complication of the syntactico-morphological comparative rules.

(35) (a) John is bigger than Mike.

(b) John wrote his thesis before Mike.

A way out of this dilemma would be to say that before is a suppletive variant of earlier than. But it seems strange to suppose that before actually replaces earlier than, for all that would really be changed by such a rule is the phonological representations of the two formatives. A third point of view is that at the level of underlying structure, neither early nor before are inserted. Instead, there exists only a phonologically neutral syntactice - semantic adjective element. It is to structures containing this phonologically neutral adjective that the syntactice - morphological comparative rules and the comparative deletion rule involved in the derivations of (35) apply. Subsequent to the application of these rules, early and before are inserted in base trees.

In what follows, I adopt the point of view of generative semantics, for I find the results obtained within this framework insightful and productive. I trust that this study will vindicate my adoption of this theoretical framework.

## FOOTNOTES

1. I shall use asterisks to indicate deviance from full syntactic or semantic well-formedness.

2. In some dialects, while-clauses can occur in surface structure with explicit antecedents, but not in most. I discuss this problem in Chapter 3 below.

## CHAPTER 2

## Relative Clauses and Noun Complements

The central claims of this study are that adverbial subordinate clauses do not constitute a special class of complement constructions and that the notion "subordinating conjunction" is of no systematic grammatical significance. I shall argue, instead, that adverbial clauses fall into two independently motivated classes of complement constructions -- relative clauses (clauses introduced by where, when, while, before, after, until and since) and noun complements (clauses introduced by if and unless, and, but I will not argue this, because, although, in order to, etc.). I shall further argue that these so-called subordinating conjunctions have diverse (synchronic) origins. Where, when, and while are relative pronouns; before and after are derivative of underlying compared adjectives; until and since exhibit properties which suggest that they may originate as aspectual verbs like end and begin, respectively; and if and unless are realizations of underlying conditional adverbials.

My analysis of clauses introduced by where, when, and while is essentially that given within the trans-

formational framework by Lees (1960) and Kuroda (1968) and by many traditional grammarians for what-clauses like that found in (1).

(1) What John swallowed made him sick.

According to Lees the what-clause of (1) is a variant of the explicitly relative which-clause of (2).

(2) That which John swallowed made him sick.

Kuroda, who accepted the essential correctness of the analysis given by Lees, argued that the morphological alternation what-which -- to Kuroda, an indefinite - definite distinction -- is to be accounted for by supposing that an indefinite noun phrase underlies both what and which and that there exists a Definitization Rule that, in the presence of an antecedent (at a relatively superficial level of syntactic representation), definitizes the indefinite noun phrase underlying which.

Most traditional grammarians recognized the relative character of what-clauses like that found in (1). However, they disagreed quite strongly about the correct analysis of such clauses. The analysis of what-clauses closest to that given by Lees is given by Sonnenschein. He writes (Sonnenschein 1916: par. 94):

In analyzing sentences containing 'what' or 'who' without an antecedent it is convenient to supply an antecedent, in order to show what the construction is. Thus the sentence 'What I have written I have written' is to be analyzed as consisting of the clauses

'what I have written' (subordinate clause) and 'that I have written' (main clause). In this construction 'what' is equivalent in meaning to 'that which', and those words may be substituted in analysis. -- In this way the difference between a relative pronoun and an interrogative pronoun introducing a dependent question may be clearly shown. For example, in the sentence 'Give me what you have bought', what means that which, and is therefore a relative pronoun; but the sentence 'Tell me what you have bought' means 'Tell me the answer to the question what have you bought?'; here what is an interrogative pronoun.

My interpretation of this passage is that the possibility of substituting that which for what is Sonnenschein's motivation for the claim that the what-clause of What I have written I have written is a relative clause, but that he did not hold the view that what is a suppletive variant of that which in such a sentence. Instead, I feel that he should be taken quite literally as meaning that the analysis of this sentence is as given in (3).

(3) That  $\left[ \begin{array}{c} \text{what I have written} \\ S \end{array} \right] \begin{array}{c} \\ S \end{array}$  I have written.

Such an analysis would, of course, presuppose the existence of an Antecedent Deletion Rule of the type I shall be proposing.

Against Sonnenschein's analysis, Jespersen (1961 III:54) writes:

.... isn't it rather strange that the antecedent which is understood, namely that, cannot, as a matter of fact, be put before what: if we use that we must let it be followed by which, not by what, but this



alters the whole grammatical structure of the combination. In par. 96 he (= Sonnenschein -- Geis) speaks of whoever, etc.: These words, too, generally have no antecedent expressed -- I should rather say: never. Sonnenschein says that whoever = 'anyone who', but it is impossible to introduce this 'antecedent' before whoever in Sonnenschein's example and say: Anyone whoever wanted to go went.

Jespersen has completely failed to understand the abstract character of Sonnenschein's analyses. The latter grammarian obviously knew that sentences like (4) and (5) are not grammatical English.

(4) \*That what I have written I have written.

(5) \*Anyone whoever wanted to go went.

Sonnenschein was not proposing that (3) is a paraphrase of (6): he was proposing that (3) is its analysis.

(6) What I have written I have written.

If Jespersen failed to understand the abstract character of Sonnenschein's analyses, the latter grammarian failed to appreciate the consequences of providing them. He makes no reference to the necessity of an Antecedent Deletion Rule, nor does he attempt to explain, as Kuroda has, why which must have an antecedent in surface structure, while what must not.

The grammarian Sweet provides an analysis of relative what-clauses which is quite different from that given by Sonnenschein. Sweet (1892:81 - 82) writes:

It sometimes happens that the antecedent to a relative noun-pronoun is not expressed either by a noun-word or a sentence, the relative itself doing duty for the antecedent as well. Such a relative is called a CONDENSED RELATIVE. Only who and what are used as condensed relatives, what being the more frequent of the two in this use. The clause introduced by a condensed relative precedes, instead of following, the principal clause: what you say is quite true; what I say I mean; what is done cannot be undone; who(ever) said that was mistaken. In the first of these sentences the condensed relative what is the object of the verb say in the relative clause, and is at the same time the subject of the verb is in the principal clause, while in the second sentence it is the object in both clauses, and in the third sentence it is the subject in both clauses.

In the case of Sweet, Jespersen's criticism is more to the point. Jespersen (1961 III:55) writes:

The other view is taken by Sweet, who repudiates the idea of ellipse and calls these pronouns condensed relative pronouns, because what unites the grammatical functions of the two words something and which (why not rather that and which?). But it is not correct to say, as Sweet does, that in "what you say is true" what is at the same time the object of say and the subject of is, for if we ask "What is true?" the answer will not be what, but what you say.

Although Jespersen does not say so, the principle underlying his criticism of Sweet is that if a noun phrase is given as the answer to a wh-question, it must be a well-formed noun phrase serving the same grammatical function as the wh-word. Thus, such noun phrases as Godel's incompleteness theorem, the claim that John is a pot-head, or what you say are all

felicitous answers to the question What is true?, but what is not. What this means to Jespersen, and I think he is right, is that what you say, not what, must be the subject of the declarative What you say is true, since what you say, but not what, is a felicitous answer to the corresponding question What is true?

What, then, is Jespersen's position? -- the only rational alternative left, namely, that the relative clause as a whole serves as the subject of a sentence like (6). Jespersen's argument is that what in (6) serves a grammatical function only in the clause it introduces. It is, in particular, the object of the subordinate occurrence of write. And, having dispensed with the hypothesis that such clauses have an "understood" antecedent, there is really no choice but to say that what I have written is, as a whole, the subject of (6).

Within the framework of transformational grammar, it is possible to resolve the controversy between Sonnenschein, Sweet, and Jespersen in a straightforward way. Let us consider the superficially similar sentences (7) and (8).

(7) I realize what John devoured.

(8) I cooked what John devoured.

In two important respects, (7) and (8) are identical. In the first place, note that what follows what in

each of these sentences does not constitute a fully grammatical sentence. We cannot say

(9) \*John devoured

but (10) is acceptable.

(10) John devoured an egg.

And, while (9) can be embedded as a what-clause,

(10) cannot.

(11) \*I realize what John devoured an egg.

(12) \*I cooked what John devoured an egg.

It would, of course, be desirable if the clauses that comprise a complex sentence were to exhibit the same selectional and strict-subcategorization relations in complex sentences as they do in simple sentences, for this would permit a single statement of these relations. Such a principle would force the view that devour is transitive in the underlying structures of (7) and (8), as well as in the underlying structure of (10). How are we going to account for the absence of the object of devour in the surface structures of (7) and (8)? The most reasonable proposal is to suppose that the object of devour in these sentences has been moved to clause-initial position and converted into what. Presumably, the same rule (to be referred to hereinafter as WH-Movement) affects the preposing of these objects.

The second respect in which (7) and (8) are alike is that what plus the following clause is in

each case a noun phrase. They pronominalize as noun phrases, as (13) and (14) show, and they undergo the Passive, as (15) and (16) show.

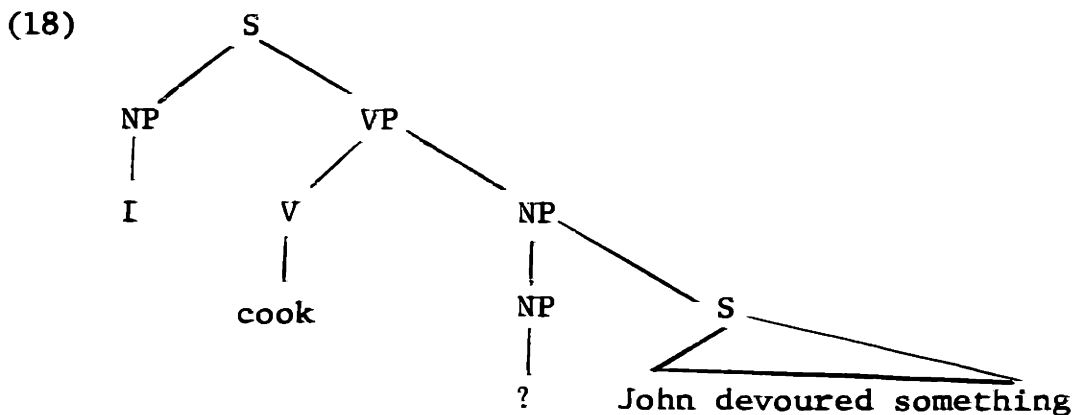
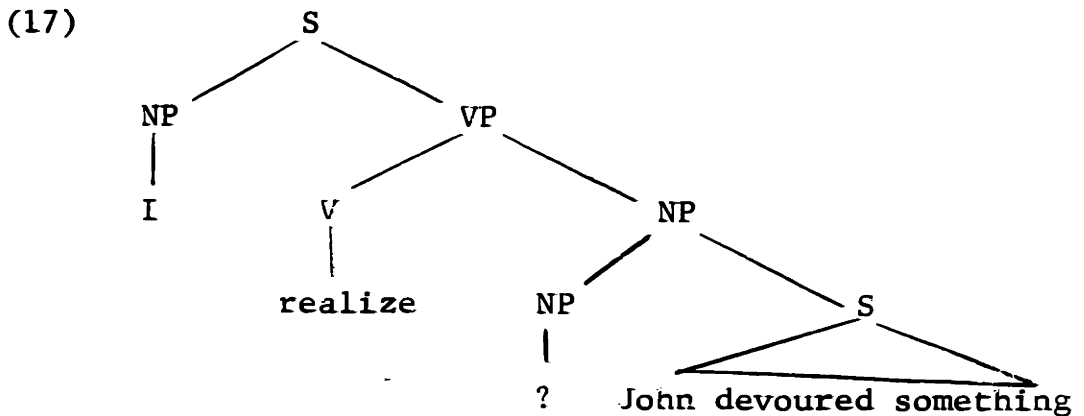
(13) I realize what John devoured, but do you realize it?

(14) I cooked what John devoured, but I wouldn't want to eat it.

(15) What John devoured is realized by me.

(16) What John devoured was cooked by me.

As a consequence of these two facts, it seems reasonable to say that the underlying structures of (7) and (8) are, as given by (17) and (18), respectively.



Rosenbaum (1967) has argued that factive complements of verbs like realize (cf. (19)) are actually complements of the abstract pronoun it.

(19) I realize that John devoured something.  
One important piece of evidence for this analysis is the existence of passives of sentences like (19) in which it emerges in surface structure.

(20) It was realized by me that John devoured something.

Rosenbaum argued that the full noun phrase it that John devoured something is placed in subject position by the Passive, the clause that John devoured something subsequently being postposed. In light of this, it seems reasonable to suppose that the question mark in (17) is also the abstract pronoun it.

Manifestly, the same analysis cannot be given for (8), for cook does not occur with abstract objects. Thus, the question mark of (18), if we are to say that there is a noun phrase there, cannot be abstract. It must be concrete. But need we suppose that there is a concrete noun phrase there? Jespersen has argued that we do not have to. But that we must do so is clear. Consider the unacceptable sentence (21).

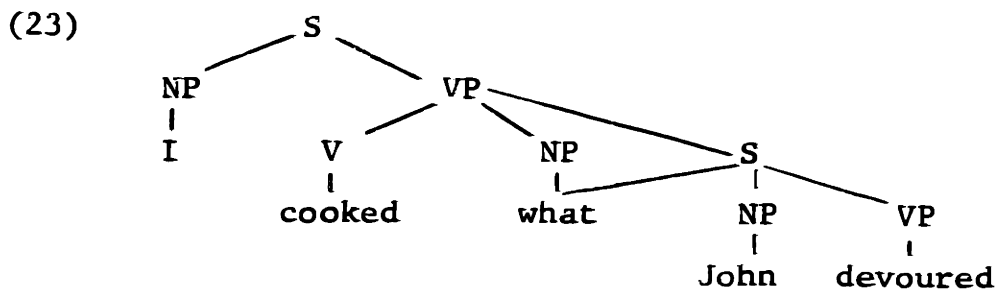
(21) \*I cooked what you realize.

Sentence (21) is strange for precisely the same reason that (22) is strange.

(22) \*I cooked the egg which you realize.

The unacceptability of (22) is due to the fact that the constituent underlying which must be abstract (it originates as the object of realize) and, thus, this constituent necessarily fails to meet the identity condition of the Relativization Rule which states that the initial constituent of the subordinate clause must be identical to the noun phrase to which the clause is adjoined. It seems reasonable then to say that the unacceptability of (21) is due to the failure to meet this same identity condition. As a consequence, we must suppose that the noun phrase that dominates the question mark in (18) does exist and is, moreover, concrete.

Returning to the controversy between Jespersen, Sweet, and Sonnenschein, we see that only the latter grammarian's analysis is tenable. Sweet's position is unacceptable on the formal grounds that a given constituent cannot occur simultaneously in two simplex clauses, for this would be to say that (8) has the structure given as (23).



We insist that only one branch ever leads downward to a given node in a tree. On the other hand, given Jespersen's analysis that what John devoured, as a whole, functions as the object of cook in (7), there is no natural way to exclude (21).

From our discussion of (7) and (8) it is clear that for a given clause to be a relative clause it is necessary (A) that the clause be adjoined to some noun phrase (which may be the object of a preposition), (B) that a noun phrase or adverbial phrase be moved to initial position in the clause, and (C) that the noun phrase to which the clause is adjoined be identical to the noun phrase moved to clause-initial position, or, in the case of a prepositional phrase, to the last-most lowest noun phrase of the prepositional phrase moved to clause-initial position (compare (24) - (26)).

(24) I lost a book  $\left[ \begin{array}{l} \text{the color of the cover} \\ \text{of } \underline{\text{which}} \end{array} \right]_S$  (= the book) is commie-red.

(25) \*I painted the house a color  $\left[ \begin{array}{l} \underline{\text{which}} \\ \text{of my car} \end{array} \right]_S$  is green.

(26) \*My book has a cover  $\left[ \begin{array}{l} \text{the color of} \\ \underline{\text{which}} \end{array} \right]_S$  (= the cover) of the book is commie-red.

Only conditions (A) and (B) are met in the case of what-clauses like that in (7). Moreover, for such



clauses it is always the case that the noun phrase to which the clause is adjoined is abstract.

In Chapter 3, I show that where-, when-, and while-clauses are formed in essentially the same way that the what-clause of (7) is formed. This is to say that such clauses meet conditions (A) - (C) above. Similarly, I show in Chapter 4 that clauses introduced by before, after, until, and since also meet conditions (A) - (C) and, thus, must also be regarded as relative clauses. In Chapter 5, however, we find that if- and unless- clauses do not meet conditions (B) and (C). Moreover, we note that the noun phrases to which these clauses are adjoined in underlying structure are abstract. As a consequence, such clauses can only be viewed as noun complements, which differ from the what-clause of (7) only in that they do not meet condition (B). That is, if- and unless-clauses are special cases of the class of clauses which includes the that-clause of (27) and the for-clause of (28).

(27) The fact that John is a fascist upset everyone.

(28) The idea for you to leave was mentioned first by Bill.

## CHAPTER 3

## Adverbial Independent Relative Clauses

## Introduction

In this chapter, I provide an analysis of the syntax of sentences containing adverbial clauses introduced by where, when, and while.<sup>1</sup> Some examples of such sentences are

- (1) Dick found his boomerang where Baby Sally hid it.
- (2) Baby Sally started for home when she heard Jane call.
- (3) Spot slept while Puff played with the ball.

The principal claim of this analysis is that the subordinate clauses of these sentences are restrictive relative clauses, the antecedents of which have been deleted. That is, I shall claim that (1) - (3) are formed in essentially the same way that the respective sentences (4) - (6) are formed, except that a post-cyclic Antecedent Deletion Rule applies in the generation of (1) - (3).

- (4) Dick found his boomerang at the place where Baby Sally hid it.
- (5) Baby Sally started for home at the time when she heard Jane call.
- (6) Spot slept during the time while Puff played with the ball.<sup>2</sup>

We shall also be concerned in this chapter with the nature of "simple" place and time adverbial

phrases. Concern with this issue arises in connection with the attempt to determine what adverbials serve as the antecedents where-, when-, and while-clauses in underlying structure. I shall try to show that at the time the Antecedent Deletion Rule applies, the antecedents are there, for where-clauses, and then, for when- and while-clauses -- if, which is by no means clear, they are actually -- occurring adverbials.

Each of the adverbial clauses which we shall consider differs enough from the other to warrant separate discussion. Since where-clauses prove to be the simplest of the three, I shall discuss them first in an attempt to clarify precisely what sorts of considerations force the analysis that the subordinate clauses of (1) - (3) are relative clauses.

### Where-clauses

It is commonplace in transformational syntactic studies to distinguish location adverbials (at the barn, in the room, and on the table) from direction adverbials (to the barn, into the room, and onto the table). Such a distinction seems to exist at the point at which verb-adverbial co-occurrence relations

are stated.

The verbs dwel and reside cannot occur in a sentence unless a location adverbial is present, as is shown by the contrast between (7) and (8).

(7) \*John is residing  $\left. \begin{array}{l} \emptyset \\ \text{to Boston} \\ \text{now} \end{array} \right\}$

(8) John is residing in a hovel.

In light, then, of the acceptability of (9), we must suppose that where he was born, like in a hovel in (8), is a location adverbial in this sentence.

(9) John is residing where he was born.

On the other hand, the verb dash cannot occur without a direction adverbial being present. Compare (10) and (11).

(10) \*John dashed  $\left. \begin{array}{l} \emptyset \\ \text{in the hovel} \\ \text{yesterday} \end{array} \right\}$

(11) John dashed to the hovel.

In light of the acceptability of (12), we must suppose that where Harry was living, like to the hovel in (11), is a direction adverbial in this sentence.<sup>3</sup>

(12) John dashed where Harry was living.

It is clear from the above that where-clauses function as location and direction adverbials at the

point at which co-occurrence relations between verbs and adverbials are stated. In Aspects, Chomsky (1965) holds the view that the distinction between location and direction adverbials is categorical and that verbs like reside and dash are subcategorized with respect to these categories. According to this view, which has been widely adopted, the distinction between verbs that occur with location adverbials and those that occur with direction adverbials is on a par with the distinction between transitive and intransitive verbs or transitive and double-object verbs, rather than on a par with the distinction between transitive verbs that occur with, say, concrete objects (surprise, pour) and those that occur with abstract objects (prove, realize). If such a view is correct, then all we can infer from (7) - (12) is that adverbial where-clauses are dominated either by the category associated with location adverbials or the category associated with direction adverbials -- depending on the nature of the verb -- at the level of deep structure.

There is, I submit, no reason to believe that the distinction between location and direction adverbials is categorical. In order to demonstrate that the distinction is categorical it would be necessary

to show either that some transformational consideration or that some deep structural consideration (e.g., the statement of co-occurrence relations) requires not only that location and direction adverbials be distinguished, but also that this distinction be drawn in terms of the categories that dominate location and direction adverbials rather than in terms of the lexical composition of these adverbials. No such demonstration has ever been provided, to my knowledge.

One transformation that might be supposed to force a categorial distinction between location and direction adverbials is that which preposes adverbials, for location adverbials can undergo it but direction adverbials cannot.

Thus, we get (13), but not (14).

(13) In Boston, Bill sold forty-five lids of grass.

(14) \*To Boston Bill went to sell grass.

There are several reasons why the rule that preposes adverbials does not support making the distinction between location and direction adverbials at a categorial level of grammar. The most important reason is that this rule does not actually require a distinction between location and direction adverbials per se. Note, for instance, that (15) is unacceptable.

(15) \*In Boston, Bill dwells.

A careful examination will show, as Chomsky(1965) has pointed out, that one must distinguish between adverbials that are in an intimate grammatical relation with the verbs they occur with and those that are not. The rule that preposes adverbials applies only to those adverbials which are not in such an intimate grammatical relation. Thus, the rule that preposes adverbials does not support the view that the location - direction distinction is a categorial one, nor does any other transformation of which I am aware.

There is reason to believe that the distinction between location and direction adverbials is lexical, and possible even semantic. The only evidence in support of making a distinction between location and direction adverbials involves co-occurrence relations like those found in (7) - (12). McCawley (1968) has shown that when there is a clear distinction between a syntactic feature and a corresponding semantic feature, subject-verb and verb-object co-occurrence relations always involve the semantic feature. Such co-occurrence relations always involve sex, not gender and semantic number, not grammatical number, etc. In light of this, it would be very surprising if the distinction between

location and direction adverbials were not also semantic.

A careful examination of co-occurrence relations involving location and direction adverbials reveals that the distinction cannot be anything but lexical. Note, for instance, that the verb put does not occur with all direction adverbials.

- (16) \*John put the book { to the drawer  
to the table }
- (17) John put the book { into the drawer  
onto the table }

If we accept (7) - (12) as evidence of a categorial distinction, then we must also take (16) and (17) as evidence of one. Further subcategorization of direction adverbials would be forced by (18) and (19).

- (18) \*John inserted the page { to the book  
onto the book }
- (19) John inserted the page into the book.

It should be clear that this line of reasoning will lead to a plethora of grammatical categories of no transformational interest whatsoever.

