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Source: *Linguistic Inquiry*, Summer, 1978, Vol. 9, No. 3 (Summer, 1978), pp. 331-391

Published by: The MIT Press

Stable URL: <https://www.jstor.org/stable/4178069>

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The Syntax of Free Relatives in English

Free relative clauses in English bear such a close superficial resemblance to *wh* (interrogative) complements that they almost invite the transformational analysis that they have usually received. In the usual analysis, a *wh*-phrase is generated within a clause and preposed by *Wh* Movement to clause-initial position, as illustrated in (1):¹

- (1) a. I'll buy [_{NP}[_S you are selling *what*]]
b. I'll buy *what you are selling*.

Despite its initial plausibility, the usual analysis fails to account for certain syntactic properties of free relatives that have remained generally unrecognized in the transformational literature. These properties indicate that free relatives have a syntactic structure considerably different from that assumed in (1). We will show that these properties of free relatives follow naturally from the assumptions that the *wh*-phrase is base-generated as a head to its clause and that a rule other than *Wh* Movement accounts for the necessary “gap” in the clause. Our reanalysis of (1b) is schematized in (2):

- (2) I'll buy [_{NP} what [_S you are selling [pro]]]
↓
ϕ

By this reanalysis, we will show that universal principles of feature induction, syntactic binding, and agreement explain not only the peculiar differences between English free relatives and interrogatives but also their uniform behavior with respect to Island Constraints. Despite the apparent complexity of the data, the syntax of free relatives in English is in fact surprisingly simple, once the role of these universal principles is recognized. Thus, the child learning English faces a less difficult task than it might seem. This result illustrates the contribution the theory of Universal Grammar can make in solving the fundamental empirical problem of language acquisition.

To recognize the special syntactic properties of free relatives, it is useful to have in mind several properties of interrogative complements in English, which are summarized in section 1.

¹ Variations of this type of analysis are given by Kuroda (1968), Chomsky (1973), Quicoli (1972), and Andrews (1975).

1. The Sentential Character of Interrogative Complements

Interrogatives in English are sentential constructions. Like other sentential complements, they may appear extraposed from *it*:

- (3) *It is not obvious to me that you are six feet tall.*
- (4) a. *It is not obvious to me whether you are tall enough.*
- b. *It is not obvious to me how tall you are.*

Nonsentential phrases cannot in general occur extraposed in this way:

- (5) a. **It is not obvious to me six feet tall.*
- b. **It is not obvious to me a tall man.*
- c. **It is not obvious to me all the facts.*

Interrogative complements occur in other environments restricted to sentential constructions. For example, the verb *care* (without an associated preposition) takes sentential complements, but not NPs or APs:

- (6) *Do you care that your shoes are muddy?*
- (7) a. **Do you care your shoes?*
- b. **Do you care very muddy?*

It takes interrogative complements as well, whether or not these are initiated by NPs (8b) or APs (8c):

- (8) a. *If no one cares whether or not your shoes are muddy, why worry?*
- b. *If no one cares whose shoes are muddy, why worry?*
- c. *If no one cares how muddy their shoes are, why worry?*

Even more restricted than the verb *care* is the verb *inquire*, which takes interrogative sentential complements:

- (9) a. *She never inquired whether their shoes were muddy.*
- b. *She never inquired whose shoes were muddy.*
- c. *She never inquired how muddy their shoes were.*
- (10) a. **Since she never inquired the amount of mud, don't worry.*
- b. **Since she never inquired how muddy, don't worry.*
- c. **Since she never inquired whose shoes, don't worry.*

(We have attempted to construct the examples in (10) so as to rule out the irrelevant sluicing interpretation; cf. Ross (1969); on complement selection of interrogatives, see Grimshaw (1977; to appear).)

This evidence indicates that the entire *wh*-complement, including the preposed *wh*-phrase, belongs to a sentential category.² At the same time, interrogative complements

² We designate this category "S̄" as proposed in Bresnan (1970) and adopted elsewhere. For justification of the distinction between S̄ and S, see Bresnan (1974; 1976b).

may appear in certain phrasal positions normally occupied by nominals, such as the object of a preposition (example (11)) or the subject of a sentence (example (12)):

- (11) a. We didn't talk much about *the muddy shoes* with Fred.
 b. We didn't talk much about *whose shoes were muddy* with Fred.
 c. We didn't talk much about *whether or not our shoes were muddy* with Fred.
 d. We didn't talk much about *how muddy our shoes were* with Fred.
- (12) a. *Muddy shoes* aren't interesting to talk about.
 b. *Whose shoes are muddy* isn't an interesting question to talk about.
 c. *Whether or not our shoes are muddy* isn't an interesting question to talk about.
 d. *How muddy our shoes are* isn't an interesting question to talk about.