If we deny, as I think we must, that the distinction between location and direction adverbials is categorial, then we must state co-occurrence relations between verbs and such adverbials in terms of the feature composition of the lexical items that



comprise the adverbials. Let us return then to the question of how we are to formalize the fact that where he was born is a location adverbial in (9) and that where Harry was living is a direction adverbial in (12). If I am correct in claiming that co-occurrence relations involving adverbials of location and direction must be stated in terms of the feature composition of these adverbials, then we must suppose that the where-clauses of (9) and (12) have "representatives" in the clauses that contain them in terms of which co-occurrence relations involving adverbial where-clauses are stated. One possibility, of course, is that where is itself this representative. However, note that in order to account for the acceptability of (20) and (21), we must suppose an occurrence of a location adverbial in each clause of (20) -- one for each occurrence of dwell -- and an occurrence of a directional adverbial in each clause of (21) -- one for each occurrence of dash -- in order to account for the acceptability of these sentences.<sup>4</sup>

(20) John is dwelling where Harry dwells.

(21) John dashed where Harry dashed.

Obviously, where can serve as only one of the two location adverbials that we must hypothesize to exist in the underlying structure of (20) and as

only one of the necessary two direction adverbials in (21). The facts we have considered so far do not allow us to choose between the view that where is a constituent of the main clauses of (20) and (21) or the view that where is a constituent of the subordinate clauses of (20) and (21) and that these where-clauses have (ultimately deleted) antecedents in the clauses that contain them which participate in the relevant verb-adverbial co-occurrence relations. However, it is not difficult to see that the latter view is correct.

Examination of pronominalization of where-clauses supports the view that these clauses have antecedents in underlying structure and that where originates within the subordinate clauses of sentences like (20) and (21) in underlying structure. It seems clear that in sentences like (22) and (23), the presence of the pronoun there must be accounted for in essentially the same way that we account for the presence of he and she in these sentences.

(22) John works where Mary works, but he doesn't want to work there.

(23) Mary went where John went, but she didn't want to go there.

The central problem posed by sentences like (22) and (23) is to account for the sameness of reference

of John and he in (22); where Mary works and there in (22), Mary and she in (23) and where John went and there in (23). According to the "standard" transformational description of pronominalization, an arbitrary integer is associated with every noun phrase in underlying structure as an index of the referent of the noun phrase. Moreover, it is supposed that the anaphoric pronouns he, she, and there of (22) and (23) do not actually occur in deep structure; a copy of the constituent with which each of these pronouns is identical occurs instead. Thus, focusing our attention on the pronominal forms he and she, we might suppose that (22) and (23) have the structures underlying (24) and (25)<sup>5</sup>.

(24) John<sub>i</sub> works where Mary works but John<sub>i</sub> doesn't want to work there.

(25) Mary<sub>i</sub> went where John went but Mary<sub>i</sub> didn't want to go there.

How are we to deal with the presence of there in (22) and (23)? We might suppose that where-clauses do not have antecedents in underlying structure and that referential indices are associated directly with where. According to this hypothesis, then, (22) and (23) are derived from the structures underlying (25) and (26) respectively.

(25) John<sub>i</sub> works where<sub>j</sub> Mary works but John<sub>i</sub> doesn't want to work where<sub>j</sub> Mary works.

- (26) Mary<sub>i</sub> went where<sub>i</sub> John went but Mary<sub>i</sub> didn't want to go where<sub>j</sub> John went.

Notice, though, that given an underlying structure like (27), we do not, as we might expect, get (28).

- (27) I realize where<sub>i</sub> John is going and Harry realizes where<sub>i</sub> John is going too.

- (28) \*I realize where John is going and Harry realizes there too.

In order to account for the fact that (22) and (23) are acceptable, but (28) is not, we will have to make reference to the fact that the where-clauses of (25) and (26) are adverbial, but the where-clause of (28) is not. That is, we will have to treat where-clauses as if they pronominalize in some special way. But, of course, they don't. They pronominalize in the same way that where-clauses which occur as relative adjuncts to adverbials like at the place and to the place pronominalize. Thus, if we were to say that (22) and (23) have the underlying structures (29) and (30), respectively, the fact that adverbial where-clauses pronominalize just like where-clauses that modify adverbials would follow automatically.

- (29) John<sub>i</sub> works at the place<sub>j</sub> where Mary works but John<sub>i</sub> doesn't want to work at the place<sub>j</sub> where Mary works.

- (30) Mary<sub>i</sub> went to the place<sub>j</sub> where John went but Mary<sub>i</sub> didn't want to go the place<sub>j</sub> where John went.

Of course, we will need to add a rule that deletes at the place and to the place from (29) and (30) after the pronominalization rule has applied.

A third argument in support of the view that adverbial where-clauses have antecedents in underlying structure is based on the fact that no constituent can be moved out of such clauses. In Constraints, (1967b:127) Ross argues that linguistic theory must contain the following constraint on grammars: "no element contained in a sentence dominated by a noun phrase with a lexical head noun may be moved out of that noun phrase by a transformation". Ross refers to the noun phrase of this definition as "complex" and to the constraint as the "Complex Noun Phrase Constraint".

The Complex Noun Phrase Constraint accounts for the fact that the constituent that person of (31a), but not of (32a), can be questioned.

- (31) a. Mary believed that John fired that person.  
 b. Which person did Mary believe that John fired?
- (32) a. Mary believed the claim that John fired that person.  
 b. \*Which person did Mary believe the claim that John fired?

In the case of (31b), the presence of the lexical noun claim brings into play the Complex Noun Phrase Constraint, thus precluding the movement of the constituent underlying which person from the that-clause.

Similarly, nothing can be pulled out of relative

clauses. We do not get (33b) and (34b), even though (33a) and (34a) are acceptable.

- (33) a. John stood at the place where Bill burned his draft card.  
 b. \*Whose draft card did John stand at the place where Bill burned?
- (34) a. John ran to the place where the cop slugged that girl.  
 b. \*Which girl did John run to the place where the cop slugged?

The Complex Noun Phrase Constraint accounts for the impossibility of (33b) and (34b). Observe, though, that we also do not get (35) and (36).

- (35) \*Whose draft card did John stand where Bill burned?  
 (36) \*Which girl did John run where the cop slugged?

If we were to say that adverbial where-clauses have antecedents with lexical heads -- say, at the place for location where-clauses -- then the unacceptability of (35) and (36) would follow automatically.

The CNPC is not the only possible explanation one could give for (35) and (36). In Current Issues, Chomsky (1964) points out that the rule of WH-Movement cannot apply twice to the same simplex S. Of particular interest is his example

- (37) \*What did he wonder where John put?

Sentence (37) is derived from (38), but only by violating Chomsky's condition.

(38) He wondered where John put something. If, as Ross himself points out, the CNPC cannot account for (37), then some such condition as Chomsky's will be required to account for it. Presumably this condition would also account for the unacceptability of (35) and (36). However, since WH-Movement is applied in the generation of only questions -- direct and indirect -- and relative clauses, to argue that (35) and (36) are unacceptable as a consequence of Chomsky's condition would be tantamount to arguing that the where-clauses of these sentences are relative clauses, for it is clear that they are not indirect questions.<sup>6</sup>

I have argued so far that the assumption that where-clauses are relative clauses which have antecedents in underlying structure will account in a quite natural way for co-occurrence relations between verbs and where-clauses, for the pronominalization of where-clauses, and for the fact that nothing can be moved out of where-clauses. However, the strongest argument in support of the view that adverbial where-clauses have adverbial antecedents -- is that sentences containing such clauses can be shown to have met an identity condition in their derivations which holds between the constituent underlying where and the hypothetical antecedent of

such clauses. I shall give this argument below. Let us turn now to consider the internal structure of where-clauses.

The most important fact about the internal structure of independent adverbial where-clauses is that where is the reflex of some location or direction adverbial that has been moved to the front of the clause. Recall that a verb like reside cannot occur without a location adverbial. As a consequence of the acceptability of (39), we must suppose that there was, in the underlying structure of the subordinate clause of this sentence, an occurrence of some location adverbial which was either deleted or moved to clause-initial position and then converted into where.

(39) John works where Bill resides.

The claim that an adverbial of location must be deleted or converted into where is not mitigated against by the acceptability of (40).

(40) John works where Bill resides in Boston.

Indeed, in Boston is interpreted as an adjunct to somewhere in (41).

(41) Bill resides somewhere in Boston.

Sentence (40), then, actually supports the view that where is the reflex of some location adverbial that is moved to clause-initial position.



Further, much stronger evidence that an adverbial moves in deriving where-clauses is provided by the fact that (42) is ambiguous but (43) is not.

(42) The general is standing where he told his men that they should attack.

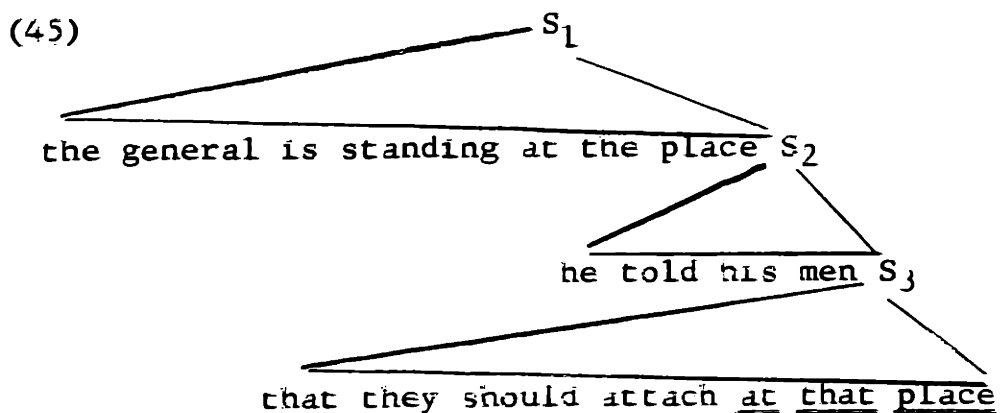
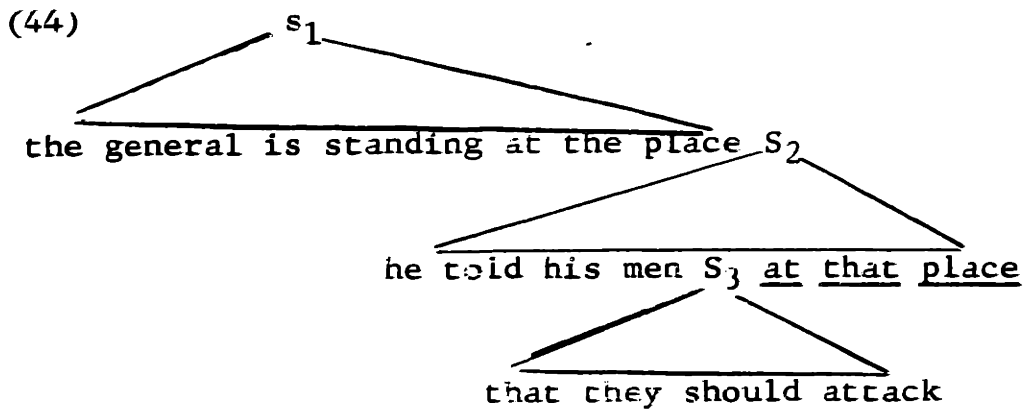
(43) The general is standing where he told his men about his desire that they should attack.

Let us suppose that the general in question is standing at point  $p_i$  and that he told his men while at point  $p_j$  that they should attack at point  $p_k$ . On one interpretation of (42), the points  $p_i$  and  $p_j$  coincide; on the other, points  $p_i$  and  $p_k$  coincide. Only the interpretation in which  $p_i$  and  $p_j$  coincide is possible in the case of (43).

The only formal difference between sentences (42) and (43) in surface structure is the presence of the phrase about his desire. Can we exploit this difference in order to account for the fact that (42) is ambiguous and (43) is not? Note that the phrase his desire that they should attack is a Complex Noun Phrase in Ross' sense. Note further that if we suppose that the where-clauses of (42) and (43) are relative clauses, formed by the movement of an adverbial to clause-initial position (and subsequent relativization of this adverbial as a consequence of its being identical to the antecedent of the clause),

then the Complex Noun Phrase Constraint will account for the fact that only one derivation (hence, interpretation) of (43) is possible.

So that it will be clear exactly how this explanation works, let us sketch the derivations of (42) and (43). Consider the highly schematic structures (44) and (45).



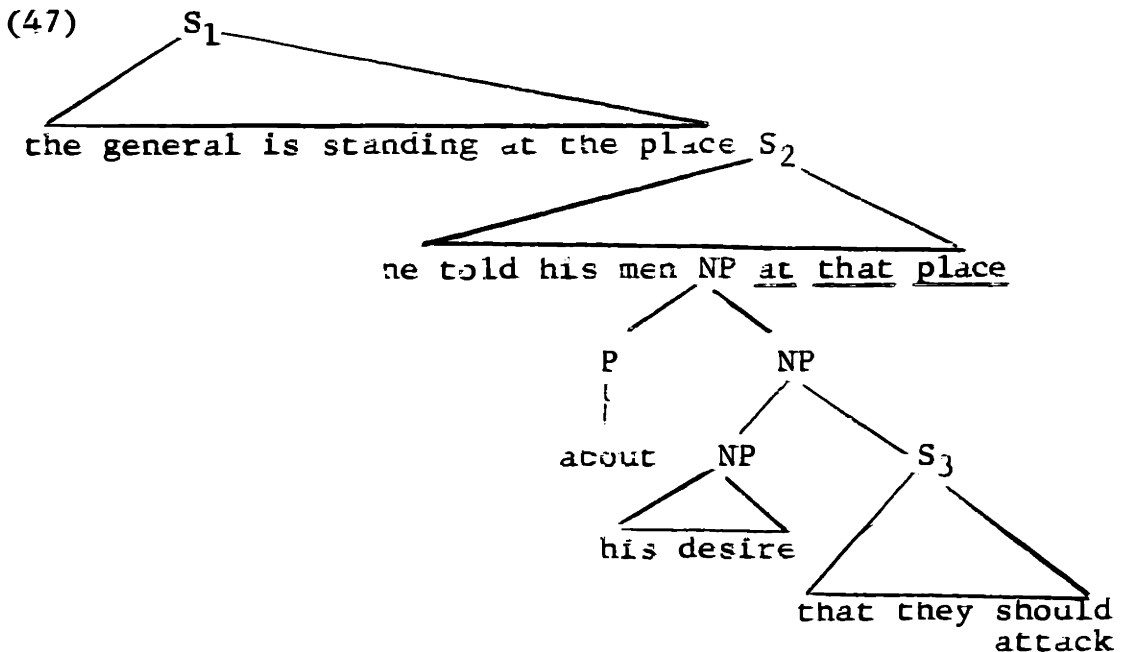
Structures (44) and (45) both underly sentence (46), this sentence being derived by moving at that place--

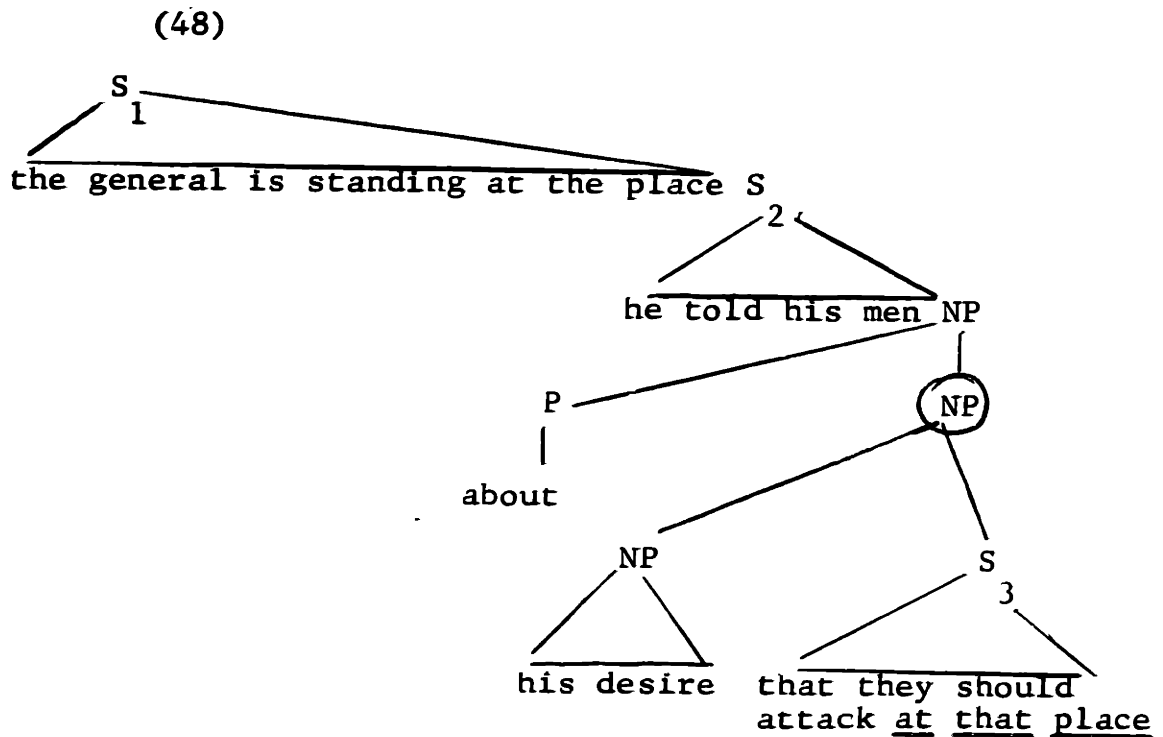
from  $S_2$  in (44) and from  $S_3$  in (45)--to the front of  $S_2$  and by pronominalizing this adverbial as a consequence of its identity with the antecedent of  $S_2$  at the place.

(46) The general is standing at the place where he told his men that they should attack.

Sentence (46) is ambiguous in precisely the same way that (42) is. Thus, if we suppose that (42) is derived from the structures underlying (46) by a rule that deletes at that place before where, then the ambiguity of (42) will be accounted for.

Now, let us turn to structures (47) and (48).





Note that as with structures (44) and (45), there is nothing to prevent the movement of at that place to the front of S<sub>2</sub> in (39). Subsequent relativization of this adverbial yields (49).

(49) The general is standing at the place  
where he told his men about his desire  
that they should attack.

On the other hand, at that place cannot be moved out of the circled NP of (48), for this NP is "complex" in Ross' sense. As a consequence, (49) can be derived in only one way. If we say that (43) is derived from the structure underlying (49) by

deletion of at the place, then the fact that (43) has only one interpretation can be accounted for.

I have shown that in order to account for the acceptability of (39)--repeated as (50)--we must suppose that a location adverbial occurs with reside in the underlying structure of this sentence.

(50) John works where Bill resides.

I further argued that in order to account for the fact that in Boston is interpreted as an adjunct to where in (40)--repeated as (51)--we must suppose that the constituent underlying where moves to clause-initial position.

(51) John works where Bill resides  
in Boston.

A third argument in support of the view that an adverbial moves in the derivation of where-clauses was that we needed to invoke the Complex Noun Phrase Constraint on movement transformations in order to account for the fact that (42) is ambiguous and (43) is not.

My discussion of the internal structure of where-clauses--from example (38) forward--has been centered around examples in which the where-clause and the constituent underlying where have been location adverbials. Nothing I have said about the internal structure of where-clauses would be altered if the

where-clauses had been direction adverbials. Let me briefly examine clauses in which where is a direction adverbial.

We observed above in connection with sentences (10) - (12) that the verb dash cannot occur without a direction adverbial in surface structure. Thus, we must suppose that a direction adverbial occurs in the underlying structure of the where-clause of (52) and that it is deleted or converted into where.

(52) Mary is standing where John dashed.  
That this obligatory constituent must be deleted or converted into where is shown by the fact that (53) is unacceptable.

(53) \*Mary is standing where John dashed  
to Boston.

That this direction adverbial is moved to clause-initial position and converted into where is suggested by the fact that in Boston is interpreted as an adjunct to where in (54).

(54) Mary is standing where John dashed  
in Boston.

There are sentences analogous to (42) and (45) involving direction adverbials which also require the assumption that a constituent moves in the derivation of where-clauses in order to use the Complex Noun Phrase Constraint to account for their

special properties. Observe that (55) is ambiguous, and (56) not.

(55) Harry lives where Joan mentioned that John sent a pig.

(56) Harry lives where Joan mentioned the fact that John sent a pig.

The ambiguity of (55) is whether where is a location adverbial related to mention or a direction adverbial related to send. In (56) where can only be a location adverbial related to mention; the Complex Noun Phrase Constraint precludes its being a direction adverbial related to send.

I have tried to show that in order to account for where-clauses, it must be supposed that these clauses are embedded as adjuncts to location or direction adverbials and that where itself is derived by moving some location or direction adverbial to clause-initial position. In order to show that these where-clauses are relative clauses we must show that the hypothesized antecedents and the adverbials underlying where necessarily participate in an identity condition.

It is obvious that I would have to be mad to utter either (57) or (58) unless I believed that the place where I found my wallet and the place where my wallet was at the time I found it are referentially identical.

(57) I found my wallet where it was.

(58) I found my wallet at the place  
where it was.

Indeed, (59) and (60) are complete gibberish.

(59) \*I found my wallet where it wasn't.

(60) \*I found my wallet at the place  
where it wasn't.

It is by no means obvious exactly how (59) and (60) should be dealt with, but it is clear that the explanation of the deviance of these sentences will involve an identity condition of the type found in relativization.

As I remarked above, the strongest argument for the existence of an antecedent for where-clauses is that sentences containing them must meet an identity condition holding between the constituent underlying where and the hypothetical antecedent of where-clauses. Thus, it is worth asking whether there is not an alternative explanation. Note that sentence (61) is deviant, and that this deviance cannot be attributed to the failure of two location adverbials to meet an identity condition.

(61) \*My wallet wasn't anywhere but I  
found it nevertheless.

However, it is clear that the deviance of (61) is rather different from the deviance of (59). In (61), the deviance is due to the contradiction "My wallet doesn't exist"--an inference of "My wallet



wasn't anywhere"--and "My wallet does exist"--a presupposition of "I found my wallet." The deviance of (59), on the other hand is like that of (62).

- (62) \*My wallet wasn't in my pocket  
but I found it there nevertheless.

In (62), as in (60) and (59), I would argue, the deviance is due to the contradiction "My wallet wasn't in my pocket" and "My wallet was in my pocket." If this discussion of (59) - (62) is sound, there can be no question that adverbial where-clauses are relative clauses and that they have antecedents.

I have argued that the where-clauses of (63) and (64) are relative clauses, closely related syntactically as well as semantically to (65) and (66), respectively.

- (63) John left his beer where no  
one could find it.
- (64) John went where Mary was  
living.
- (65) John left his beer at a  
place where no one could  
find it.
- (66) John went to the place  
where Mary was living.

We must now ask what the antecedents of the where-clauses of (63) and (64) are and what adverbials underly where in these sentences.

In view of the sameness in meaning of (63) and (65) and of (64) and (66), it might seem reasonable to suppose that (65) and (66) are the syntactic sources of (63) and (64), respectively. However, consideration of a broader range of data will force a somewhat different analysis.

The where-clauses we have considered so far have all been adverbials. However there are relative where-clauses which seem to be noun phrases. Consider, for instance, such sentences as

- (67) John walked up to where Bill was standing.
- (68) John returned from where he was born.
- (69) John works near where George does.

In view of such sentences, we might say that not only at that place and to that place can be deleted, but that that place can be deleted in forming relative where-clauses. Since any direction where-clause can optionally be preceded by to in my dialect--cf. (67) and (70) or (71) and (72), for example--we could reasonably suppose that deletions of to that place result from the separate deletions of that place, as in the case of (68) and (69), and subsequent optional deletion of to.

- (70) John walked up where Bill was standing.

- (71) John threw himself to where the fierce grabble couldn't reach him.
- (72) John threw himself where the fierce grabble couldn't reach him.

There are other cases in which it appears that the deleted antecedent of a relative where-clause is a noun phrase. Consider

- (73) John selected where he wanted to go to graduate school by flipping a coin.
- (74) John found out where Blackbeard had hidden his treasure, while digging for clams.
- (75) John photographed where he found the treasure.

The verbs select, find out, and photograph would seem to be able to take noun phrases containing place nouns like place, site, or location as objects. In particular, note that we get (76) - (78).

- (76) John selected the place where he wanted to go to graduate school by flipping a coin.
- (77) John found out the place where Blackbeard had hidden his treasure while digging for clams.
- (78) John photographed the place where he found the treasure.

However, the verb find out does not ordinarily take place noun phrases as objects, as is shown by (79).

- (79) \*John found out Boston.

Thus, it may be wrong to say that the where-clauses of (74) and (77) are conventional relative clauses, for their antecedents--deleted in the case of (74)--violate selectional restrictions associated with find out. My guess is that the where-clause of (74) is an indirect question and that the place is transformationally inserted in (77).

In support of this guess, observe that wherever is possible in (80), but not in (81).

(80) I went wherever Bill went.

(81) \*John found out wherever  
Blackbeard had hidden his  
treasure.

As is indicated by (80), wherever-clauses can occur wherever independent relative where-clauses can occur. They cannot occur as indirect questions, as is shown by (82).

(82) \*I wonder wherever Black-  
beard hid his treasure.

Moreover, where else is possible in question clauses, but not in relatives. Consider

(83) I wonder where else Black-  
beard hid treasure.

(84) \*I went where else Black-  
beard hid treasure.

Again, the complement of find out acts like a question clause.

(85) I found out where else Black-  
beard hid treasure.

Notice that although select seems to take place-noun phrases like Boston as objects, complements of this verb act like question clauses with respect to the possibility of occurrence of wherever and where else, as (86) and (87) show.

(86) \*John selected wherever he wanted to go to graduate school by flipping a coin.

(87) John selected where else he wanted to go to graduate school by flipping a coin.

The verb photograph takes neither wherever nor where else, which makes neither the relative analysis nor the question clause analysis particularly attractive. Consider

(88) \*John photographed wherever he found treasure.

(89) \*John photographed where else he found treasure.

In light of the above, it seems reasonable to say that the where-clauses of (73) and (74) are not relative clauses and that a relative analysis of the where-clause of (75) is at least problematic. The only clear cases of nominal where-clauses which are relative clauses then, are those that occur as the objects of prepositions.<sup>7</sup>

Any preposition which can take the place as its object can also take there, with the exception of at everywhere and to everywhere except in expressions like from here to there.

- (90) \*John lives at there.
- (91) \*John went to there.
- (92) John walked over there.
- (93) John looked down there.

And, any nominal where-clause which is the object of such a preposition can have there as its pronominal reflex.

- (94) John lives up where Harry is and Joe lives up there too.
- (95) John came from where George is sitting and Joe came from there too.
- (96) John lives near where George does and Joe lives near there too.

It is, I think, rather extraordinary that objects of prepositions like over, under, up, from, and near take an adverbial like there as an "object". It is no less extraordinary, if true, that the only nominal relative where-clauses are those that occur as the objects of location and direction prepositions. I shall argue below (see my discussion of the antecedent Deletion Rule) that these are not unrelated facts. Specifically, I shall argue that independent relative clauses only occur in environments in which pronouns occur. This would mean in the case of where-clauses that there is the antecedent. There is factual evidence in support of this proposal to be given immediately below.

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As for the fact that there can occur as the "object" of certain place prepositions, I shall have very little to say. It is my belief that these prepositions are derivative of underlying intransitive verbs which obligatorily occur with location adverbials.<sup>8</sup> However, I do not wish to push this point now.

I have suggested that the antecedent which is deleted in forming relative where-clauses is there. An important fact in support of this view is the distributional consideration that wherever where-clauses can occur, there also can occur. A plausible alternative to this analysis for location clauses would be that at the place is deleted. However, there is at least one verb which can occur with location where-clauses that cannot occur with at that place, namely stick, in the sense of "place". Consider

- (97) \*John stuck the paper at the place where  
I told him to.
- (98) John stuck the paper where I told him  
to.

Note though that one can say

- (99) John stuck the paper there.

Interestingly, there do exist cases in English in which where-clauses can have there as an antecedent in surface structure.<sup>9</sup> In all such cases, one must be pointing somehow at the referent of there

at the time of utterance. Compare the following sentences.

(100) John stood there where Bonnie and Clyde got gunned down.

(101) John stood where Bonnie and Clyde got gunned down.

In uttering (100) the speaker must be pointing in some way at the location referred to by there, but it would, I think, be odd to utter (101) while pointing to a specific location.

In the above, I have argued that adverbial where-clauses and where-clauses that serve as the "objects" of location and direction prepositions are relative clauses whose antecedent -- at least at the time of its deletion, if not in underlying structure -- is there. In the section on the Antecedent Deletion Rule below, I will attempt to formalize the rules involved in forming such clauses. Let us turn now to consider when-clauses.

### When-clauses

We have seen that all adverbial where-clauses, as well as certain apparently nominal where-clauses, are relative clauses, the antecedents of which have been deleted. In this section, I shall show that adverbial when-clauses are also relative clauses,



formed in essentially the same way that adverbial where-clauses are.

Of all the various types of adverbials, few pose more problems than time adverbials. Their distribution, for example, is not only a function of inherent (presumably semantic) properties of main verbs (cf. (1)-(2)), as is usual, but also of auxiliary verbs (cf. (3)-(4)).

- (1) a. \*John studied at ten o'clock.
- b. John studied for four hours.
- (2) a. \*John arrived for four hours.
- b. John arrived at ten o'clock.
- (3) a. \*John studied at ten o'clock.
- b. John was studying at ten o'clock.
- (4) a. \*John studied for four hours by ten o'clock.
- b. John had studied for four hours by ten o'clock.

The nature of the co-occurrence relations exhibited in (1) - (4) -- especially those of (3) and (4) -- is largely a mystery. The most fruitful approach to (3) and (4), it seems to me, would be to take seriously the view, advanced by Ross (1967a), that auxiliary verbs are main verbs in underlying structure and, therefore, that they are capable of entering into ordinary verb-adverbial relations.<sup>10</sup> However, we need not go into this question here,

although the argument that adverbial when-clauses are relative clauses might vary subtly depending upon the view one takes of auxiliary verbs, and, hence, of auxiliary verb-adverbial relations. I find it inconceivable that it vary in any significant way.

Of somewhat more immediate concern here is what the nature of the differences between the various types of time adverbials is and how these differences should be characterized. In Hall (1964), four different categories of time adverbials are recognized. Her classification is given in (5).

- (5) a. point (instant): at 2:00, ten minutes ago, when the gun went off.
- b. duration: for ten minutes, from 8 o'clock until 10 o'clock, while the supplies hold out.
- c. frequency: every ten minutes, whenever she sees him.
- d. frame of reference: in 1950, in the fall, last year.

In what follows, I shall refer to the adverbials of (5a) as "instantive", those of (5b) as "durative", those of (5c) as "frequency", and those of (5d) as "frame".

Hall alludes to the existence of syntactic evidence that the division between these four different classes of adverbials is categorial. However, she does not specifically mention what

this syntactic evidence is, but almost certainly she -- like all other transformational grammarians at the time -- regarded selectional differences as syntactic.

It would be wrong, I think, to regard selectional differences between time adverbials as evidence of categorial differences, if for no other reason that that such a procedure would lead to a host of categories of no independent grammatical significance. The selectional difference between adverbials like by ten o'clock and at ten o'clock, as evidenced by (6) and (7), would, quite counter-intuitively, lead to the assignment of these adverbials to different syntactic categories.

- (6) a. John will be arriving at ten o'clock.  
 b. \*John will be arriving by ten o'clock.
- (7) a. \*John had arrived at ten o'clock.  
 b. John had arrived by ten o'clock.

Actually at ten o'clock and by ten o'clock seem to be related to each other in much the same way that at the barn and near the barn are. Recall that near can have the adverbial there as its object. In order to account for this fact, I argued that, at an appropriately abstract level of representation, a phrase like near the barn is like up at the barn in that near, like up, modifies, somehow,

an adverbial equivalent to at the barn. Such a point of view would make a good deal of sense if we were to say that near is a transitive adjective which occurs with objects that are marked [+locative] and that at is the lexical representation for this feature. In the case of near, this feature is not realized superficially, for we do not get \*near at the barn.

Note that the time preposition by can also take an adverbial as its object.

(8) John had left by then.

This fact could be accounted for if we were to say that by is the type of constituent that takes objects that are marked [+temporal, +instantive] and that at is the lexical representation for this set of features. In the presence of another preposition, the time preposition at is never realized (\*by at that moment). It might seem counter-intuitive to regard by as de-adjectival or de-verbal as in the case of near. However, as I shall show in Chapter 4, the so-called prepositions before, after (in some dialects), until, and since can all occur with then as their object and each can be shown to be de-adjectival or de-verbal. Thus, it would not be surprising if by were ultimately shown also to have an adjectival or verbal origin.

Although my speculative view of adverbials like by ten o'clock may not have much to be said for it, nothing can be said for the view that by ten o'clock and at ten o'clock are members of different syntactic categories. But precisely this conclusion results if we suppose that a selectional difference is grounds for the assumption of a categorial difference.

If we are to exclude selection considerations as motivation for the assignment of constituents to syntactic categories, what motivation can be given for Hall's division of time adverbials into four categories (cf. (5))? I have serious doubts that there is any. It seems to me in fact that any differences between the adverbials of (5) -- including, as we shall see, the clauses mentioned by Hall -- can be accounted for entirely in terms of the lexical composition of the adverbials. Frequency adverbials, for example, are really just instantive, frame, and durative adverbials with special determiners. Consider, for instance, the phrases at every other moment, during every other afternoon, and throughout every other year. Instantive, frame, and durative adverbials themselves each have distinctive prepositions and/or head nouns. It would be a mistake to set up distinct categories for each of these different types of

adverbials, for such categories would, at best, be redundant and would, at worse, complicate the description of any transformation (e.g., the adverb preposing rule) which treats them similarly.

The adverbials then and at that time are ambiguously either instantive or frame adverbials. Consider, for instance, the sentences

- (9) John arrived  $\left. \begin{array}{l} \text{then} \\ \text{at that time} \end{array} \right\}$
- (10) John slept  $\left. \begin{array}{l} \text{then} \\ \text{at that time} \end{array} \right\}$

The adverbial at that time in (10) is somewhat curious in that its object that time refers to a time that has extension, as in the case of frame adverbials, but it employs the unmarked instantive preposition at. Then in (10), but not, of course, in (11), is similarly some sort of frame adverbial.

These two interpretations of then and at that time -- the instantive (cf. (9)) and the frame (cf. (10)) -- are of interest to the present study, for when seems to have the same two interpretations. In sentence (11), when is interpreted as an instantive adverbial; in (12) when has temporal extension.

(11) John arrived when Harry left.

(12) John slept when Mary slept.<sup>11</sup>

There is clear selectional evidence that then is an instantive adverbial in (11). As (13) shows, the two instantive time adverbials at ten o'clock and at that moment cannot occur in the same clause.

- (13) \*At ten o'clock, John arrived at that moment.

And, as (14) shows, a when-clause also cannot occur with the instantive adverbial at ten o'clock.

- (14) \*At ten o'clock, John arrived when Harry left.

We can account for the unacceptability of (14) if we say that the when-clause of (14) is an instantive adverbial, for the generalization that only a single instantive time adverbial can occur in a single clause would exclude it. On the other hand, there is clear selectional evidence that the when-clause of (12) is not an ordinary instantive adverbial, for we do not get instantive adverbials with sleep in the simple past tense, as (15) shows.

- (15) \*John slept at ten o'clock.

On the other hand, sleep is compatible with ordinary frame adverbials (cf. (16)), as well as with at that time and then (cf. (10)) when these adverbials are interpreted as frame adverbials.

- (16) John slept during the afternoon.

As a consequence, it would appear that there are at least two types of when-clauses, instantive when-clauses (cf. (11)) and frame when-clauses (cf. (12)).

In light of this conclusion, the unacceptability of a sentence like (17) or (18) is of considerable interest.

(17) \*John slept when Bill arrived.

(18) \*Bill arrived when John slept.

Compare (17) and (18) with (19) and (20), respectively.

(19) John slept during the { afternoon } when  
time Bill arrived.

(20) Bill arrived during the { afternoon }  
time when John slept.

Sentences (19) and (20) are acceptable because both sleep and arrive can occur with frame adverbials.<sup>12</sup>

If we are to suppose that the when-clauses of (11) and (12) are relative clauses, then, clearly we must not suppose that in deriving (11) an adverbial like during the time serves as the antecedent of the when-clause, for such an hypothesis would lead to the derivation of (17) and (18) from (19) and (20), respectively, when during the time is the antecedent of the when-clauses of the latter pair of sentences.

Now consider (21) and (22).

(21) \*John slept at the time when Bill arrived.

(22) \*Bill arrived at the time when John slept.

Let us suppose, as is reasonable, that there is an occurrence of at some time underlying when in (21) and (22). Then, when at some time occurs with arrive it is necessarily interpreted as an instantive



adverbial -- time is marked with the feature [- extension] -- but when this adverbial occurs with sleep (in the simple past tense) it is necessarily interpreted as a frame adverbial -- time is marked [+ extension]. Relativization is not possible in the case of (21) and (22) because the two occurrences of time in each of these sentences have contradictory values for the feature [+ extension], and, thus, the identity condition which must be met if relativization is to be successful cannot be met.

Observe that if we were to say that the when-clauses of sentences like (11) and (12) are relative clauses whose antecedents are at the time or then, then we could account for the acceptability of these sentences and for the unacceptability of (17) and (18), for (11) and (12) would be derived from something like (23) and (24), respectively, and (17) and (18) could not be derived because (21) and (22), respectively, cannot be derived.

(23) John arrived at the time when Harry left.

(24) John slept at the time when Mary slept.

It is difficult to imagine a more natural explanation of why (11) and (12) are acceptable and (17) and (18) are not than that adverbial when-clauses are relative clauses.

In support of the view that adverbial when-clauses are embedded as relative adjuncts to an adverbial like at some time or then is the fact that when-clauses can occur anywhere that these simple time adverbials can occur. Such an analysis, for instance, accounts for the fact that when-clauses can occur with the very different verbs arrive and sleep (cf. (11), (12), (23), and (24)), but not with last (cf. (25) and (26)).

(25) \*The party lasted when Bill slept.

(26) \*The party lasted { at that time  
then }

Further evidence pointing to the view that adverbial when-clauses have antecedents, i.e., are embedded as relative adjuncts to some time adverbial, is provided by the fact that these clauses pronominalize in precisely the same way that simple time adverbials do. Consider, for instance, the sentences

(27) John left at a quarter past ten and George left then too.

(28) John left when Harry left and George left then too.

In the case of (27), we would suppose that underlying then there is an occurrence of at a quarter past ten and, moreover, that each occurrence of at a quarter past ten in (27) is provided with the same temporal referential index, indicating thereby

that the two occurrences of a quarter past ten (o'clock) refer to the same point in time. This latter point is quite crucial, of course, for (27) can be true when (29) is false, and vice versa, if we take the two occurrences of a quarter past ten (o'clock) in (29) to refer to different points in time.

(29) John left at a quarter past ten and George left at a quarter past ten too.

How are we to account for the fact that the when-clause of (28) can also have then as its pronominal reflex and for the fact that the when-clause of (28) and then are co-referential? It is my belief that whenever answers come concerning the nature of pronominalization and of co-reference, they will force the analysis that the two when-clauses in the underlying structure of (28) have antecedents. The reason for this belief is the absolutely crucial role played by nouns in referring expressions. Other alternatives are conceivable, but not, I think, very reasonable.

A final consideration which suggests that when-clauses have antecedents is that like Complex Noun Phrases, nothing can be moved out of them. Note, for instance that the object of the verb kiss of (30) can neither be questioned (cf. (31)), nor relativized (cf. 32)).

- (30) Mary began to cry when Harry kissed Lelita.
- (31) \*Which hussy did Mary begin to cry when Harry kissed?
- (32) \*The hussy who Mary began to cry when Harry kissed is named Lelita.

If we were to suppose that the when-clauses of (30) - (32) were relative adjuncts to some time adverbial, then the impossibility of (31) and (32) could be explained by the Complex Noun Phrase Constraint. Compare, for instance, (33) - (35) with (30) - (32).

- (33) Mary began to cry at the moment when Harry kissed Lelita.
- (34) \*Which hussy did Mary begin to cry at the moment when Harry kissed?
- (35) \*The hussy who Mary began to cry at the moment when Harry kissed is named Lelita.

I have argued so far that adverbial when-clauses should be analyzed as being embedded as adjuncts to some time adverbial like at the time or then in order to account for their distribution, for the fact that they pronominalize in the same way that simple time adverbials do, and for the fact that nothing can be moved out of them.

Let us turn now to consider the internal structure of when-clauses.

In forming relative clauses in English, as we've seen, it is crucial that some constituent be

moved to clause-initial position in the course of deriving the clause. Note, then, the contrast between (36) and (37).

(36) John arrived when Harry told Mary that she should leave.

(37) John arrived when Harry told Mary about his desire that she should leave.

In the case of (36), when can be interpreted to modify either tell or leave. But when can modify only tell in (37). How are we to account for this? The only difference in surface structure between (36) and (37) is the presence of about his desire in (37). Since that she should leave is an adjunct to his desire in (37), his desire that she should leave is a Complex Noun Phrase and thus, is subject to the Complex Noun Phrase Constraint. If we were to suppose, then, that when is derived from some time adverbial that moves to clause-initial position, we could associate the possibility of interpreting when as modifying a given verb in the clause it introduces with the possibility of moving the adverbial that underlies when out of the clause that contains that verb. Since the Complex Noun Phrase Constraint would preclude movement of any constituent out of his desire that she should leave in (37), the assumption that the constituent underlying when in (36) and (37) moves would account for the fact that

when cannot be interpreted as modifying leave in (37). Comparison of (36) and (37) with (38) and (39), respectively, serves to show that the supposition that the when-clauses of (36) and (37) are relative clauses is consistent with our observations about the possibilities in interpreting (36) and (37).

(38) John arrived at the moment when Harry told Mary that she should leave.

(39) John arrived at the moment when Harry told Mary about his desire that she should leave.

As I noted in Chapter 2, a necessary and sufficient condition for a clause to be a relative clause is that there be some constituent of the subordinate clause which is identical to the noun phrase or adverbial phrase to which the clause is adjoined. In English, of course, the requisite constituent of the subordinate clause must be moved to clause-initial position. I have given arguments in support of the existence of an antecedent adverbial to which when-clauses are adjoined and of an adverbial which moves to clause-initial position in the course of deriving when-clauses. And, finally, I have shown that this antecedent and the adverbial underlying when must participate in an identity condition in order to account for the unacceptability of (17) and (18).

There is another argument in support of the claim that when-clauses meet an identity condition of the type found in relativization. Observe that while (40) and (41) are acceptable, (42) and (43) are not.

- (40) John left at the moment when Bill left.
- (41) John will leave at the moment when Bill leaves.
- (42) \*John left at the moment when Bill leaves.
- (43) \*John will leave at the moment when Bill left.

Sentences (40) - (43) show that in the case of explicit time relative clauses, there must be harmony between the tenses of the main and subordinate clauses. Sentences (44) - (46) serve to indicate that this harmony actually holds between the tenses of the clauses within which the antecedent of the when-clause and when itself originate.

- (44) John left at the moment when Bill promised that he would leave.
- (45) John will leave at the moment when Bill promises that he will leave.
- (46) John will leave at the moment when Bill promised that he would leave.

Notice that (44) and (45) are ambiguous; in each when can be interpreted to modify either promise or leave. But in (46), when can modify only leave. What seems to be going on here is that when can be interpreted to modify a verb in the clause it intro-

duces just in case there is harmony between the tense of the clause containing this verb and the tense of the main clause (more exactly, with the tense of the clause in which the antecedent originates).

Time relative clauses are unique among relative clauses in requiring tense harmony, as the following sentences show.

- (47) John met the girl who he loves yesterday.
- (48) John will sail on the boat which Bill built tomorrow.
- (49) John will travel to the place where he was born in a few weeks.
- (50) John solved the problem in the way in which you said that you will solve it.

How can we account for the fact that time relative clauses differ so strikingly from all other relative clauses with respect to the phenomenon of tense harmony without losing sight of the fact that they are otherwise identical to all other types of relative clauses? The difficulty, of course, is that in none of the rules involved in relativization is reference to auxiliaries made.

My suggested solution to this problem is that we suppose that time adverbials are provided with a binary feature -- let us say [+past] -- which indicates whether the adverbial refers to past time or present or future time. We must further suppose



that there is some rule -- call it the Tense Harmony Rule -- (no doubt semantic in nature) which insures that the value of this feature for any specific time adverbial is compatible with the auxiliary of the clause in which it originates. Concerning the form and content of the Tense Harmony Rule I shall have nothing further to say here. However, there is no doubt that such a rule is required in the grammar independently of the need for a solution to the problem of tense harmony in time relative clauses. It is required in order to mark such sentences as (51) and (52) as deviant.

(51) \*John left tomorrow.

(52) \*John will leave yesterday.

Let us turn, though, to consider how the assumption that time adverbials have temporal reference aids in accounting for the phenomenon of tense harmony in time relative clauses.

In a simple case like (40), we know (cf. (53)) that at the moment and the adverbial underlying when, presumably at some moment, both refer to past time and thus have the same value for the feature "past". On the other hand, in the case of (42), we know that at the moment refers to past time (cf. (53)) and the adverbial underlying when to future time (cf. (54)).

- (53) a. John left yesterday.  
 b. \*John left tomorrow.
- (54) a. Bill leaves (= will leave) tomorrow.  
 b. \*Bill leaves (= will leave) yesterday.