Such facts have been accounted for by permitting the phrase structure rules for English to expand NP optionally as S (\bar{S} in our terms: cf. fn. 2): $NP \rightarrow \bar{S}$. This analysis (essentially due to Rosenbaum (1967)) does not account for the (slight) unacceptability of interrogative complements in other NP positions, such as in (13) and (14).

- (13) a. *Are muddy shoes* unimportant?
 b. ?*Is whose shoes are muddy* unimportant?
 c. ?*Is whether or not our shoes are muddy* unimportant?
 d. ?*Is how muddy our shoes are* unimportant?
- (14) a. He considers *muddy shoes* unimportant.
 b. ?He considers *whose shoes are muddy* unimportant.
 c. ?He considers *whether or not your shoes are muddy* unimportant.
 d. ?He considers *how muddy your shoes are* unimportant.

However, the unacceptability of examples like (14b-d) disappears under extraposition (15) and topicalization (16):

- (15) a. He considers it unimportant *whose shoes are muddy*.
 b. He considers it unimportant *whether or not your shoes are muddy*.
 c. He considers it unimportant *how muddy your shoes are*.
- (16) a. *Whose shoes are muddy* he considers unimportant.
 b. *Whether or not your shoes are muddy* he considers unimportant.
 c. *How muddy your shoes are* he considers unimportant.

And extraposition also improves (13b-d), as the reader can check.

A generalization governing such facts, due to Ross (1967) and Kuno (1973), is that sentences exhaustively dominated by NP cannot appear internal to phrases of which they are immediate constituents. We will refer to this statement as the *Internal NP over S Constraint*. In the unacceptable cases—(13b-d) and (14b-d)—the interrogative com-

plement [_{NP} \bar{S}] is on the periphery of the phrase that immediately contains it.³ The Internal NP over S Constraint correctly predicts that headed interrogatives (17) and conjoined interrogatives (18) should be acceptable for speakers who dislike (13b-d) and (14b-d):

- (17) Is the question of *whether or not our shoes are muddy* so uninteresting?
 (18) I consider *whether you go or not* and *whether you stay or not* to be equivalent questions.

In both of these examples, the interrogative clauses are on the periphery of the phrases that immediately contain them. Although the Internal NP over S Constraint is not unproblematic, a less problematic alternative is not yet available.⁴ We will therefore assume that nonextraposed interrogative complements have the structure [_{NP} \bar{S}].

2. A Morphological Property of Free Relative Pronouns

The *wh*-words of free relatives often appear identical to those of interrogatives:

- (19) I'll buy *what* he is selling. (free relative)
 (20) I'll inquire *what*he is selling. (interrogative)

However, there is one morphological difference that we shall exploit in what follows: the free relative pronoun can be suffixed by *-ever*.

- (21) I'll buy *whatever* he is selling.

This is not true of interrogative pronouns:

- (22) *I'll inquire *whatever* he is selling.

The word *ever* can be used in interrogatives as a temporal quantifier or a rhetorical intensifier:

- (23) Who did he *ever* kiss?
 (24) What *EVER* is the matter with him now?

These *evers* "float", unattached to the interrogative pronoun:

- (25) What is *EVER* the matter with him now?

³ This condition is Kuno's addition to Ross's (1967) original formulation. See Ross (1973) for further discussion.

⁴ Among the problems for the constraint is the proper characterization of the well-formedness of examples like (11): see Kuno (1973) for discussion. Still another problem is the failure of headless NP clauses to undergo Heavy NP Shift: cf. *He considers unimportant the issue of whose shoes are muddy*, **He considers unimportant whose shoes are muddy*. Among the alternative accounts is Koster's (1978) proposal that sentential complements are never immediately dominated by NP but are base-generated in sentence-peripheral positions (i.e. either topicalized or extraposed positions). Unfortunately, Koster has overlooked the existence of examples of the type presented here. Although Koster's proposal is not in principle incompatible with our analysis, we must reject it for failing to provide any source for (11b-d), (17), (18), and examples like *I regard which node dominates which as a rather boring question to discuss*.

In contrast, the *-ever* of free relatives is a bound form:

- (26) a. *I kissed *who* he *ever* kissed.
 b. I kissed *whoever* he kissed.
- (27) a. *I don't like *what* is *ever* the matter with him now.
 b. I don't like *whatever* is the matter with him now.