If we were to insist that the identity condition of relativization include identity of temporal referential features then we could account quite simply for the fact that (40) is acceptable and (42) is not.

Let us turn to a more complicated example like (46). It is clear that at the moment must be marked [- past]. The adverbial underlying when potentially could have been moved from the clause containing promise (in which case it would be marked [+ past]) or from the clause containing leave (in which case it could be [+ past] (cf. (55) or [- past] (cf. (56))).

- (55) Yesterday, Bill promised that he would leave yesterday.
- (56) Yesterday, Bill promised that he would leave tomorrow.

The identity condition of relativization will permit only one derivation, namely that in which the adverbial underlying when is moved from the clause containing leave and is marked [- past]. And this, of course, provides the right results; (46) is unambiguous, for when modifies only leave.

The suggested analysis of tense harmony in time

relative clauses presupposed (a) that time adverbials have temporal reference, (b) that there is some rule which guarantees that the auxiliary of any clause containing a time adverbial is compatible with the value of the temporal reference feature, and (c) that the temporal reference feature is involved in the identity condition in relativization. Assumptions (a) and (b) are independently required in order to account for such data as (53) and (54). Assumption (c) is a natural extension of the domain of the identity condition in relativization.<sup>13</sup>

The phenomenon of tense harmony can also be found in connection with adverbial when-clauses. Compare (57) - (63) with (40) - (43).

- (57) John left when Bill left.
- (58) John will leave when Bill leaves.
- (59) \*John left when Bill leaves.
- (60) \*John will leave when Bill left.
- (61) John left when Bill promised that he would leave.
- (62) John will leave when Bill promises that he will leave.
- (63) John will leave when Bill promised that he would leave.

If we were to say that (57) - (63) are derived from structures in which the when-clauses have explicit antecedents, then assumptions (a) - (c) would account

for the fact that (57) and (58) are grammatical while (59) and (60) are not and the fact that (61) and (62) are ambiguous while (63) is not. But even if assumptions (a) - (c) are not exactly right, I submit that the correct description of tense harmony in when-clauses will crucially involve their meeting an identity condition of the type found in relativization.

What constituent could serve as the antecedent of when-clauses -- equivalently, what constituent underlies when itself? My discussion of (11), (12), (17), and (18) showed that this adverbial is most probably an adverbial like at the time or then. There is one reason not to select at the time. Klima has suggested to me privately that the (a) and (b) forms of (64) are not equivalent in meaning.

(64) a. John left at the time when Harry arrived.

b. John left when Harry arrived.

Both (a) and (b) claim that John's departure was simultaneous with Harry's arriving, but (a), unlike (b), seems to do so by means of reference to some specific (but unspecified) point in time. It is, of course, quite impossible to determine whether (65) is equivalent in meaning to (64b).

(65) \*John left then when Bill arrived.

Thus, we cannot infer that then is the antecedent, but only that at the time is not. However, there are theoretical considerations which suggest that then is the antecedent of when-clauses. These will be given below in the section on the Antecedent Deletion Rule.

### While-clauses

I have argued in the previous two sections of this chapter that adverbial clauses introduced by the so-called subordinating conjunctions where and when are relative clauses, the antecedents of which have been deleted. Thus, according to this analysis, where and when are ordinary relative adverbs in such sentences. In this chapter, I shall turn to consider adverbial clauses introduced by while and try to show that they are also relative clauses, that is, that while is also a relative adverb.

As far as I have been able to determine, no one has seriously suggested before now that the while-clause of a sentence like (1) might be a relative clause.

- (1) John wasn't very happy while he was a student.

Most grammarians would be content to say that while is a conjunction in (1). However, Jespersen (1961 V:345) points out that occurrences of while

such as that in (1) are historically related to such nominal occurrences of while as that in (2).

- (2) John wasn't very happy all the while he was a student.

Interestingly, such an "analysis", if taken seriously synchronically, is tantamount to the view that while-clauses are relative clauses, for the clause he was a student is a relative clause in (2).

The distribution of while-clauses is exactly the same as that of frame adverbials like during that time and in 1952. Note in particular that neither a while-clause nor a frame adverbial can occur with last.

- (3) \*The concert lasted while I was asleep.  
 (4) \*The concert lasted during the time that I was asleep.

This environment is important, for, as far as I have been able to determine, the only verb that can take time adverbs at all but which cannot take frame adverbials, is last. As (5) indicates, last can occur only with durative adverbials like throughout the afternoon or for six hours.

- (5) The concert last
- \*at ten o'clock
  - \*during the afternoon
  - \*in the evening
  - \*every other week
  - throughout the evening
  - for six hours

One of the more interesting facts about frame

adverbials is that they--or, rather, sentences containing them--are systematically ambiguous. Notice, for instance, that (6) can be interpreted to mean either that John was in England during all of the time that Bill was in France or that he was in England only during some of that time.

- (6) John was in England during the time that Bill was in France.

Sentence (7) has the same two interpretations.

- (7) John was in England while Bill was in France.

The only time when frame adverbials do not have this ambiguity is when the verb with which the frame adverbial is grammatically related is inherently "instantive" (cf. (8)) or inherently "durative" (cf. (9)).

- (8) a. The baby was born during the time that we were on our way to the hospital.  
 b. The baby was born while we were on our way to the hospital.
- (9) a. John stayed in bed during the time that Mary did the dishes.  
 b. John stayed in bed while Mary did the dishes.

Like when-clauses, while-clauses have then as their pronominal realization. Consider, for instance, the sentences

- (10) Flight 737 arrived while I was on my way to the airport; flight 940 arrived then too.
- (11) John stayed in bed while Mary was doing the dishes even though he promised that he wouldn't do so then.

In this respect also, while-clauses are like frame adverbials. In addition to (10) and (11), we have the corresponding sentences (12) and (13).

- (12) Flight 737 arrived during the time that I was on the way to the airport; flight 940 arrived then too.
- (13) John stayed in bed during the time that Mary was doing the dishes even though he promised that he wouldn't do so then.

The interpretations that (10) and (12) have mitigate against one possible analysis of the "instantive" interpretation of frame adverbials. It is clear that sentences (14) and (15) have the same meaning as (16) and (17), respectively.

- (14) Flight 737 arrived while I was on my way to the airport.
- (15) Flight 737 arrived during the time that I was on my way to the airport.
- (16) Flight 737 arrived at some moment while I was on my way to the airport.
- (17) Flight 737 arrived at some moment during the time that I was on my way to the airport.

In light of the similarity in meaning of (14) and (15) to (16) and (17), respectively, it is



tempting to suppose that (14) and (15) are derived from these sentences by deletion of at some moment. However, if (14) and (15) are to have the same underlying structure as (16) and (17), respectively, then (10) and (12) should have the same meaning as (18) and (19), respectively. But, of course, they do not.

(18) Flight 737 arrived at some moment while I was on my way to the airport; flight 940 arrived then too.

(19) Flight 737 arrived at some moment during the time that I was on my way to the airport; flight 940 arrived then too.

Sentences (18) and (19) are true only if flights 737 and 940 arrived at the same moment. On the other hand, (10) and (12) are true if these flights did not arrive at the same moment. Thus, it seems that the fact that (14) and (15) have the same meaning as (16) and (17) will have to be accounted for by some semantic rule--possibly a universal one--and not by the syntax directly.

As in the case of where- and when-clauses, nothing can be pulled out of a while-clause. Observe that while (20) is perfectly acceptable, the object of wash can be neither questioned (cf. (21a)) nor relativized (cf. (21b)).

(20) John stayed in bed while Mary washed the dishes.

(21) a. \*What did John stay in bed while Mary washed.

- b. \*The dishes which John stayed in bed while Mary washed were plastic.

We could account for the fact that (21a) and (21b) are unacceptable if we were to suppose that while-clauses are contained within Complex Noun Phrases. One analysis which is consistent with such a supposition is to say that while-clauses are embedded as relative adjuncts to the adverbial during the time. According to this analysis, (20) would be grammatically related to (22).

- (22) ? John stayed in bed during the time while Mary washed the dishes.

Against such an analysis is the fact that (22) is totally unacceptable in some dialects--it is only marginally acceptable in mine. Presumably this difficulty can be dealt with by a constraint on the lexical insertion while (see below). On the other hand, such an analysis is consistent with the facts we have observed about the distribution of while-clauses, with the fact that while-clauses have then as their pronominal realization, and with the fact that nothing can be pulled out of while-clauses.

As in the case of clauses introduced by where and when, it is possible to show that an adverbial must exist in the underlying structure of a while-clause which does not appear in surface structure--

at least in its original form. We noticed above that the verb last can occur with durative time adverbs like throughout the evening or for six hours, but not with any other type of time adverbial. As (23) shows, last cannot occur without a durative adverbial.

- (23) The concert lasted  $\left. \begin{array}{l} * \phi. \\ \text{throughout the evening.} \\ \text{for four hours.} \end{array} \right\}$

Note, though, that last can occur in a while-clause without a durative adverbial--indeed, it cannot occur with one.

- (24) John was pretty happy while the concert lasted.
- (25) \*John was pretty happy while the concert lasted throughout the evening.

A reasonable hypothesis as to why a durative adverbial must occur with last in simple sentences but cannot occur with last in while-clauses is that such an adverbial does occur in the deep structure of while-clauses and is deleted or converted into while, for as the impossibility of (26) illustrates, only one durative adverbial can occur per clause.

- (26) \*The concert lasted for four hours throughout the evening.

Last is the only verb I know of which must occur with a durative adverbial. Some examples in which duratives can occur optionally in simple sentences but not at all in while-clauses are

- (27) a. John watched T. V. for thirty hours.  
 b. John expired while he watched T.V.  
 c. \*John expired while he watched T.V. for thirty hours.
- (28) a. Johnson was President throughout Mary's formative years.  
 b. Mary wasn't too happy while Johnson was President.  
 c. \*Mary wasn't too happy while Johnson was President through out her formative years.
- (29) a. Harold was sick for three weeks.  
 b. Harold stayed at home while he was sick.  
 c. \*Harold stayed at home while he was sick for three weeks.

The explanation of the unacceptability of (27, 28, and 29c) which seems most natural is that a durative adverbial is absorbed in the formation of while-clauses. Since only one durative is permitted per verb, the only possible durative in a non-complex while-clause is lost or converted into while.

If we say that a durative time adverbial is absorbed in forming while-clauses, then it should be the case that strings which are incompatible with the presence of a durative adverbial in simple sentences cannot occur as while-clauses. There are some minor difficulties here. Consider the sentences

- (30) a. \*John died throughout the night.  
 b. ?I was at the hospital while John died.
- (31) a. \*The balloon burst for six days.  
 b. ?\*The kids cried while the balloon burst.
- (32) a. \*John had died throughout the night.  
 b. \*I was at the hospital while John died.
- (33) a. \*The balloon had burst throughout the night.  
 b. \*The kids cried while the balloon had burst.

Sentence (30b) strikes me as nothing like as bad as (30a) and (31b) strikes me as a little better than (31a). But the hypothesis that a durative time adverbial is absorbed in forming while-clauses leads to the prediction that (30b) and (31b) should have the same degree of acceptability of (30a) and (31a), respectively. That they don't isn't actually very troubling, especially in light of the fact that (32) and (33) -- sentences using the same verbs -- pose no problem.

I have argued that a durative adverbial is deleted or converted into while in forming while-clauses on the basis of co-occurrence relations observed to obtain within these clauses. In this regard, while-clauses seem to be like when- and where-clauses. However, there is one quite striking difference between while-clauses and the others,

namely, that this hypothetical adverbial can be in a verb-adverbial relation only with the main verb of the while-clause. Observe that (34), (35), and (36) are all ambiguous.

- (34) Mary doubted that John would work very much throughout the summer.
- (35) Throughout what period did Mary doubt that John would work very much?
- (36) Mary was miserable during the period throughout which she doubted that John would work very much.

In each of these sentences the adverbial underlying throughout which can be interpreted as modifying either doubt or work. Note, though, that (37) is not similarly ambiguous.

- (37) Mary was miserable while she doubted that John would work very much.

In (37) while can modify only doubt. As far as I have been able to determine, there are no counter-examples to the claim that while can modify only the main verb of the subordinate clause.

The fact that while can only modify the main verb of a clause it introduces might seem to provide a death-blow to the hypothesis that while-clauses are formed in part by the movement of a representative of the class of adverbials that includes those like for six months and throughout the last week to clause-initial position, which is, of course, a necessary condition for relativization.

For if the movement rule were the same as that involved in forming where- and when-clauses, or, more to the point, the relative clause of (36), then there would be no non-ad hoc way to block the generation of a sentence like (37) in two ways. The only device I have been able to rig up that will preclude generating (37) in two ways is to suppose that each S that occurs in a tree is assigned an integer which reflects the degree to which it is embedded: the highest S receiving (say) the integer 1, the next highest 2, the third from the highest 3, etc. -- equally deep S's receiving the same integer. We must also suppose that every category in a given simplex S is assigned the same integer as is assigned to the S. Assuming these facts then some "rule" like (38) would seem to work.

(38) X -- [ [ throughout which ] -- Y  
 $s_n$   $adv_n$   $adv_n$   
 1 -- 2 -- 3  
 Substitute while for 2  
 Condition:  $n > 1$

I find this account of the fact that (36) is ambiguous and (37) is not ambiguous ad hoc in the extreme. But some device at least this ad hoc will be required unless we can find some purely grammatical explanation of this somewhat strange property of while-clauses.

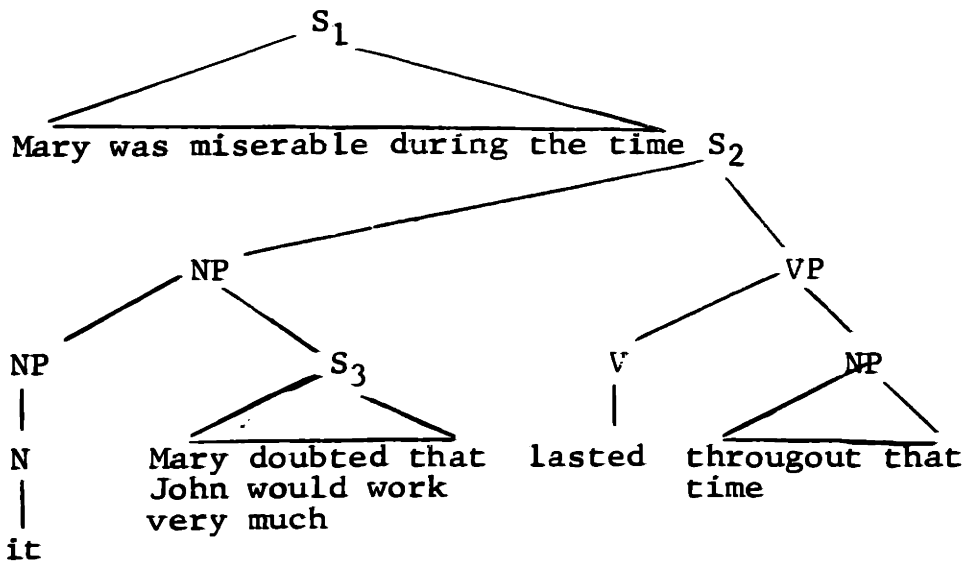
There does exist such an explanation. There is another way to look at (37) than to say that while can only modify doubt. It is just as reasonable, in fact even more reasonable, to say that while modifies the whole subordinate clause. That is, I think the meaning of (37) is as closely approximated by (39) as by the interpretation of (36) in which throughout which modifies doubt.

(39) Mary was miserable while her doubt  
that John would work very much lasted.

Indeed, if we were to suppose that (37) and (39) have essentially the same underlying structure -- (39) being more basic than (37) -- and if we suppose that while-clauses are formed by the deletion or conversion into while of a representative durative adverbial, we can account for the fact that while seems only to modify the main verb of any clause that it introduces. In order to show how this account works, let us consider sentences (37) and (39) in light of the following structure:



(40)



We suppose, in order to derive (39), that the NP throughout the time is moved to the front of S<sub>2</sub> while the cycle is operating within the domain of S<sub>2</sub> by the same rule that moves it to the front of the relative clause on both derivations of (38), thus generating sentence (41).

(41) Mary was miserable during the time throughout which her doubt that John would work very much lasted.

Suppose, though, that there had been an occurrence of the adverbial throughout that time somewhere in S<sub>3</sub> as well as one associated with last. If this adverbial modifies work and if it is not preposed, then all will be well. Sentence (42) is acceptable, as are (43) and (44).

(42) Mary was miserable during the time throughout which her doubt that John would work

very much throughout the summer lasted.

(43) Mary was miserable while her doubt that John would work very much throughout the summer.

(44) Mary was miserable while she doubted that John would work very much throughout the summer.

On the other hand, if the occurrence of this durative which modifies work is preposed, chaos results. Corresponding to (42) and (53) we have (45) and (46), respectively.

(45) \*Mary was miserable during the time throughout which her doubt that John would work very much lasted throughout the summer.

(46) \*Mary was miserable while her doubt that John would work very much lasted throughout the summer.

Since last must be deleted in the formation of "ordinary" while-clauses--it must be deleted from structure (40) if  $S_3$  is not nominalized--the ungrammatical sentence that corresponds to (44) is (47) below.

As far as I can tell, if an occurrence of some adverbial like throughout the summer were to modify doubt in (40), no fully acceptable sentence will result. If this adverbial is preposed, (45) and (46) result; if it is not, then (47) - (49) result.

(47) \*Mary was miserable during the time throughout which her doubt throughout the summer that John would work very much lasted.

(48) \*Mary was miserable while her doubt  
throughout the summer that John  
would work very much lasted.

(49) \*Mary was miserable while she doubted  
throughout the summer that John  
would work very much.

Sentences (47) - (49) are very strange, if not ungrammatical. The interesting thing about them is that throughout the summer and while necessarily must be interpreted as delimiting the same period of time. Note that this is not at all the case with (42) - (44). In the case of (47), the explanation is clear, for it is inconceivable that the adverbial modifying last and that modifying doubt not delimit the same time-periods. This is true of a variety of verbs semantically like last.

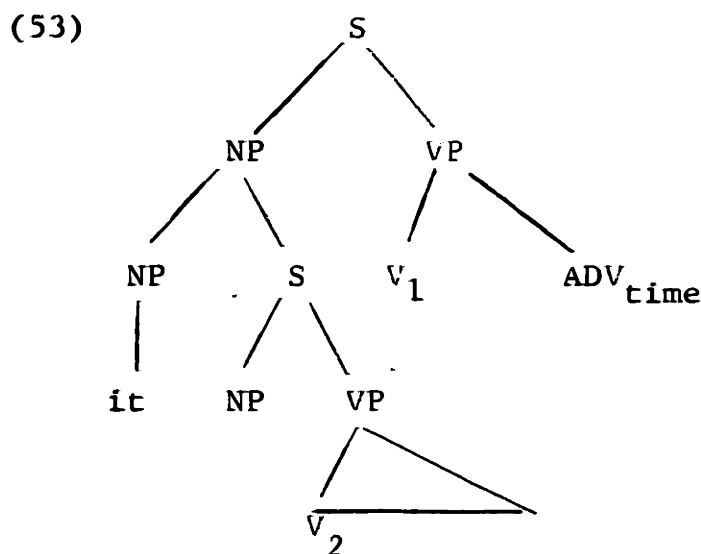
(50) \*John's proposal to Mary in 1952  
took place in 1968.

(51) \*Mary's arrival at three transpired  
at eleven.

(52) \*Mary's departure at ten occurred  
at eleven.

Sentences (50) - (52) would be ungrammatical even if the adverbials were identical, as are (47) - (49). What is important about them is that if an adverbial is present in the nominalized clause, it must refer to the same time as that which occurs with the higher verb last, take, place, transpire, or occur, etc.

The impossibility of (49) and (50) - (52) may be due, I think, to the semantic fact that in a structure like (53)



if  $V_1$  is a verb like last, take place, transpire, or occur, then the referent of  $V_2$ --the event, state of being, etc.--is necessarily interpreted as restricted to the time referred to by the time adverbial (or place adverbial, by the way) that modifies  $V_1$ .<sup>14</sup> I submit that this is the explanation for the strangeness of (48). If we were to provide a rule that deletes last from a while-clause if the clause which is subordinate to last has a finite verb, then we could account for the strangeness of (49). (The last-Deletion Rule must apply to get (49). Such a proposal also accounts for the fact that while

always seems to modify the main verb of any clause it introduces.

Let me make clear that I am not claiming that only those verbs which can be nominalized and, thus, serve as the subject of last can occur as the main verb of a while-clause, as might be inferred from my drawing a parallel between (37) and (39). I am assuming that it is just those AUX-V configurations which are compatible with durative adverbials that are compatible with last as the next verb up.

I have not yet worked out the details of this analysis. However, I can think of no reason why the basic insight of the analysis of while-clauses--the view that all while-clauses have the underlying structure of (53), where  $V_1$  is last (or some verb which is like it in that it obligatorily occurs with durative time adverbials) and where the adverbial of time is throughout that time (or some adverbial like it)--should pose any insurmountable problems.

I showed above that while-clauses have the same distribution as a frame adverbial like during the time, that they pronominalize, as do "simple" frame adverbials like during the time, and that they must be supposed to be contained within Complex Noun Phrases. All of these facts could be accounted for if we were to say that while-clauses are always embedded as rela-

tive adjuncts to during the time or some other frame adverbial. Note that for those who, as I do marginally, get (54) and (55), such an analysis would be well-motivated on grounds of simplicity.

(54) ? John died during the time while  
I was in Rome.

(55) ? John worked hard all during the  
time while he was a student.

I have further argued that we must suppose an occurrence of last, or some similar verb, as the highest verb in the underlying structure of a while-clause. The obligatory durative adverbial that accompanies last, I argue, underlies while. This set of assumptions about the internal structure of while-clauses is the basis for my account of the fact that while seems only to modify the main verb of a while-clause.

Is there any evidence that points specifically to the view that while-clauses are relative, that is, to the view that the adverbials of the main and subordinate clauses that I have hypothesized exist participate in an identity condition? There is, of course, the semantic fact that the action or state of being referred to by the verb of the main clause occurs within the time period delimited by while. An identity condition will obviously play a role in accounting for this fact. Moreover, the phenomenon of tense harmony

observed in connection with sentences containing when-clauses also obtains in the case of sentences containing while-clauses. Consider, for example,

(56) John will work while you study.

(57) John worked while you studied.

(58) \*John worked while you study.

(59) \*John will work while you  
studied.

If we suppose that the head noun phrase of the duration adverbial into which I have suggested while-clauses are embedded and the head noun phrase of the adverbial underlying while are assigned indices of temporal reference--i.e., [+past] or [-past]--and that these noun phrases undergo an identity condition, we can account for (56) - (59) in a straightforward way.

I have no evidence that singles out some specific frame adverbial as the antecedent of while-clauses. However, from the fact while-clauses have then as their pronominal reflex, it is not unreasonable to suppose that, as in the case of when-clauses, then is this antecedent. As we shall see in the next section, this analysis has an interesting theoretical consequence.

In order to account for dialects in which while-clauses can never have antecedents in surface structure, it is necessary to suppose that the insertion

of while into a tree be restricted to cases in which then (or whatever is the correct antecedent) is the antecedent. The Antecedent Deletion Rule will then obligatorily delete then. I am not especially happy with this hypothesis, but I know of no better alternative.

### The Antecedent Deletion Rule

I have been shown that adverbial clauses introduced by where, when, and while and certain putatively nominal clauses introduced by where are relative clauses, the antecedents of which are deleted by an Antecedent Deletion Rule. Before attempting to give this rule, let us briefly review the data which it must account for. The clear cases are found in such sentences as

- (1) John lives where Bill lives.
- (2) a. John left when Bill left.  
b. John slept when Bill slept.
- (3) a. John arrived while Bill  
was away.  
b. John slept while Bill slept.

Additionally, our rule must be able to deal with relative what-clauses, as in

- (4) I ate what Mary cooked for me.

In the case of such sentences as (5), I have argued that the object of the prepositions to, near, and



up is actually an adverbial, not an ordinary noun phrase. Thus, the sentences of (5) are special cases of (1).

- (5) a. I was sent to where Bill was living.  
 b. I live near where Bill grew up.  
 c. I live up where Bill does.

The direction where-clause of (6), which corresponds to (5a), I have argued, is derived by an application of the Antecedent Deletion Rule to an adverbial object of to and, then, by an application of a rule of to-Deletion, which deletes to before where (optionally in my dialect) except when to is a part of a compound prepositional expression like from where Harry was born to where Joe was born.

- (6) I was sent where Bill was living.

All of the above data could be accounted for by supposing that the Antecedent Deletion Rule deletes a pronominal adverbial (there, for where-clauses, and then, for when- and while-clauses) before its corresponding wh-adverbial, or a pronoun (that, for what-clauses) before its corresponding wh-noun phrase. However, we must restrict this rule so that it does not apply to human pronouns before who, for sentences like (7) are no longer acceptable English.

(7) Who steals my purse steals trash.

I suggest, then, that Antecedent Deletion by formulated as follows:

(8) Antecedent Deltion Rule

X	-	[NP	+ <sup>pro</sup> -human	-	[s	+ <sup>pro</sup> +WH	Y
1	-		2	-		3	
1	-		∅	-		3	

What recommends the claim that a pronoun is being deleted? For one thing, such a decision permits a rather elegant formulation. More to the point, though, such a decision may permit an account for why we do not have adverbial relative why - and how-clauses such as are in (9).

- (9) a. \*I solved the problem how you did.  
 b. \*I left why you did.

Note that we do not get

- (10) a. \*I solved the problem in the way  
 you did and Harry solved it  
 { in { it  
           that } } too.  
           thus }  
 b. \*I left for the reason that you left  
 and Harry left { for { it  
                           that } } too.  
                           ? }

If we were to correlate the possibility of occurrence of an independent relative clause with the existence of a pronoun having the same grammatical function

as the clause, then we would have an explanation for the non-existence of (9).

There is, of course, a much more mundane explanation for the unacceptability of (9) which is possible, namely that how never occurs as a relative pronoun and why occurs as a relative pronoun only when its antecedent is a nonadverbial noun phrase, as in (11).

- (11) The reason why Bill left is that he had too much sense to stay.

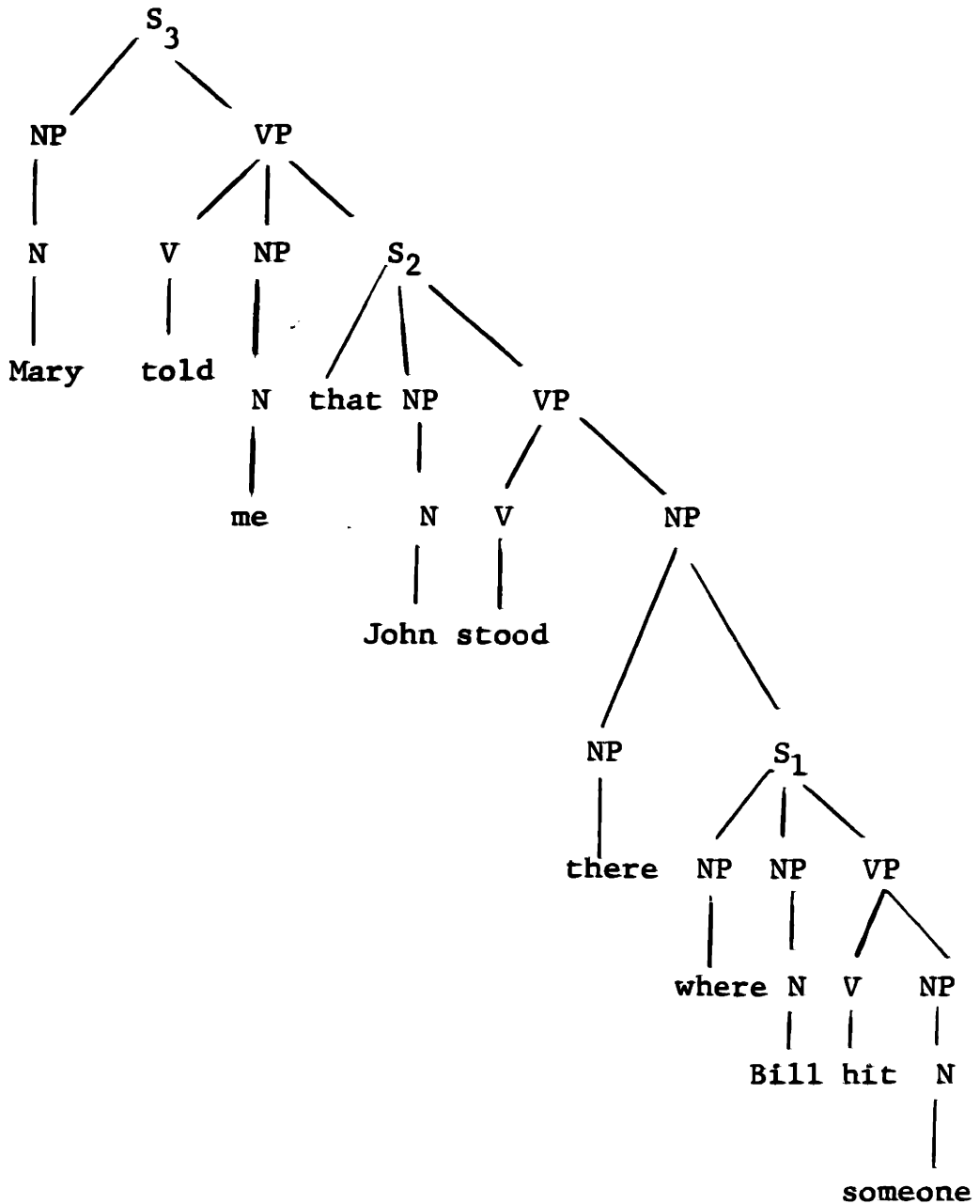
According to this view, the unacceptability of (9) is a consequence of the unacceptability of (12).

- (12) a. \*I solved the problem in the way how you did.  
 b. \*I left for the reason why you left.

I am presently unable to provide reasons for accepting one over the other explanation for the nonexistence of (9). One real possibility, though, is that these are related phenomena.

It is reasonably clear that Antecedent Deletion must be post-cyclic. Consider the following structure:

(13)



Observe that if Antecedent Deletion were cyclic,  
 then this rule could apply on the  $S_2$  cycle, making

possible an application of the rule that moves noun phrases to sentence-initial position in forming questions on the  $S_3$  cycle, for after there has been deleted,  $S_1$  will no longer be within a complex noun phrase. Thus, if Antecedent Deletion were cyclic, (14) could be derived from (13).

(13) \*Who did Harry tell me that John stood  
where Bill hit?

The only way we can avoid generating (13) is to suppose that Antecedent Deletion is post-cyclic and that it follows all rules making essential use of variables.

## Footnotes

1. Each of these so-called "conjunctions" has several meanings. For instance, while can mean "during the time that" or "although". In this chapter, we shall be concerned exclusively with the location and direction senses of where and the temporal senses of when and while.

2. The fact that (2) is ungrammatical in most dialects poses certain problems for the view that while-clauses are relative clauses. As John Ross has pointed out to me privately, it won't do to simply make the Antecedent Deletion Rule obligatory for while-clauses, for we must block such expressions as \*during the summer while. I shall suggest a solution to this problem below.

3. In many dialects, (12) is unacceptable without the presence of to (i.e., dashed to where). Any reader who has this dialect should read sentences containing such verbs as dash or send with to. What is at stake here is whether or not to-Deletion (see the section on the Antecedent Deletion Rule below) is optional or non-existent in a given dialect.

4. Recall footnote 3 when reading (21).

5. This "standard view of pronominalization

can be found in Lees and Klima (1963), Langacker (1969), and Ross (1967c). Those familiar with Jackendoff (1969) will note that precisely the same problems arise in connection with his very different view of pronominalization.

6. See Baker (1968) for an excellent discussion of the "diagnostic" tests for relative clauses and indirect questions and for an analysis of the latter type of complement construction.

7. The verb *near* might seem to be a counter-example to the view that relative where-clauses never occur as the object of a verb, for note

- (i) John neared where his father was born with a feeling of great awe.

However, note that the where-clause of (i) has there as its pronominal reflex.

- (ii) John neared where his father was born with a feeling of great awe, but his wife felt nothing when she neared there.

Immediately below, I argue that all where-clauses have there as an antecedent. Thus, since near can co-occur with the adverbial there it can, according to my analysis, co-occur with where-clauses. In short, near is not a transitive verb in underlying structure.

8. See J. Geis (in preparation) for

arguments in support of this conjecture. In Chapter 4 below, I show that the so-called "conjunctions" before, after, until, and since are derivative of underlying prepositional occurrences of these words and that these prepositional occurrences are derivative of underlying adjectives (for before and after) and verbs (for until and since).

9. I am indebted to William Cantrall for pointing this out to me.

10. I find the existence of auxiliary verb-adverbial co-occurrence relations particularly compelling evidence in support of the view that auxiliary verbs and the relevant adverbials originate outside of the clauses in which they occur in surface structure. Two example of such relations involve the perfect auxiliary and "completive" adverbials like by ten o'clock, up to now and before (now) and the modal would and conditional clauses.

Note for instance, that (i) is acceptable, but that (ii) is unacceptable and (iii) is acceptable, but clearly elliptical (something like by then or up to then has been deleted).

- (i) John had studied for four hours  
by then.



(ii) \*John studied for four hours  
by then.

(iii) John had studied for four hours.

Moreover, I find (iv) acceptable, (v) unacceptable, and (vi) acceptable but elliptical (by now or up to now has been deleted).

(iv) John has lived here for four  
years by now.

(v) \*John lives here for four  
years by now.

(iv) John has lived here four  
years.

Sentences (i) - (vi) show, I think, that the perfect auxiliary and adverbials like by that time participate in the same sort of co-occurrence relation as holds between ordinary verbs and adverbials. But if I am correct in saying that auxiliary verb-adverbial relations are special cases of verb-adverbial relations, then we must, I think, state both kinds in the same way.

Ordinary verb-adverbial relations always, to my knowledge, involve contiguous constituents. For example, if we suppose that adverbs "come from" higher sentences as has been argued by Lakoff (1965, 1967), then the adverbial will occur in the sentence immediately above that containing the main verb. And, if auxiliary verb-adverbial relations are special cases of verb-adverbial relations, we must suppose that

the auxiliary verbs and adverbials involved occur in separate, but contiguous (in the sense just discussed) sentences in underlying structure.

Another example of an auxiliary verb-adverbial co-occurrence relationship is that which seems to hold between would and conditional adverbials. Consider, for instance, the sentences

(vii) \*John would leave.

(viii) John would leave if he could.

11. Although when can be interpreted to mean "while" in this sentence, I do not have this interpretation in mind. Read when as "at the same time that" in this and all other examples in this section. I shall discuss while-clauses in the next section. See J. Geis (in preparation) for a discussion of cases in which when is interpretable as meaning "while!"

12. It should be noted that time in (19) and (20) has extension and that the adverbial underlying when must also have extension.

13. See M. Geis (in preparation) for a more detailed discussion of the phenomenon of tense harmony.

14. See Newmeyer (1969) for a discussion of this problem.

## CHAPTER 4

## Clauses Introduced by Time Prepositions

## Introduction

In the previous chapter, I showed that adverbial clauses introduced by where, when, and while are not, as is suggested by many traditional grammarians, examples of some special type of complement construction, but, instead, are special cases of relative clauses. In this chapter, I turn to consider clauses introduced by the so-called "conjunctions" before, after, until, and since. Some examples of sentences containing this type of construction are

- (1) John arrived before Bill was fired.
- (2) John departed after Bill left.
- (3) John studied until Bill arrived.
- (4) John has been living there (ever) since he began to work for Bill.<sup>1</sup>

Generally speaking, grammarians have regarded before, after, until and since as prepositions functioning as conjunctions in sentences like (1) - (4). Such grammarians do not seem to mean by this that (1) - (4) are grammatically related to (5) - (8).

- (5) John arrived before the time at which Bill was fired.
- (6) John departed after the time at which Bill left.

- (7) John studied until the time at which Bill arrived.
- (8) John has been living there (ever) since the time at which he began to work for Bill.

Instead, it has been meant, I think, that words like before, after, until, and since can occur either as prepositions (i.e., before noun phrases) or as conjunctions (i.e., before clauses), but that prepositional occurrences of these words are grammatically more central, or are historically prior, or both. In this study, however, I shall show that (1) - (4) are in fact related to (5) - (8), that is that the clauses introduced by these time prepositions, like where-, when-, and while-clauses, are relative clauses.

The demonstration that clauses introduced by time prepositions are relative clauses serves, for two of the three classes of adverbial clauses under consideration here, to support the central point of this thesis that such clauses are special cases of independently motivated types of complement constructions. However, I shall go one step further in my analysis of these time prepositions and try to show that each of them has a (synchronic) deverbal origin. I take this latter demonstration as evidence in support of the view that prepositional phrases, to say nothing of prepositions, do not

exist as such in underlying structure, but, instead, are degenerate verb phrases.

The Prepositional Character of before, after, until, and since

There are three reasons for supposing that clauses introduced by these so-called "conjunctions" are adjuncts to some noun phrase at an abstract level of structure, i.e., that these words are prepositions. One reason is that nothing can be moved out of such clauses. Consider, for instance, the sentences

- (9) a. John departed before Mary kissed the other boy.  
 b. \*Which other boy did John depart before Mary kissed?
- (10) a. John dashed for the closet after his father screamed at his brother.  
 b. \*Whose brother did John dash for the closet after his father screamed?
- (11) a. John studied until Mary called their friends up.  
 b. \*Where has John been miserable (ever) since he began to live?
- (12) a. John has been miserable (ever) since he began to live there.  
 b. \*Where has John been miserable (ever) since he began to live?

If we were to suppose that clauses introduced by time prepositions are Complex Noun Phrases, then we would have an explanation for the fact that the b forms of (9) - (12) are unacceptable, for the Complex Noun Phrase Constraint would preclude movement of any

constituent out of such clauses. The view that these clauses are relative clauses--that (9) - (12) are related to (13) - (16), for example--would account for the fact that it is impossible to question constituents of such clauses.

- (13) a. John departed before the moment at which Mary kissed the other boy.
- b. \*Which other boy did John depart before the moment at which Mary kissed?
- (14) a. John dashed for the closet after the time at which his father screamed at his brother.
- b. \*Whose brother did John dash for the closet after the time at which his father screamed?
- (15) a. John studied until the moment at which Mary called their friends up.
- b. \*Whose friends did John study until the moment at which Mary called up?
- (16) a. John has been miserable (ever) since the time at which he began to live there.
- b. \*Where has John been miserable (ever) since the time at which he began to live?

A second argument in support of the view that clauses introduced by time prepositions are embedded as adjuncts to noun phrases is that in all but one case they prenominalize like noun phrases, or, more accurately, like adverbial phrases. Consider, for instance, the sentences

- (17) a. John arrived before Bill was fired and George arrived before then too.
- b. John arrived before the moment at which Bill was fired and George arrived before then too.
- (18) a. \*John departed after Bill left and George departed after then too.
- b. \*John departed after the moment at which Bill left and George departed after then too.
- (19) a. John studied until Bill arrived and George studied until then too.
- b. John studied until the moment at which Bill arrived and George studied until then too.
- (20) a. John has been living there (ever) since he began to work for Bill and George has been living there (ever) since then too.
- b. John has been living there (ever) since the moment at which he began to work for Bill and George has been living there (ever) since then too.

There is some dialect variation with respect to the pronominal form of clauses introduced by these prepositions. Many find the a and b forms of (18) acceptable. Others, including me, can have only that where then occurs in (18). Some can have only that where then occurs in (17), but I get both then and that in this sentence. As far as I have been able to determine, (19) and (20) are acceptable to everyone

and that cannot occur in place of then in these sentences for anyone. That before and after should work alike and differ from until and since with respect to the possibility of occurrence of that is not surprising, as we shall see. What interests me here is the fact that in three of the four cases in my dialect and in all cases in some dialects an adverbial occurs as the pronominal realization of before-, after-, until-, and since-clauses.

In order to provide a univocal account of the a and b forms of (17) - (20) we must suppose, minimally, that the clauses introduced by the prepositions in the a forms, like the relative clauses in the b forms, are embedded as adjuncts to noun phrases. I say "minimally," for it seems to me that we must suppose that the "objects" of until and since are actually adverbials at an abstract level of structure in order to account for the presence of then in (19) and (20). Clauses introduced by before and after have both then and that, so any decision about the character of objects of these prepositions will be problematic if we consider only facts from pronominalization. We are not dealing in the case of until and since with a completely isolated fact, for recall that certain location and direction prepositions can occur with the adverbial there as an object. I shall return to show how the



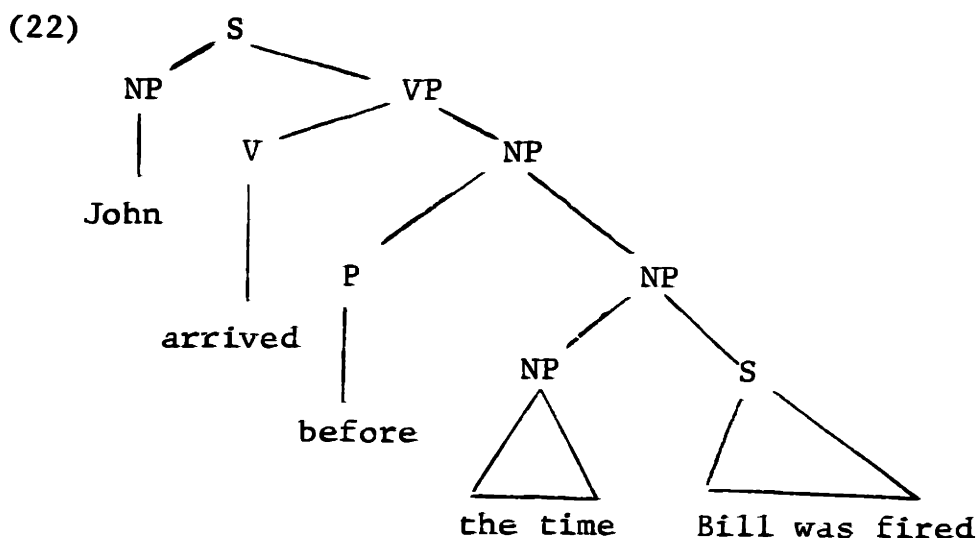
somewhat counter-intuitive view that the objects of until and since are actually adverbials can be made quite plausible. On the other hand, I shall show below that the objects of before and after are probably noun phrases, not adverbials. In any case, we must suppose that these clauses are embedded as adjuncts to some noun phrase-like constituent in order to account for the presence of then and that as the pronominal reflexes of clauses introduced by time prepositions.

A third reason for believing that clauses introduced by time prepositions are embedded as adjuncts to noun phrases--equivalently, that these prepositions have objects--at some abstract level of representation is that such an hypothesis provides the simplest description of the distribution of the prepositions before, after, until, and since. We need only fit them out with a strict-subcategorization feature stating that they always take objects. Such a move would, as is reasonable, force us to regard apparent adverbial occurrences (cf. (21)) of these words as elliptical--involving deletion of their objects.

- (21) a. I have never done that before.  
 b. They lived happily ever after.  
 c. They have lived happily ever since.

Additionally, the supposition that constructions in which before, after, until, and since "introduce" clauses in surface structure are special cases of ordinary prepositional phrases predicts--correctly, as far as I have been able to determine--that the distribution of the former and latter types of constructions in main clauses is the same.

I have argued so far that before, after, until, and since in sentences like (1) - (4) occur with objects in underlying structure and that the clauses these prepositions seem to introduce are adjuncts to the objects of these prepositions. Structure (22) illustrates, for sentence (1), what I take my argument to have shown about the structure of clauses introduced by time prepositions.



Let us turn now to consider the internal structure of these clauses.

The Internal Structure of Clauses Introduced by before, after, until, and since

In this section, I shall try to show that some instantive time adverbial must be supposed to occur in the underlying structure of clauses introduced by time prepositions and that this adverbial must be supposed to move in the derivations of these clauses. Such demonstrations are, of course, integral to the argument that clauses introduced by time prepositions are relative clauses.

Note that although (23) and (24) are perfectly acceptable, they cannot occur as before- or after- clauses.

- (23) John had finished the problem by midnight.
- (24) John had studied for ten hours by midnight.
- (25) \*I left before John had finished the problem by midnight.
- (26) \*John got up from his desk after he had studied for ten hours by midnight.

It is clear, from a comparison of (27) and (28) with (25) and (26), respectively, that the unacceptability of the latter pair of sentences is due to the presence of the adverbial by midnight in these sentences.

- (27) I left before John had solved the problem.
- (28) John got up from his desk after he had studied for ten hours.

Similarly, although an adverbial like by midnight is possible in such simple sentences as (29) and (30), it cannot occur in an until- or since- clause, as comparison of (31) and (32) with (33) and (34) shows.

- (29) Bill had arrived by midnight.
- (30) I wrote my thesis by midnight.
- (31) \*I studied until Bill had arrived by midnight.
- (32) \*I have been miserable (ever) since I wrote my thesis by midnight.
- (33) I studied until Bill had arrived.
- (34) I have been miserable (ever) since I wrote my thesis.

There are three ways in which we can account for the fact that by midnight cannot occur in these clauses. The least interesting would be to suppose that there is some filtering transformation that blocks any structure in which an adverbial like by midnight occurs in such a clause. A much more interesting solution would be to suppose (a) that some representative adverbial of the class containing by midnight occurs in the underlying structure of before-, after-, until-, and since- clauses and that

this adverbial is obligatorily deleted in the derivation of such clauses or (b) that some constituent (possibly an adverbial) which cannot co-occur with an adverbial like by midnight occurs in the underlying structure of these clauses and that this constituent is obligatorily deleted. We must, of course, insist that the obligatory deletion of the hypothetical constituent of (a) or (b) be independently motivated.

It is reasonably clear that some instantive time adverbial does occur in the underlying structure of clauses introduced by before, after, until, and since. First, let us note that a frame or durative adverbial cannot be our hypothetical adverbial. As (35) - (38) show, strings compatible with such adverbials cannot always occur as before- or after-clauses.

(35) John slept during the afternoon.

(36) The party lasted for four hours.

(37) \*I left before John slept.

(38) \*John left after the party lasted.

Similar examples could be given for until-, and since- clauses. On the other hand, it is clear from (23) - (34) that strings compatible with the instantive adverbial by midnight can occur as time preposition clauses.

There are cases where clauses incompatible with instantives like by midnight, but compatible with instantives like at midnight, can occur as time preposition (henceforth, TP) clauses, for consider

- (39) a. \*John began to sleep by midnight.  
 b. John began to sleep at midnight.
- (40) I left before John began to sleep.

As a consequence, it seems to me that the correct approach is to suppose that some representative instantive adverbial occurs in the underlying structure of TP clauses but is obligatorily deleted in the derivation. The specific preposition--at or by--of this instantive adverbial is determined by clause-internal distributional considerations--roughly, by in the presence of the perfect auxiliary and at otherwise.<sup>2</sup>

There is further evidence of the existence of some hypothetical adverbial in the underlying structure of TP clauses. Recall from an earlier discussion that when-clauses are often ambiguous. In (39), for instance, when can be interpreted to modify either verb in the subordinate clause.

- (41) Joan left when Harry told her to (leave).

Let us suppose that Harry told Joan at time  $t_1$  to leave at time  $t_2$ . Sentence (41) can be interpreted to mean either that Joan left at time  $t_1$  or that she left at time  $t_2$ . Consider, in this light, (42) and (43).<sup>3</sup>

(42) Joan left before Harry told her to (leave).

(43) Joan left after Harry requested her to (leave).

My intuition is that (42) and (43) are ambiguous in the same way. If we suppose that the clauses of (42) and (43) are relative clauses, then we can account for the ambiguity of these sentences in a straightforward way, for (44) and (45) are ambiguous in the same way that (42) and (43), respectively, are.

(44) Joan left before the moment at which Harry told her to leave.

(45) Joan left after the moment at which Harry requested her to leave.

The ambiguity of (44) and (45) is, of course, due to the fact that the adverbial underlying at which could have been moved either from the clause containing tell or from the clause containing the subordinate occurrence of leave. If we were to suppose that (42) and (43) are derived in essentially the same way that (44) and (45) are, we can account for the fact that (42) and (43) are ambiguous in a natural way.

Let us suppose that Harry told Joan at time  $t_1$  to leave at time  $t_2$ . Sentence (41) can be interpreted to mean either that Joan left at time  $t_1$  or that she left at time  $t_2$ . Consider, in this light, (42) and (43).<sup>3</sup>

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Clauses introduced by until and since can be ambiguous in the same way that before- and after-clauses have been shown to be. Consider

(46) I waited around until Joe told me to leave.

(47) I have stayed at home (ever) since Joe asked me to (stay).

Sentence (46), if we suppose that Joe told me at time  $t_1$  to leave at time  $t_2$ , can mean either that I waited around until  $t_1$  or until  $t_2$ . Sentence (47) can be interpreted similarly. If we assume, as would be the case if until- and since-clauses were relatives, an adverbial occurs in underlying structure in grammatical relation with tell and ask on one derivation of (46) and (47), and in grammatical relation with leave and stay on the other derivation, then the ambiguities would be accounted for. Compare (46) and (47) with the explicitly relative sentences

(48) I waited around until the time at which Joe told me to leave.

(49) I have stayed at home (ever) since the time at which Joe asked me to (stay).

Thus, the assumption that until- and since-clauses are relative clauses provides a well-motivated account of the interpretations of such clauses.

The hypothesis that TP clauses are relative clauses is consistent with our earlier observation

that instantive adverbials cannot ordinarily occur inside them. Consider

- (50) \*I left before the moment at which John had finished the problem by midnight.
- (51) \*John got up from his desk after the moment at which he had studied for ten hours by midnight.
- (52) \*I studied until the moment at which Bill phoned at midnight.
- (53) \*John has lived here (ever) since the moment at which Bill died at midnight.

The unacceptability of (50) - (53) is, of course, due to the fact that no clause can contain more than one instantive adverbial.

In further support of the hypothesis that before- and after-clauses are relative clauses is the fact that derivations of them are subject to the Complex Noun Phrase Constraint. Note that although (42) and (43) are ambiguous, (54) and (55) are not.

- (54) Joan left before Harry told her of his desire for her to leave.
- (55) Joan left after Harry made his request for her to leave.

In (54) and (55), but not (42) and (43), the subordinate occurrences of leave are embedded in Complex Noun Phrases, and, as a consequence, if we say, as would be the case were before- and after-clauses relative clauses, that some adverbial moves in the

derivation of these clauses, then the Complex Noun Phrase Constraint would preclude an interpretation in which these subordinate occurrences of leave are involved in the case of (54) and (55), but not in the case of (42) and (43). Thus, just as (42) and (43) are like (44) and (45), respectively, in being ambiguous, (54) and (55) are like (56) and (57), respectively, in being unambiguous.

(56) Joan left before the time at which Harry told her of his desire for her to leave.

(57) Joan left after the time at which Harry made his request for her to leave.

Clauses introduced by until and since also evidence the movement of a constituent. Compare, for example, the ambiguous sentences (46) and (47) with the unambiguous sentences (58) and (59).

(58) I waited around until Joe told me of his desire to leave.

(59) I have stayed at home (ever) since Joe made his request for me to stay.

In neither (58) nor (59) is an interpretation involving the subordinate occurrences of leave and stay possible. Again, if we were to say that the possibility of an interpretation with a given verb in an until- or since-clause is a function of the possibility of moving an adverbial out of the clause in which this verb occurs, then we could account for

the fact that (58) and (59) are unambiguous, for the Complex Noun Phrase Constraint would block movement of an adverbial out of the clauses containing the subordinate occurrences of leave and stay.

Note, of course, that explicitly relative until- and since-clauses are similarly unambiguous.

(60) I waited around until the time at which Joe told me of his desire to leave.

(61) I have stayed at home (ever) since the time at which Joe made his request for me to stay.

I have argued thus far that the so-called conjunctions before, after, until, and since are in fact prepositions, i.e., these formatives have objects. I have further argued that within the clauses introduced by these prepositions there is some representative instantive time adverbial that moves (presumably, to clause-initial position) in the derivations of these clauses.<sup>4</sup> In order to show that TP clauses are relative clauses, we must further show that the objects of these prepositions and the adverbial that moves to clause-initial position participate in an identity condition. That they do follows from the fact that TP clauses, like time relative clauses, evidence tense harmony.

## The Identity Condition

In this section, I shall show that TP clauses are subject to tense harmony, a phenomenon characteristic of time relative clauses. However, since since-clauses differ from the others in how tense harmony works, I propose to break up my discussion into two parts--one on before- and after-clauses and one on until- and since-clauses. I shall, additionally, show that all four prepositions must be supposed to be de-verbal in origin.

### Before- and after-clauses

The most important argument in support of the view that before-and after-clauses are relative clauses is that they exhibit the phenomenon of tense harmony characteristic of time relative clauses. Consider, for instance, the sentences

- (62) I left  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Bill left.
- (63) I will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Bill leaves.
- (64) \*I left  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Bill leaves.
- (65) \*I will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Bill left. <sup>5</sup>

As in the case of when-clauses, tense harmony here

is not limited simply to the clause containing before and after and the main clause of the subordinate clause. Compare the ambiguous sentence (66) with the unambiguous sentence (67).

(66) Joan will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Harry  
tells her to (leave).

(67) Joan will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Harry  
told her to (leave).

Sentence (66), if we suppose that Harry will tell Joan at time  $\underline{t}_1$  to leave at time  $\underline{t}_2$ , asserts that Joan will leave after (before)  $\underline{t}_1$  or after (before)  $\underline{t}_2$ . Sentence (67) can mean only that Joan will leave after (before)  $\underline{t}_2$ . We get, then, precisely the same sort of facts as we noticed in connection with when-clauses, as replacement of after and before by when in (62) - (67) would show.

Now compare (68) - (73) with (62) - (67), respectively

(68) I left  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  the time at which  
Bill left.

(69) I will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  the time at  
which Bill leaves.

(70) \*I left  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  the time at which  
Bill leaves.

- (71) \*I will leave  $\left. \begin{array}{c} \text{after} \\ \text{before} \end{array} \right\}$  the time at  
which Bill left.
- (72) Joan will leave  $\left. \begin{array}{c} \text{after} \\ \text{before} \end{array} \right\}$  the time at  
which Bill tells her to (leave).
- (73) Joan will leave  $\left. \begin{array}{c} \text{after} \\ \text{before} \end{array} \right\}$  the time at  
which Bill told her to (leave).

It should be clear that my proposed solution for tense harmony in time relative clauses will carry over to data like (68) - (73). This solution, for (70) is that the time is marked [+past] since the tense of the main clause is past, that the occurrence of the time underlying which is marked [-past] since the tense of the subordinate clause is nonpast, and thus, that relativization must fail since the identity condition of relativization is not satisfied.

It should be clear that precisely the same thing is going on in (62) - (67) as is going on in (68) - (73). But if this is so, it must be the case that the before- and after-clauses of (62) - (67) are relative clauses, for only time relative clauses exhibit the sort of tense harmony exhibited by (62) - (67).

Before going on, let me review my argument so far. I have tried to show, by way of demonstrating that before- and after-clauses are relative clauses, that like relative clauses, clauses introduced by before and after are embedded

as adjuncts to some noun phrase. This hypothesis permits us to account for the fact that nothing can be moved out of before- and after-clauses, for the fact that these clauses pronominalize like ordinary objects of before and after, and it permits a single statement of the categorial environment of before and after (i.e., before and after always have objects in underlying structure) and of the distribution in main clauses of before- and after-clauses and before- and after phrases. I have also tried to show that, like relative clauses, an adverbial, which, like the hypothetical objects of before and after, is deleted, must be supposed to occur in underlying structure and that this adverbial moves to clause-initial position in the derivation of these clauses. This hypothesis permits us to account for the fact that certain adverbials which are compatible with before- and after-clauses on purely internal grounds can't occur in surface structure, for the fact that before- and after-clauses are ambiguous if this adverbial could have originated in more than one of the clauses occurring within before- and after-clauses, for the fact (crucial for the inference that this adverbial moves) that interpretations involving subordinate verbs are impossible if the verb happens to occur within a Complex Noun Phrase,



and, finally, if we add the supporting hypothesis that this adverbial participates in an identity condition with the hypothetical antecedent of before- and after-clauses, for the fact that these clauses exhibit the phenomenon of tense harmony. All of the above strikes me as overwhelming evidence that before- and after-clauses are relative clauses.

There are some facts, though, that cannot be accounted for simply by assuming that before- and after-clauses are relative clauses. One of the more interesting problems has to do with deletions not ordinarily possible in relative clauses. Consider the sentences

- (74) John will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Bill leaves.
- (75) John will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Bill does.
- (76) John will leave  $\left. \begin{array}{l} \text{after} \\ \text{before} \end{array} \right\}$  Bill.

That the predicate phrase of the subordinate clause of (75) can be deleted leaving only the tense bearing element (or, more generally, the first constituent of the auxiliary) is by no means surprising. We find such deletions in a variety of complement constructions, as the following sentences show:

(77) John will leave when Bill does.

(78) John ran faster than Bill did.

(79) John worked on the problem and  
so did Bill.

(80) If John goes, so will Bill.

But observe that the deletion of the full predicate phrase as in (76) is by no means as general.

(81) \*John will leave when Bill.

(82) John ran faster than Bill.

(83) \*John worked on the problem  
and so Bill.

(84) \*If John goes, so Bill.

Full deletion of the subordinate predicate phrase seems to be limited to comparatives (if we say, as is reasonable, that expressions like as tall as are comparative) and to clauses introduced by before and after. (It does not happen in clauses introduced by until and since.) Surely this is not an accidental property of these clauses, given the fact that their meaning contains a comparative element.

The actual deletion rule in comparatives deletes everything in the subordinate clause but the subject, as in (82), or the object, provided that the deleted elements are identical to corresponding elements in the main clause. As a consequence, if the verbs of the main clause are transitive, ambiguity will result. Consider, for example, sentence (85).

(85) John hit Bill harder than Joe.

Sentence (85) can be interpreted to mean that John hit Bill harder than Joe hit Bill or that John hit Bill harder than John hit Joe. Clauses introduced by before and after are ambiguous in the same circumstance. Consider (86) and (87)

(86) John met Bill before Joe.

(87) John saw Bill after Joe.

Sentence (86) can be interpreted to mean either that John met Bill before Joe met Bill or that John met Bill before John met Joe. Sentence (87) is interpreted similarly.

In light of these facts, it is tempting to say that before and after are in fact derivative of underlying comparatives, semantically quite like earlier than and later than, respectively. There is further evidence in support of such a view. Ross (1964) argued in a study of measure phrases (expressions like five hours, six pounds, etc.) that the distribution of measure phrases can best be dealt with if we suppose that in underlying structure all occurrences of measure phrases modify measure adjectives or adverbs. According to Ross, the unacceptability of a sentence like (88) or (89) is to be accounted for in the same way that we would account for the unacceptability of (90) or (91), namely, by a verb-adjective constraint

in underlying structure.

- (88) \*John lived five feet.
- (89) \*John worked five pounds.
- (90) \*John lived five feet taller  
than Joe did.
- (91) \*John worked five pounds  
heavier than Joe did.

In order to make this solution work, Ross demonstrated that there was some natural adjective or adverb for each type of measure phrase. However, in the case of such sentences as (92) or (93), Ross was unable to do so.

- (92) John left five hours before  
Bill did.
- (93) John will begin work a few  
minutes after you do.

But note that if we were to say that before and after are derivative of compared adverbs (actually, adjectives, as we shall see momentarily), then sentences like (92) and (93) would no longer be counter-examples to Ross' rather nice generalization. They would be accounted for in exactly the same way that (94) and (95) are.

- (94) John left five hours earlier  
than Bill did.
- (95) John will begin work a few  
minutes before you do.

But, of course, the real significance of the comparative analysis of before and after is not just that the distribution of measure phrases is made

more regular, although that is important, it is, rather, that such an analysis provides an explanation for the fact that before- and after-clauses, but not until- or since-clauses, as we shall see, or where-, when-, or while-clauses, or if- or unless-clauses can be modified by measure phrases.

There is at least one major difficulty with the view that after is a comparative. Indefinite elements occur freely in comparative clauses, as is evidenced by (96) and (97).

(96) John left earlier than any-  
one else.

(97) John left later than he ever  
had before.

As we would expect if before were a comparative, indefinites can occur in before-clauses.

(98) John left before anyone else.

However, after-clauses cannot tolerate indefinites.

(99) \*John left after he ever had before.

I am unable to explain why after should differ from before in this respect, or from later than. Undoubtedly an account of this idiosyncrasy will not be available until it is understood exactly why comparative clauses can contain indefinites.

Before- and after-clauses differ from comparative clauses with earlier than and later than in at least two important respects. The more superficial of the

two is that before- and after-clauses can be pronominalized, while the corresponding comparative clauses cannot. Consider

- (100) a. John left before Harry did  
and George left then too.
- b. \*John left earlier than Harry  
did and George left then too.
- (101) a. John left after Harry did and  
George left then too.
- b. \*John left later than Harry did  
and George left then too.

The a forms of (100) and (101) do not claim that John and George left at the same point in time, but just that they both left within the same periods of time. In this respect, these sentences are identical to (102) and (103).

(102) John left sometime before Harry did  
and George left then too.

(103) John left sometime after Harry did  
and George left then too.

In light of this, it is reasonable to suppose that (100a) and (101a) are elliptical versions of (102) and (103), respectively. Interestingly, a correlative line of reasoning would lead us to believe that comparatives with earlier than and later than are not similarly elliptical, for note that unlike (100a) and (100b), comparatives embedded as adjuncts to an adverbial like sometime pronominalize. Consider

(104) John left sometime earlier than Harry did and George left then too.

(105) John left sometime later than Harry did and George left then too.

As a consequence, I think we must say that all occurrences of before- and after-clauses originate as adjuncts to some adverbial like sometime, but that superficial adverbial occurrences of earlier than and later than do not. This will entail, of course, limiting the rule that deletes sometime to occurrences which precede the "prepositional" comparative before and after.

There is additional evidence in support of the view that before- and after-clauses originate in underlying structure as an adjunct to some adverbial like sometime. Recall that adverbials like sometime, then, at that time, etc., have the property that they can occur either with verbs which ordinarily occur with instantive adverbials or with verbs that cannot occur with instantive adverbials, but can occur with frame adverbials. Note that before- and after-clauses can occur with both classes of verbs.

(106) a. John left before Harry.  
 b. John slept a lot before he left.

(94) a. John left after Harry.  
 b. John slept a lot after he came back.

The hypothesis that before- and after-clauses originate as adjuncts to some adverbial like sometime or at some time will account for their distributions in main clauses, as a comparison of (106) and (107) with (108) and (109), respectively, shows.

- (108) a. John left at a time that was  $\left. \begin{array}{l} \text{before} \\ \text{earlier than} \end{array} \right\}$  the time at which Harry left.
- b. John slept a lot at a time that was  $\left. \begin{array}{l} \text{before} \\ \text{earlier than} \end{array} \right\}$  the time at which he left.
- (109) a. John left at a time that was  $\left. \begin{array}{l} \text{after} \\ \text{later than} \end{array} \right\}$  the time at which Harry left.
- b. John slept a lot at a time that was  $\left. \begin{array}{l} \text{after} \\ \text{later than} \end{array} \right\}$  the time at which he came back.

Clauses introduced by before and after differ from the corresponding comparatives with earlier and later in the very interesting respect that the last verb in these comparatives must be identical to the main verb. Consider

- (110) a. John left earlier than he said he would.
- b. \*John left earlier than he said he would go to work.
- (111) a. John left later than he said he would.



- b. \*John left later than he said he would go to work.

Before- and after-clauses are not subject to this constraint. Compare (112) and (113) with (110) and (111), respectively.

- (112) a. John left before he said he would.  
 b. John left before he said he would go to work.
- (113) a. John left after he said he would.  
 b. John left after he said he would go to work.

Why before and after should differ from earlier and later in this respect is unknown to me. However, what seems to be going on in the case of the "true" comparative is that the verb-verb constraint applies, not at underlying structure, but at the point the deletions which result in the apparent adverbial occurrences of these comparatives apply. Note that (114) and (115), which I take to be very similar to (110b) and (111b) in underlying structure are perfectly good sentences.

- (114) The time at which John left was earlier than the time at which he said he would go to work.
- (115) The time at which John left was later than the time at which he said he would go to work.

In light of the acceptability of (114) and (115), we must, I think, associate the verb-verb constraint

with the rule that deletes the underlined portions of these sentences. Occurrences of comparatives with earlier than and later than which are embedded as adjuncts to a time adverbial, as in (116) and (117), are also subject to this constraint. Again, this constraint seems to be associated with the deletion rules. Consider

- (116) a. \*John left sometime earlier than Harry did.  
 b. John left at a time that was earlier than the time at which Harry did.
- (117) a. \*John left sometime later than he found the penny.  
 b. John left at a time that was later than the time at which he found the penny.

At the present time I have no idea why before and after are not subject to the verb-verb constraint. Presumably, an answer to this question will not be available until we better understand what is involved in the claim that prepositions are deverbal. It is clear that we do not mean by this that prepositions are like verbs in every respect and it may be hoped that the discovery of some general property or properties that distinguish true verbs from underlying prepositions will lead to an explanation, among other things, of the fact that before- and after-

clauses are not subject to the verb-verb constraint noted above.

I realize that some will find my attempt to make precise the comparative character of before- and after-clauses implausible. However, I would suggest to these people that in the absence of a viable analysis of comparatives, it will be very difficult to make both plausible and precise the implications of the facts which support the view that before and after are derivative of underlying comparatives. And, to be sure, there is nothing to be said for the view that before and after are prepositions which are only accidentally comparative in character.

#### Until- and since-clauses

One of the striking differences between until and since, on the one hand, and before and after, on the other, is that the former require very special auxiliary verb-main verb configurations in main clauses. Until-clauses, for example, function like durative time adverbials. Recall that the verb last obligatorily occurs with a durative time adverbial. Consider

- (118) The party lasted { \*at ten o'clock  
\*during the evening  
for four hours  
throughout the night. }

Note, though that last can occur with an until-clause.

- (119) The party lasted until the cops busted it up.

And, in general, it is just these auxiliary verb-main verb configurations which are compatible with durative adverbials which are required by until-clauses.

Since-clauses are even more restricted in distribution. In particular, it seems that they require the present perfect auxiliary as well as a verb which is ordinarily restricted to durative adverbials. Thus, while (120) is acceptable, (121) is not.

- (120) John has lived in Boston (ever) since he began graduate school.

- (121) \*John lived in Boston (ever) since he began graduate school.

As (122) shows, the present perfect is not enough to guarantee the acceptability of a sentence containing a since-clause.

- (122) \*John has arrived (ever) since he said he would.

In the case of since-clauses, there is good reason to believe that one feature of their distribution--their durative quality--should be accounted

for by supposing that they are embedded in some durative time adverbial. This is the fact that since-clauses can be modified, without change of meaning by the element ever. Ever is, of course, not the indefinite element associated with negation and questions when it modifies since-clauses, for note that (120) contains no negative element, nor is it a question. Instead, I would suggest that it is derivative of something like for all of the time. Note the equivalence in meaning between (120) and (123).

- (123) John has lived in Boston for all of the time since he began graduate school.

This hypothesis does have the troubling property that ever seems to modify the since-clause in (120), but the since-clause is an adjunct to for all of the time in (123). However, no problems concerning the assignment of structure arise.

The hypothesis that since-clauses are adjuncts to an adverbial like for all of the time in underlying structure not only accounts for certain features of the distribution of since-clauses, but also accounts for the otherwise anomalous fact that since plus the clause it introduces cannot be pronominalized. As we noted earlier before plus its clause can be pronominalized.

(124) John left before Harry did and George left then too.

But compare (124) with (125).

(125) \*John has lived in Boston (ever) since he began graduate school and George has lived therethen too.

As (126) shows, expressions like for all of the time or for four hours do not pronominalize, presumably because they do not have temporal reference.

(126) \*John has lived in Boston for all of the time since he began graduate school and George has lived there then too.

The unacceptability of (125) is, I argue, to be accounted for in the same way as (126).

Until-clauses cannot be modified by ever in surface structure. We do not get (127).

(127) \*I studied ever until John arrived.

However, I think a case can be made for the view that until-clauses are also adjuncts to an adverbial like for all of the time. Note, first, that (128) and (129) are paraphrases.

(128) I will wait until you come.

(129) I will wait for all of the time until you come.

And, secondly, note that such an hypothesis will account for the fact that until plus its following clause do not pronominalize. Consider

(130) \*I will wait until you come and Harry will wait then too.

(131) \*I will wait for all of the time until you come and Harry will wait then too.

If we do adopt this hypothesis, though, we shall have to say that ever-deletion is obligatory in the case of until-clauses, while it is only optional in the case of since-clauses.

If until- and since-clauses are relative clauses, as I have argued, then it should be the case that they exhibit the phenomenon of tense harmony associated with time relative clauses. As (132) and (133) show, until-clauses do exhibit this phenomenon, but since-clauses do not.

(132) a. John will study until Harry leaves.

b. \*John will study until Harry left.

(133) a. \*John has been living here (ever) since his father dies.

b. John has been living here (ever) since his father died.

Actually, the correct way to view (133) is not, I think, that tense harmony is not applicable in connection with since-clauses, but that the opposite principle does apply.

It is my argument that the fact that since-clauses are subject to tense discord is very closely related to the fact that the present perfect auxiliary

is obligatory in main clauses. My explanation of these two facts is that in the underlying structure of sentences containing since-clauses, there is an occurrence of the verb begin. Observe that although (134) is acceptable, (135) is not.

(134) John lived here for all of the time that began at the time at which his father died and ended at the time at which his father came back to life.

(135) \*John lived here for all of the time that began at the time at which his father died.

Note, though, that (136) is acceptable.

(136) John has lived here for all of the time that began at the time at which his father died.

Note, further, that (136) exhibits tense discord-- has is in the present tense, but died is in the past tense. And, finally, note that (136) and (137) are paraphrases.

(137) John has lived here (ever) since his father died.

It is my argument that the subject of begin (e.g., the noun phrase underlying that in (136)) must have nonpast time reference and the adverbial that complements begin (e.g., at the time in (136)) must have past time reference. It is this switching of time reference across begin which accounts for the apparent tense discord exhibited by (136).<sup>6</sup> However, the essential features of my solution to the problem of



tense harmony must be supposed to be operative in the generation of (136), for identity conditions are met by the occurrence of the time in for all of the time and the noun phrase underlying that as well as by the occurrence of the time in at the time and the noun phrase underlying which. I can see no alternative to the view that tense discord in a sentence like (137) should be dealt with in the same way that it is dealt with in (136). But this is to say not only that since-clauses are relative clauses, but also that that since is derivative of a verb like begin. I am, however, unable to provide a well-motivated statement of actual derivations of since from such an aspectual verb. As a consequence, the suggested analysis can only be regarded as highly tentative.

Until-clauses, as we saw, function in main clauses like durative time adverbials, a fact which led me to suggest that, like since-clauses, they are embedded as adjuncts to an adverbial like for all of the time. Such an hypothesis accounts, in a positive way, for the distribution of until-clauses. But there is a restriction on the distribution of until-clauses that cannot be accounted for with just this hypothesis. In particular, it does not account for the fact that until-clauses are incompatible with

the occurrence of the present perfect in main clauses. We do not get, on a nongeneric interpretation,

(138) \*John has studied until Bill arrives.

Were we to suppose that until is derivative of an aspectual verb like end, this otherwise anomalous fact would be accounted for, for compare (138) and (139).

(139) \*John has studied for all of the time  
that { <sup>will</sup> } at the time at which  
      { ended }  
Bill arrives.

And note that (140) and (141) are paraphrases.

(140) John will study until Bill arrives.

(141) John will study for all of the  
time that ends at the time at which  
Bill arrives.

If my view that until is derivative of a verb like end, it will be necessary to extend my proposed solution of tense harmony slightly. We shall have to add the constraint that the subject of end (e.g., the constituent underlying that in (154) and the adverbial complement of end (e.g., at the time in (154)) must both be either past or nonpast in time reference. As a consequence, until-clauses do not exhibit tense discord.

It is interesting that until- and since-clauses should differ so strikingly with respect to their

possibility of occurrence with the present perfect auxiliary in main clauses. Since-clauses always occur with the present perfect; until-clauses never do. We would like, of course, an explanation of this fact. And such an explanation of their polarity with respect to occurrences of the present perfect is provided by the hypothesis that until and since are derived from the polar opposite aspectual verbs end and begin, or, more accurately, from abstract semantic structures essentially equivalent to what underlies end and begin. This hypothesis also provides an explanation for the fact that since-clauses, but not until-clauses exhibit tense discord.

Arnold Zwicky has pointed out to me that my analysis accounts for the fact that until then (= for all of the time that ended then), but not \*since now (= \*for all of the time that began now). However, I'm not quite sure what to say about until now, for \*for all of the time that ended now isn't acceptable. The latter phrase is possible if just occurs before now and just is possible in until just now. I hesitate to suggest that there exists a rule that optionally deletes just after until but I presently see no better solution to this difficulty.

## Conclusion

At the conclusion of the last chapter, I argued that English is subject to a rule of Antecedent Deletion, which I formulated as follows:

$$(142) \quad X \quad - \quad \left[ \begin{array}{l} \langle +\text{pro} \\ -\text{human} \rangle \\ \text{NP} \end{array} \right] \quad - \quad \left[ \begin{array}{l} \langle +\text{pro} \\ +\text{wh} \rangle \\ \text{S} \end{array} \right] \quad Y$$

$$\begin{array}{ccccccc} 1 & - & 2 & - & 3 \\ 1 & - & \emptyset & - & 3 \end{array}$$

The question I would like to raise now is whether or not clauses introduced by before, after, until, and since, which we have found to be relative clauses, can also be accounted for by this rule. We shall, of course, additionally require a rule of Relative Pronoun Deletion to be discussed momentarily.

In the case of until- and since-clauses, it is clear that (142) will apply correctly. Recall that clauses introduced by these formatives are pronominalized with then, a fact suggesting that what follows until and since is an adverbial. And note that the hypothesis that until and since are prepositional realizations of verbal elements like end and begin leads, of course, to the view that clauses introduced by until and since have adverbial

antecedents. Thus, such clauses are special cases of when-clauses.

In my dialect, recall, clauses introduced by before are pronominalized with then or that, but those introduced by after are pronominalized only with that. However, there are dialects in which then can occur as the pronominal realization of clauses introduced by after. Thus, from this evidence, it is unclear whether the objects of these formatives are noun phrases or adverbials. But the hypothesis that before and after are prepositional realizations of compared adjectives semantically like earlier than and later than makes clear that the objects of these formatives are noun phrases. This result poses no problem for the applicability of Antecedent Deletion the basic correlation that independent relatives occur just when there exists a pronoun having the same grammatical function as the clause, which underlies my formulation of this rule, holds.

In addition to Antecedent Deletion, we also require a rule that deletes the relative pronoun. I would imagine that this rule is the same as that involved in the deletion of the relative pronoun in (143), and, perhaps, in (144).

(143) John arrived by the time Harry  
left.

(144) I love the girl John leaves.

However, my understanding of this phenomenon is  
too limited to state this rule.

## Footnotes

1. I shall be concerned in this chapter only with cases in which since is construed temporally, not causally (e.g., Since you are over thirty, you can't be trusted.). In order to keep attention focused on the intended sense of since, all examples of since-clauses will have a preceding (optional) occurrence of ever below.

2. Recall my discussion of the co-occurrence relation between the perfect auxiliary and adverbials like by midnight in Footnote 10 of Chapter 3.

3. The question whether clauses introduced by before, after, until, and since are ambiguous has plagued my research since it began. My initial reaction to sentences like (i) John left before Harry promised to pick him up. was that they weren't ambiguous and, during a series of lectures at MIT, no one took issue with this intuition. Upon considering sentences like (ii) John left before he said he would., in which the most subordinate verb of the before-clause is identical to the main verb, which are clearly ambiguous, I began to perceive sentences like (i) as ambiguous. Again, during a second series of lectures at MIT, no one took issue with this

intuition. Manifestly we are dealing with a subtle intuition here and, for rather obvious reasons, a very important one. I still do not understand what is going on as well as I would like. However, I feel that the best approach to the question is to suppose that such clauses are relative clauses and see if more abstract considerations are not, as was the case, recall, with while-clauses, precluding relativization of the hypothesized time adverbials in certain cases.

4. I have no direct evidence that this adverbial moves to clause-initial position. However, that it must be supposed to move to the front of the clause is clear, for, in English, rules that move constituents to the right are always "upward bounded" (see Ross (1967)), but our hypothetical adverbial can move out of the S within which it originates. Thus, the rule that moves this adverbial is not upward bounded and, therefore, is a rule that moves constituents to the left.

5. Some persons may not object to (65) and (71) when after is present. I shall argue below that both sentences are derived from an underlying structure essentially like that that (i) has.

- (i) I will leave at a time that is later than the time at which Bill left.



The occurrence of the time underlying that (NP<sub>1</sub>) necessarily refers to a point in time earlier than that to which the underlined occurrence of the time (NP<sub>2</sub>) refers. Since (i) is acceptable, dialects like mine in which (67) and (71) are unacceptable are subject to the constraint that simplification of (i) is possible only if NP<sub>1</sub> and NP<sub>2</sub> have the same value for the temporal reference feature. Dialects in which (65) and (71) are acceptable permit simplification when NP<sub>1</sub> is [-past] and NP<sub>2</sub> is [+past]. In both dialects, we must suppose that the two instances of relativization in (i) involve identity of the temporal reference features of a time (main clause) and that and of the time and which. Thus, the essential features of the phenomenon of tense harmony must be supposed to obtain the derivations of before- and after-clauses. My discussion in the text is, then, somewhat oversimplified.

6. Recall the discussion in Footnote 5 of a similar case of the switching of time reference.

## CHAPTER 5

## Conditional Clauses

## Introduction

Clauses introduced by the wh-words where, when, and while and the prepositions before, after, until and since have proved to be restrictive relative clauses. As a consequence, it is not necessary to suppose that such clauses are instances of some special, otherwise unmotivated, type of complement construction. In this chapter, I turn to consider conditional clauses -- clauses introduced by if and unless -- and show that they too are instances of some otherwise attested type of complement construction. In the case of conditional clauses, though, the subordinate clause is not a relative clause, but a noun complement.

I think it is fair to say that there is a dearth of systematic syntactic information about conditional clauses. However, their semantic properties have been studied rather extensively, if unsystematically, by philosophers and logicians. Perhaps the most interesting philosophical study is given by Goodman (1965). In this study, I propose to focus almost entirely on the syntax of conditional

clauses. Necessarily, most of what I say is highly tentative.

Despite Jespersen's claim that subordinating conjunctions do not constitute a special part of speech, he, (Jespersen 1961 V:344) calls if a "conjunction proper." Quite possibly he meant by this just that if is an adverb having only one function, that of introducing clauses.<sup>1</sup> A much more generally accepted view, of course, is that if is a conjunction. A reasonable interpretation of this view is that English has a phrase structure rule like (1).<sup>2</sup>

$$(1) \text{ ADV}_{\text{cond}} \dashrightarrow \text{CONJ}_{\text{cond}} \text{ S}$$

Concerning the relation between if and unless, Jespersen (1961 V:366) argues that "the regular conjunctions of condition are if and its negative counterpart unless (originally on, or rarely some other preposition, + less) = 'if ... not'." Jespersen does not make clear whether the not in question is supposed to occur in the if-clause or in the main clause. That is, he doesn't make clear whether it is (2) and (3) or (2) and (4) which are supposed to be related.

(2) I will leave unless you leave.

(3) I will leave if you don't leave.

(4) I won't leave if you leave.

According to Sweet (1892:147), (2) and (3) are related. No doubt Jespersen also meant to make the same claim.

Within the framework of a generative grammar of English, this traditional conception of the relation between if and unless can be formalized by supposing that if, but not unless, can occur as the CONJ<sub>cond</sub> of rule (1) and that unless is derived as a consequence of the incorporation of [+neg] from an if-clause into the set of features associated with if, resulting somehow in a subsequent replacement of if by unless. According to this view, then (2) and (3) have the same underlying structure; the difference between them is due to the placement of [+neg] into the set of features associated with if in the derivation of (2). The alternative view that (4) and (2) are related would require a rule that incorporates an occurrence of [+neg] from the main clause into the set of features associated with if, instead of from the subordinate clause.

There are, I think, rather compelling reasons for rejecting the view that unless is derived by the incorporation of [+neg] into if, no matter where [+neg] originates. Let us first entertain the view

that [+neg] originates in the if-clause, i.e., that (2) is derived from the structure underlying (3).

The hypothesis that sentences like (2) and (3) are syntactically related encounters the rather interesting difficulty that clauses introduced by if and unless differ strikingly with respect to their tolerance of indefinites like any and ever. Consider, for instance, the sentences

(5) \*I will be angry unless you give any-one a nickel.

(6) I will be angry if you don't give anyone a nickel.

and the sentences

(7) \*I will be happy unless you ever hit me again.

(8) I will be happy if you don't ever hit me again.

The interesting thing about the failure of the traditional analysis of if and unless in regard to (5) - (8) is that, as Klima (1964) has pointed out, if-clauses and the presence of [+neg] are each sufficient to motivate indefinites like anyone or ever. Consider

(9) a. I will be angry if you give any-one a nickel.

b. You shouldn't give anyone a nickel.

(10) a. I will hit you back if you ever hit me again.

b. You shouldn't ever hit me again.

The view that the incorporation of [+neg] into if might somehow block indefinites would be patently ad hoc.

Another problem with the view that (2) and (3) are related syntactically is that we would have to suppose that there are two occurrences of [+neg] in the underlying structure of an if-clause in order to account for the presence of one occurrence of [+neg] in the surface structure of a corresponding unless-clause. That is, the view that unless is derived by incorporating an occurrence of [+neg] from an if-clause into if itself would force us to suppose that (11) and (12) are syntactically related.

(11) I will leave unless no one else does.

(12) \*I will leave if no one else doesn't.

Ordinarily, of course, only one occurrence of [+neg] is permitted in the underlying structure of a given clause. To suppose that the structure underlying (12) also underlies (11), we would have to relax this constraint on the occurrence of [+neg] in deep structure and make our incorporation rule obligatory if there are two occurrences of [+neg] in the if-clause.

A third and final argument against the analysis of Jespersen and Sweet is that it inevitably must

provide an ad hoc account of the fact that if can be modified by only, even, and, in some dialects, except, but unless cannot. According to the traditional view, the sentences of (13) are syntactically equivalent to the corresponding sentences of (14).

- (13) a. I will be happy if you don't ask me to leave.  
 b. I will be happy only if you don't ask me to leave.  
 c. I will be happy even if you don't ask me to leave.  
 d. ?I will be happy except if you don't ask me to leave.
- (14) a. I will be happy unless you ask me to leave.  
 b. \*I will be happy only unless you ask me to leave.  
 c. \*I will be happy even unless you ask me to leave.  
 d. \*I will be happy except unless you ask me to leave.

There are basically two ways in which we might try to deal with the incompatibility of only, even, and except with unless within the framework of the traditional analysis of if and unless. We could adopt the view that only, even, and except originate in deep structure as modifiers of CONJ<sub>cond</sub> (among other types of alleged conjunctions) and that the incorporation of [+neg] into if is blocked if any

of these modifiers is present. The blocking of our incorporation rule is otherwise unmotivated, thus it can only be regarded as ad hoc.

An alternative approach would be to suppose, as Kuroda (1969) does in the case of even, that only, even, and except originate in clause-initial position and are attached by transformation to the constituents which they modify in surface structure. If we adopt this view of the origin of only, even, and except, and if we suppose that the attachment rule applies before the incorporation of [+neg] into if, the latter will have to be blocked if the former applies. This view poses the same problem that we encountered before, namely, the need for an ad hoc restriction on the incorporation rule. With the reverse rule order, though, the problem of accounting for (13) and (14) falls squarely on the shoulders of the attachment transformation. I will discuss this problem below, for it emerges upon another view of the relationship between if and unless.

I have provided three arguments against the view that unless is derived by the incorporation of [+neg] from an if-clause into the set of features associated with if: they are (a) that indefinites can appear in if-clauses, but not in unless-clauses,



(b) that two occurrences of [+neg] must be supposed to be present in the underlying structure of an if-clause in order to account for the presence of a negative in the supposedly related unless-clause, and (c) that if, but not unless, can be modified by the constituents only, even, and except. Thus, it seems that if and unless are not related in quite the way that the grammarians Jespersen and Sweet have supposed.

The alternative interpretation of Jespersen's vaguely stated view that unless is the negative counterpart of if is that (2), repeated below as (15), is derived from the structure underlying (4), repeated below as (16).

(15) I will leave unless you leave.

(16) I won't leave if you leave.

Such an analysis fails semantically, for (15) and (16) are not equivalent in meaning. In the case of (15), I am committed to leaving if you stay, but in (16), I am not so committed. Thus, (15) and (16) are not equivalent in meaning. The view that (15) might be derived from the structure underlying (16) also fails on syntactic grounds.

As in the case of the view that (3) might underlie (15), the position that (16) underlies (15), i.e. that unless is derived by the incorporation

of [+neg] from the main clause into if, runs into the difficulty that if-clauses, but not unless-clauses, can contain indefinites. Moreover, this position would force us to suppose two occurrences of [+neg] in the underlying structure of the main clause of a sentence that contains an if-clause (cf. (17)) in order to account for a single occurrence of [+neg] in the main clause of a sentence that contains an unless-clause (cf. (18)).

(17) \*No one won't leave if you leave.

(18) No one will leave unless you leave.

And, finally, this analysis is inconsistent with the fact that only, even, and except can modify if but not unless.

Before going on to consider a somewhat different view of the relationship between if and unless, let us consider the view advanced by Hall (1964) that both if and unless occur in deep structure as  $\text{CONJ}_{\text{cond}}$ , i.e., that if and unless are not related beyond being members of the same lexical class.

In the first place, since this position claims no relationship between if and unless beyond membership in the same lexical class, it cannot be refuted on semantic grounds. Furthermore, if we suppose that the complex symbol of if contains some feature, say [+F], in virtue of which indefinites are motivated

in if-clauses, we need only suppose that unless is marked [-F] in order to account for the fact that unless-clauses contain no indefinites. Thirdly, it should be noted that no difficulties will be encountered in accounting for negatives in unless-clauses or in the main clauses of sentences that contain unless-clauses. What difficulties arise with this analysis emerge upon consideration of problems posed by changes in if-clauses as a consequence of modification by only, even, and except and by the fact that only, even, and except cannot modify unless.

As we noted earlier, if we suppose that only, even, and except can be constituents of deep structure, then we must suppose either that they occur as modifiers of if-clauses directly in deep structure or that, as Kuroda (1969) has suggested in the case of even, that they occur in deep structure as sentence-initial constituents and that there exists an attachment transformation that adjoins these constituents to if-clauses. Upon either alternative, we must somehow block adjunction of these constituents to unless. Let us suppose that unless has some lexical property [+G] which blocks modification by only, even, and except. We might mark if as [-G].

One of the interesting facts about if-clauses is that when they are modified by only, even, and except, indefinites become much less acceptable within them. Consider (19) and (20).

- (19) a. John will leave town if Joan ever telephones him again.  
 b. \*John will leave town only if Joan ever telephones him again.  
 c. \*John will leave town even if Joan ever telephones him again.  
 d. \*John will leave town except if Joan ever telephones him again.
- (20) a. John will be angry if you tell anyone to hit him.  
 b. \*John will be angry only if you tell anyone to hit him.  
 c. \*John will be angry even if you tell anyone to hit him.  
 d. \*John will be angry except if you tell anyone to hit him.

Very troubling to the analysis in question is why only if, even if, and except if should differ from if with respect to the toleration of indefinites. What seems to be required is some ad hoc rule like (21) or, possibly, an ad hoc output condition.

(21) [+F] --- [-F]  $\left. \begin{array}{c} \text{only} \\ \text{even} \\ \text{except} \end{array} \right\} \text{---}$

Our discussion of the analysis that if and unless, on the one hand, and only, even, and except, on the

other, are deep structure lexical items has revealed three somewhat troubling problems: we have no principled explanation (a) why if, but not unless, can be modified by only, even, and except, (b) why unmodified if-clauses, but not unless-clauses, can contain indefinites, and (c) why modification by only, even, and except should alter the fact that if-clauses can contain indefinites. Let me stress that considerations (a) - (c) do not constitute a refutation of the analysis in question, but they do constitute the rather troubling consequences of accepting it.

Some remarks on only

In what follows, I propose to consider the syntax of only in an attempt to provide a basis for a somewhat more satisfactory analysis of conditional clauses. I shall also suggest, but not justify, an analysis of even and except which parallels my analysis of only.

The adverbial modifier only is at least two-ways semantically ambiguous. In (22), only has something like the meaning of merely; in (23), only means roughly "on no days other than Sundays".

(22) Bill left town only a year ago.

(23) Mary entertains men only on Sundays.

Let us refer to the only of (22) as a "weak" only and to that of (23) as a "strong" only.

These semantically different occurrences of only are syntactically distinguishable. Both of the only-phrases of (22) and (23) can be preposed, but with very different consequences.

- (24) a. Only a year ago Bill left town.  
 b. \*Only a year ago did Bill leave town.

- (25) a. \*Only on Sundays Mary entertains men.  
 b. Only on Sundays does Mary entertain men.

As (24) and (25) show, strong only obligatorily attracts the finite verb; weak only cannot attract it. As (26) and (27) show, sentence-initial negative constituents also obligatorily attract the finite verb.

- (26) a. \*At no time John left.  
 b. At no time did John leave.  
 (27) a. \*Never John has kissed Mary.  
 b. Never has John kissed Mary.

Another characteristic of negative constituents is that indefinites can occur after them.

- (28) a. \*John hit anyone at no time.  
 b. At no time did John hit anyone.  
 (29) a. \*John ever kissed someone.  
 b. No one was ever kissed by John.

In this respect too, strong only acts as if it were negative.

- (30) a. \*Mary entertains anyone only on Sundays.  
 b. Only on Sundays does Mary entertain anyone.
- (31) a. \*John ever cursed only Bill.  
 b. Only Bill was ever cursed by John.

Weak only does not.

- (32) \*Only a year ago Bill hit anyone.

We could account for the similarity between strong only and negative constituents if we were to suppose that strong only contains the feature [+neg]. The question quite naturally arises, then, as to whether only is inherently negative or contains the negative of sentence negation. If only were inherently negative, then it should be possible for only to occur in a clause along with an instance of sentence negation, for note that not is possible with inherently negative constituents like deny or unhappy.

- (33) John didn't deny that.

- (34) Bill isn't unhappy.

Consider, in this light, the sentence

- (35) \*John didn't kiss Mary only on Sundays.

Sentence (35) is marginal if only is interpreted.

as weak only, that is as if it means "merely". But, if only is construed as strong only--as if the sentence meant that John failed to kiss Mary only on Sundays--it is, I think, unacceptable.

- Those who do not find (35) especially unacceptable will, I think, grant that (36) is far better.

(36) It isn't true that John kissed Mary only on Sundays.

The only relevant difference between (35) and (36) is that [+neg] and only are clause mates (a term due to Postal (1969)) in the former, but not in the latter sentence. If we were to say that only is derived, in part, by the incorporation of an instance of sentence negation, there we would have an explanation--or, at least, the basis for an explanation--of the fact that (36) is so much better than (35).

The contrast between (35) and (36) is also present in the following pairs of sentences--if only is interpreted as strong only.

(37) a. \*John didn't hit only Bill.

b. It's not true that John hit only Bill.

(38) a. \*John didn't go only to Boston.

b. It's not true that John went only to Boston.

(39) a. \*John won't leave only if you leave.



- b. It's not true that John will  
leave only if you leave.

I find the a forms of (37) - (39) quite poor, but the b forms are perfectly good. Again, in order to account for this, I think we must say that the negative character of strong only, in contrast with words like deny and unhappy, is due to the incorporation of sentence negation.

The view that strong only is derived by incorporation of the [+neg] of sentence negation would also account for the otherwise strange fact that only one occurrence of strong only is possible per clause, for there can be only one instance of sentence negation per clause. Consider, for instance,

(40) \*John hit only Bill only on the arm.

(41) \*John hit no one other than Bill no  
place other than on the arm.

There are problems with the view that strong only is derived by the incorporation of an instance of sentence negation. As Klima (1964) has pointed out neither-tags are ordinarily possible in the context of sentence negation. Consider, for instance, the sentences

(42) John doesn't like Bill and neither  
does Harry.

(43) John doesn't like anyone and neither  
does Harry.

Neither-tags are not possible, however, in the context if only.

- (44) \*John hit only Bill and Harry didn't either.

Thus, if we are to maintain that only contains an instance of sentence negation, we must explain why (44) is unacceptable.

Another problem is posed by the fact that tag-questions (cf. Lees and Klima (1963)) appended to sentences containing strong only are negative rather than positive. Compare (45) and (46).

- (45) a. John didn't hit Bill, did he?  
       b. \*John didn't hit Bill, didn't he?  
 (46) a. \*John hit only Bill, did he?  
       b. John hit only Bill, didn't he?

We must, then, explain why sentences containing strong only differ from sentences containing an overt occurrence of sentence negation with respect to tag-question formation.

There are two types of close paraphrases of strong only in which sentence negation appears overtly. Compare the a and b forms of (47) with (23), repeated as (48).

- (47) a. Mary entertains men on Sundays  
       but on no other days.  
       b. Mary entertains men on no days  
       other than Sundays.

- (48) Mary entertains men only on Sundays.

The basic difference between (47a) and (47b) is the location of the negative element.

In an interesting study of what I have called strong only, Horn (1969) argues that a sentence like (48) is used to assert (49b) while presupposing the truth of (49a).<sup>5</sup>

- (49) a.  $E(M, m, S)$ , i.e. Mary entertains men on Sundays.
- b.  $\neg(x) (X = S \ \& \ E(M, m, x))$ , i.e., There exist no days of the week such that these days differ from Sundays and Mary entertains men on these days.

The evidence for this analysis is that the denial of (48)--cf. (50)--does not deny that Mary entertains men on Sundays.

- (50) It's not true that Mary entertains only on Sundays.

In light of the above, it is clear that of the two putative paraphrases of (48), namely (47a) and (47b), only the latter is like (48) in what it asserts and presupposes. Note, for instance, that the denial of (47a)--cf. (51a)--can be taken to mean that Mary doesn't entertain men on Sundays, but that the denial of (47b)--cf. (51b)--can not mean that Mary doesn't entertain men on Sundays.

- (51) a. It's not true that Mary entertains men on Sundays but on no other days.

- b. It's not true that Mary entertains men on no days other than Sundays.

In short, (47a) asserts that Mary entertains men on Sundays, while (47b) and (48) both presuppose this. Moreover, it is clear that (47b) and (48) assert the same thing, namely (49b).

In light of the fact that sentences like (47b) and (48) are semantically equivalent, it is worth raising the question whether these sentences are also syntactically related. The hypothesis that they are related is consistent with the facts which seemed to suggest that only is negative in character.

We noted above--cf. (25)--that clause-initial constituents containing strong only obligatorily attract the finite verb. As (52) and (53) show, clause-initial constituents containing no...other than also attract the finite verb.

(52) \*On no days other than Sundays,  
Mary entertains men.

(53) On no days other than Sundays  
does Mary entertain men.

Moreover, we observed--cf. (30b) and (31b)--that sentences whose clause-initial constituents contain strong only can contain indefinites like any and ever. This is also true of sentences whose clause-initial constituents contain no...other than, as (54 and (55) show.

(54) On no days other than Sundays  
does Mary entertain anyone.

(55) No one other than Bill was  
ever cursed by John.

We further noted that sentences containing only cannot also contain an overt occurrence of sentence negation. Recall (35) and the a forms of (37) - (39) and compare them with (56) - (59).

(56) \*John didn't kiss Mary on no days  
other than Sundays.

(57) \*John didn't hit no one other  
than Bill.

(58) \*John didn't go no place other  
than Boston.

(59) \*John won't leave in no event other  
than that if you leave.<sup>6</sup>

Finally, as was pointed out above in connection with my discussion of (40) and (41), the hypothesis that strong only is a variant of no...other than accounts for the fact that only one occurrence of strong only is possible per clause.

We noted above that there were two apparent difficulties with the view that strong only is derived in part by the incorporation of sentence negation. First, negative sentences ordinarily have neither-tags but sentences containing strong only don't. Interestingly sentences containing no...other than don't have neither-tags either. Consider

- (60) a. John didn't hit anyone other than Bill and neither did Joe.
- b. \*John hit only Bill and neither did Joe.
- c. \*John hit no one other than Bill and neither did Joe.

In light of the unacceptability of (60c) it would appear that the placement of sentence negation is crucial to the formation of neither-tags. In any case, the view that strong only is a variant of no... other than receives support from the fact that both (60b) and (60c) are unacceptable.

The other problem was that negative sentences ordinarily have positive tags in Tag-questions, but sentences containing strong only have negative tags. Again no...other than works like strong only, as can be seen by comparing (61) with (45).

- (61) a. \*John hit no one other than Bill, did he?<sup>7</sup>
- b. John hit no one other than Bill, didn't he?

We discover, there, that the view that strong only is a variant of no other...than accounts not only for the cases in which only acts like a sentential-ly negative element, but also for the cases in which it does not. Surely it is no accident that strong only and no...other than work alike, but precisely this would be claimed by an analysis

that does not relate them.

There are essentially two ways in which one could envision relating only and no...other than. We could suppose that the relationship is a purely semantic one. Given this view, only would occur as a deep structure lexical item and it would be mapped by interpretive semantic rules onto the same semantic representation that no...other than is mapped onto. According to this view, any syntactic similarities between only and no...other than must be stated in terms of inherent lexical properties of only and no...other than.

The other point of view is that only and no...other than have the same, or nearly the same, underlying semantic representation and that this semantic representation is mapped by transformational rules of the usual sort onto different phrase markers at the level of structure at which lexical insertion applies. We might, for instance, postulate a rule--Only-formation--that collapses the complex symbols underlying no...other than into a single complex symbol appropriate for insertion of only. According to this view, there ought to be facts about sentences containing only which can most naturally be accounted for in terms of structural properties of sentences containing no...other than.

In the next section, I show that the latter analysis of only--the view that only is a suppletive variant of no...other than--is to be preferred over the former analysis, for the latter analysis provides the basis for a natural explanation of the fact that if-clauses can contain indefinites like any and ever, but if-clauses modified by only, even, and except and unless-clauses cannot and the fact that if can be modified by only, even, and except while unless cannot. As we saw in the first section of this chapter, the former analysis--the view that only is a deep structure lexical item--cannot account for these facts in a natural way.

#### The Relationship between if and unless.

The view that only is a suppletive variant of no...other than would appear to break down completely in the face of the fact that only if does not have the appropriate paraphrase. Although we get (62), (63) is impossible.

(62) I will leave if you ask me to.

(63) \*I will leave now if other than if  
you ask me to.

However, observe that (64) and (65) are paraphrases of (62).

(64) I will leave only in the event  
that you ask me to.



- (65) I will leave in no event other than that you ask me to.

If we were to postulate that (65) is mapped onto (64) by the rule of Only-formation and that there is a further rule--If-formation--which collapses the complex symbols underlying in the event that into a single complex symbol appropriate for insertion of if, then the fact that there are no phrases like\* no if other than if would not contradict the view that only is a suppletive variant of no...other than.

There is evidence in support of the view that if is a suppletive variant of in the event that. In the first place, note that indefinites occur in in the event that constructions.

- (66) a. I will be unhappy in the event that you tell any-one I'm insane.  
 b. I will be unhappy in the event that you ever hit me again.

Thus, if we were to relate if to in the event that we would not need to provide if with some ad hoc feature indicating that the clauses it introduces can contain indefinites.

Secondly, notice that the view that if is a suppletive variant of in the event that accounts, in conjunction with Ross' Complex Noun Phrase Constraint, for the fact that nothing can be moved

out or if-clauses. Consider

- (67) a. John will be angry if you go to Boston.
- b. \*To what city will John be angry if you go.
- (68) a. John will be angry in the event that you go to Boston.
- b. \*To what city will John be angry in the event that you go.

The parallel between (67) and (68) is of special importance for there is no known movement constraint besides the Complex Noun Phrase Constraint which could reasonably be expected to prohibit formation of a sentence like (67b).

The analysis that if is a suppletive variant of in the event that and that only is a suppletive variant of no...other than is not only consistent with the fact that if-clauses can contain indefinites, but also with the fact that if-clauses modified by only cannot contain them. Consider

- (69) a. \*John will leave town only in the event that Joan ever telephones him again.
- b. \*John will be angry only in the event that you tell any-one to hit him.
- (70) a. \*John will leave town in no event other than that Joan ever telephones him again.

- b. \*John will be angry in no event other than that you tell anyone to hit him.

Why is it that (69) and (70) are unacceptable?

Ross (1967) has shown that there must be a rule which, in an apparent top-to-bottom fashion, converts some to any in relative clauses if the head of the relative contains a determiner like no, any, a, or every, among others, but not if the head contains a definite or demonstrative determiner. Thus we get (71), but not (72).

- (71) John doesn't like anyone who loves anyone who eats anything purple.

- (72) \*John doesn't like anyone who loves the boy who eats anything purple.

Now, if we were to assume that that Joan ever tele-phones him again in (70a) and that you tell anyone to hit him in (70b) are noun complements whose head (perhaps, the event) has been deleted, then it would follow that the top-to-bottom some-to-any rule not reach into such clauses. We would, of course, have to say that Only-formation and If-formation follow this top-to-bottom some-to-any rule, for these rules create structures which are consistent with the application of the some-to-any rule.

We noted that if-clauses modified by even and, for those who get such constructions, except also cannot contain indefinites like any or ever. I propose

to account for these facts by postulating that even if is a variant of even in the event that and that except if is a variant of except in the event that. Note that indefinites cannot occur in (73) and (74).

- (73) a. \*John will leave town even in the event that Joan ever telephones him again.
- b. \*John will be angry even in the event that you tell any-one to hit him.
- (74) a. \*John will leave town except in the event that Joan ever telephones him again.
- b. \*John will be angry except in the event that you tell any one to hit him.

I shall further suppose that even is a suppletive variant of any...including and that except is a suppletive variant of any...other than. These variants could, of course, be provided by an extension of the only-formation rule. In support of such an analysis, note that indefinites are not possible in (75) and (76).

- (75) a. \*John will leave town in any event including that Joan ever telephones him again.
- b. \*John will be angry in any event including that you tell anyone to hit him.
- (76) a. \*John will leave town in any event other than that Joan ever telephones him again.

- b. \*John will be angry in any event other than that you tell anyone to hit him.

As in the case with (69) and (70), the unacceptability of (75) and (76) is due to the inability of the top-to-bottom some-to-any rule to reach into the clauses that Joan ever telephones him again and that you tell anyone to hit him, presumably because they are adjuncts to some noun phrase with a definite determiner (possibly, the event).

In sum, if we say that each of the sentences of (77) and of (78) is related to the others by the rules of Only-formation and If-formation, we can account for the fact that if-clauses which are modified by even and except cannot contain indefinites in a principled way.

- (77) a. I'll leave even if you leave.  
 b. I'll leave even in the event that you leave.  
 c. I'll leave in any event including that you leave.
- (78) a. I'll leave except if you leave.  
 b. I'll leave except in the event that you leave.  
 c. I'll leave in any event other than that you leave.

What, then, is the analysis of unless? Semantically unless is like except if, that is, the sentences of (78) are paraphrases of (79).

(79) I'll leave unless you leave.

If we were to suppose that (79) is derived from (78a) by a rule--Unless-formation--that collapses the complex symbols underlying except and if we could provide a principled account of the fact that unless-clauses cannot contain indefinites.

Such an analysis also provides an explanation for the fact that unless cannot be modified by only, even, and expect. According to this analysis, the unacceptability of (80a)-(80c) is to be attributed to the unacceptability of (81a)-(81c).

(80) a. \*I will leave only unless you leave.

b. \*I will leave even unless you leave.

c. \*I will leave except unless you leave.

(81) a. \*I will leave in no event other than in any event other than that you leave.

b. \*I will leave in any event including in any event other than that you leave.

c. \*I will leave in any event other than in any event other than that you leave.

In order to generate (80a)-(80c) we would be forced to suppose that the underlined occurrences of in any event other than (for unless) are unbedded within in no event other than (for only), in any event in-

cluding (for even), and in any event other than (for unless), respectively. This is impossible for other than and including require objects, that is, they cannot occur with adverbials of condition.

My alternative to the view that unless is the 'negative counterpart' of if is that unless is a suppletive variant of in any event other than. Its apparent negative character is, I submit, due to the presence of the restrictive comparative other than. I give below a sketch of the derivation of a sentence containing unless.

- (82) a. I will leave in any event other than that you leave.
- b. (by Only-formation) I will leave except in the event that you leave.
- c. (by If-formation) I will leave except if you leave.
- d. (by Unless-formation) I will leave unless you leave.

In the above, I have argued that if is a variant of in the event that. Actually, other conditional adverbials (for example, in case, under the circumstance) could have been chosen. However, I know of no facts which have a clear bearing on the issue whether if is literally a variant of some actually occurring adverbial or not. Nor do I have evidence which selects some specific adverbial as being a more likely candidate than the others.

## Footnotes

1. See the quotation from Jespersen in Chapter 1.

2. Essentially this analysis is given by Hall (1964).

3. The reader may notice that the main clauses of (11) differ from those of (7) and (8). I have changed examples because I find (i) very odd.

(i) <sup>?</sup> I will be happy if you ever  
hit me again.

On the other hand, (ii) is perfectly good.

(ii) I will be angry if you ever  
hit me again.

Notice further that (iii) is acceptable.

(iii) I won't be happy if you ever  
hit me again.

What seems to be happening is that the main clause must be logically negative or be emotively negative (e.g., angry vs. happy) if ever or any is to occur in the if-clauses of these examples. Presumably, the idea of hitting someone back (cf. (10)) is emotively negative. See R. Lakoff (1969) for a stimulating discussion of the problems posed by words like any and ever. Thus, the claim that if-clauses can freely contain any and ever is a slight oversimplification.



4. (46a) is acceptable if it is interpreted in a rhetorical way, but not if it is a true question.

5. I have represented the assertion and presupposition of (48) with formulas to distinguish these semantic representations from paraphrases of (48).

6. I anticipate here my analysis of only if.

7. Recall footnote 4 above.

## CHAPTER 6

## Conclusion

The central aims of this study have been to demonstrate that adverbial subordinate clauses are special cases of independently motivated types of complement constructions--relative clauses and noun complements--and that the notion "subordinating conjunction" plays no role in the description of them. I have shown that clauses introduced by where, when, and while and by before, after, until, and since are relative clauses and that clauses introduced by if and unless are noun complements. I have further shown that these so-called conjunctions are superficial lexical realizations of quite diverse underlying structures: where, when, and while are relative adverbs; before and after are realizations of underlying compared adjectives; until and since are realizations of aspectual verbs like end and begin; and if and unless are realizations (quite complexly so in the case of unless) of underlying conditional adverbials.

In one particular, I have tried to raise my case, analysis to the level of explanatory adequacy. I have argued that an independent relative clause can exist only if the class of noun phrases or adverbial

phrases of which it would be a member has a pre-nominal realization. This generalization is captured in my formulation of the Antecedent Deletion rule, for, as I have stated it, the antecedent must be a pronoun. Thus adverbial why-clauses and how-clauses cannot exist, for there is no pronominal realization of adverbials like for some reason and in some way. This principle allows for different classes of independent relatives from language to language. Language-particular differences are possible, according to this principle, if there are different pronoun "inventories" in different languages.

Regretably, the correlation between the existence of pronouns of a given class and the existence of independent relatives occurring as members of that class occurred to me at a late stage in my writing of this study. As a consequence, I have been unable to investigate its consequences cross-linguistically. Of particular interest would be languages in which there are clauses introduced by location prepositions like near, in front of, from, etc., for they are, in principle, no different from clauses introduced by time prepositions. Note that we get both (1) and (2).

- (1) John lives near the place Bill lives.

- (2) I studied until the moment Bill arrived.

Thus, it is clear that Relative Pronoun Deletion can apply in this environment. And, as (3) and (4) show, the noun phrases (rather adverbials) which serve as the objects of near and until pronominalize.

- (3) John lives near the place Bill lives and George lives near there too.
- (4) I studied until the moment Bill arrived and George studied until then too.

Thus, we would expect that Antecedent Deletion would apply after near as well as after until. Exactly this happens, for we get (5).

- (5) John lives near where Bill lives.

In the case of until, Antecedent Deletion and Relative Pronoun Deletion work together to yield (6).

- (6) I studied until Bill arrived.

In the case of near, application of these two rules yield the ungrammatical sentence (7).

- (7) \*John lives near Bill lives.

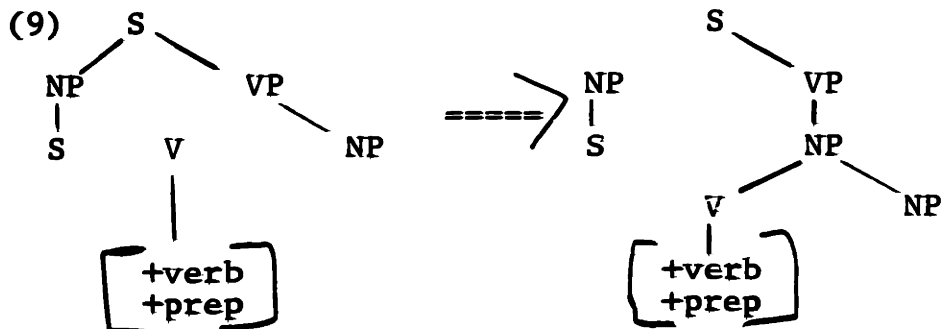
Interestingly, Japanese has sentences like (7).<sup>1</sup>

If we are to relate superficial prepositional occurrences of near with grammatically more fundamental adjectival occurrences, as Lakoff (1965) has suggested, we must suppose that the structure underlying (7) is a stage on the way to the derivation of (8).

(8) John lives near Bill.

What seems to be required is an obligatory deletion of the repeated occurrence of live from the subordinate clause of (7). Thus, we may conclude that it is accidental that sentences like (7) are not possible in English.

The analyses I have given of clauses introduced by before, after, until, and since are of particular interest, for the demonstration that the formatives before and after are de-adjectival and that until and since are de-verbal lends further credence to the view that prepositional phrases do not occur as such in underlying structures. Such analyses lead, instead, to the view that prepositional phrases are "degenerate" verb phrases, formed by Chomsky adjunction of "prepositional" verbs to their objects, a process illustrated by (9).



Let me just briefly mention three very general considerations which suggest the correctness of the view that prepositional phrases are degenerate verb phrases.

In the first place, in a variety of languages, both prepositions and verbs govern Case-Marking and, commonly, as in German, some of the same cases. Now, we could write a rule something like (10), which is, quite clearly, descriptively adequate (if linguistic theory is to permit braces in structural descriptions).

$$(10) \quad X \quad - \quad \left\{ \begin{array}{c} P \\ V \end{array} \right\} \quad - \quad NP \quad - \quad Y$$

$$1 \quad - \quad 2 \quad - \quad 3 \quad - \quad 4$$

$$1 \quad - \quad 2 \quad - \quad 3 \text{ union}[+case] \quad - \quad 4$$

However, the second term of (10) is nothing more than a list and, as such, leaves unexplained why prepositions and verbs should work alike. In order to explain why these two lexical categories should work alike, linguistic theory must contain some ad hoc universal from which this would follow. The difficulty is this: it is very hard to imagine any evidence in support of lumping prepositions and verbs together in Case-Marking which would go beyond the language-particular evidence for the existence of rules like (10). On the other hand, if we were to say that prepositions originate in underlying structure as verbs and that they continue to be dominated by V in surface structure, then we could write the English Case-Marking rule as follows:

(11) X - V - NP - Y  
 1 - 2 - 3 - 4  
 1 - 2 - 3 union[+case] - 4

Given rule (11), there is no need for an ad hoc universal stating that verbs and prepositions should work alike with respect to Case-Marking.

A second general consideration in support of the view that prepositions originate as verbs is that such an analysis provides an explanation for the fact that English, a verb-object language, should have prepositions, but Hindi, an object-verb language, should have postpositions. An analysis, in which prepositions and verbs are treated as members of different lexical categories in underlying structure would require an ad hoc universal stating that verb-object languages have prepositions and object-verb languages have postpositions. And an ad hoc universal is no less objectionable for being universal, a point which has not, I think, been fully realized.

A third, but more mundane, argument in support of the view that prepositions are de-verbal is that such an analysis will permit us to use the formalism Chomsky (1965) provided for dealing with verb-object co-occurrence relations. Given the analysis suggested here, the phenomena exhibited by (12) and (13) will be accounted for in precisely the same way.

- (12) a. John looked at the barn.  
       b. \*John looked at midnight.
- (13) a. John stood near the barn.  
       b. \*John stood near midnight.

In light of these very general--indeed, universal--similarities between verbs and prepositions and of the language-specific arguments given by G. Lakoff (1965), J. Geis (in preparation), and by myself to the conclusion that certain specific English prepositions are de-verbal, it is clear that the widely accepted view that prepositions and verbs are members of different underlying lexical categories cannot be taken very seriously. But, before much credence can be placed in the analysis proposed here, we must provide a principled explanation for the phenomenon of Prepositional Phrase Formation (cf. (9) above). Regretably, I must confess a complete lack of understanding of this phenomenon.



**Footnotes**

1. I am indebted to Miss Noriko Akatsuka for informing me of this.

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