The interpretation of the bound morpheme *-ever* of free relatives seems to involve universal quantification in the domain specified by the *wh*-phrase.

With some free relative pronouns, *-ever* is obligatory (**I'll take which you give me, I'll take whichever you give me*); with others it is optional (*I'll take what you give me, I'll take whatever you give me*). The choice between *whatever* and *what* in free relatives depends upon semantic factors that we will not explore systematically. Our purpose here is merely to ensure some simple means of distinguishing free relatives from interrogatives in order to characterize their distinctive syntactic properties.

A large number of other properties that distinguish interrogatives from free relatives is given in the very valuable study by Baker (1968). For example, Baker observes that, unlike interrogative complements, free relatives may not contain multiple *wh*-phrases:

- (28) I have to remember *who* is applying for *what*.
 (29) *I have to interview *whoever* is applying for *what*.

This is of course a property of ordinary relative clauses as well: **I have to interview anyone who is applying for what*.

3. The Phrasal Structure of Free Relatives

Consider the examples of free relatives given in (30)–(37):

- (30) a. I'll buy *whatever you want to sell*.
 b. I'll buy *the turkey*.
- (31) a. I'll read *whichever book you give me*.
 b. I'll read *your book*.
- (32) a. John will be *however tall his father was*.
 b. John will be *six feet tall*.
- (33) a. She vowed to become *however rich you have to be to get into that club*.
 b. She vowed to become *very rich*.
- (34) a. I'll word my letter *however you word yours*.
 b. I'll word my letter *quite carefully*.
- (35) a. I can run *however fast you can run*.
 b. I can run *faster*.
- (36) a. I'll put my books *wherever you put yours*.
 b. I'll put my books *anywhere*.
- (37) a. John will leave *whenever Mary leaves*.
 b. John will leave *sometime*.

It is apparent on inspection that the italicized strings in (30a) and (31a) are NPs, those

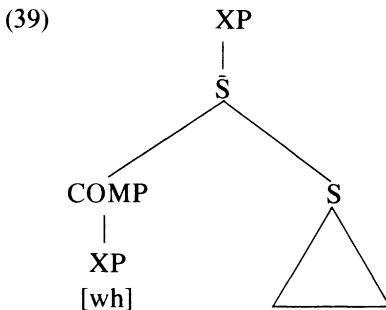
in (32a) and (33a) are APs, those in (34a) and (35a) are AdvPs, and those in (36a) and (37a) are locative and temporal adverbials. (A more precise analysis of these will be given in section 5.) For instance, *buy* and *read* are subcategorized for direct object NPs, and the strings in (30a) and (31a) are fulfilling this subcategorization. The verb *word* as in (34) requires a following manner adverbial, implying that *however you word yours* is such an adverbial, and so on. In short, free relatives have the same syntactic distribution as the simple phrases given in the (b) examples.

Now compare this list, arrived at by assigning syntactic categories to the italicized strings in (30)–(37), with the list obtained by assigning syntactic categories to the *wh*-phrases themselves in each sentence. *Whatever* and *whichever book* are NPs, *however tall* and *however rich* are APs, *however* and *however fast* are AdvPs, and *whenever* and *wherever* are temporal and locative adverbials. (We will temporarily use the label XP for the latter, returning to these constructions in section 5.) The two lists are identical. Assigning category labels as we have done gives the following structure:

- (38) a. I'll buy [_{NP}[_{NP} whatever] you want to sell]
 b. John will be [_{AP}[_{AP} however tall] his father was]
 c. I'll word my letter [_{AdvP}[_{AdvP} however] you word yours]
 d. I'll put my books [_{XP}[_{XP} wherever] you put yours]

In every case, the syntactic category of the *wh*-phrase is the same as that of the whole free relative; that is, the same as that of the dominating node.

How can this ‘‘matching effect’’ be explained, given the usual transformational analysis of free relatives? If we supposed that the *wh*-phrase were fronted into COMP position by *Wh* Movement, we would arrive at configurations like the following one:



The problem is that there is nothing to predict or ensure that the fronted *wh*-phrase has the same categorial specification as the dominating XP. A special constraint would have to be devised requiring that the two occurrences of XP in configuration (39) have the same categorial specification; otherwise, ill-formed sentences would be generated. For example, the verb *reach* takes an NP (as in *He'll reach that height* vs. **He'll reach that tall*), while the verb *get* in the sense of ‘become’ takes an AP (as in *He'll get that tall* vs. **He'll get that height*):

- (40) He'll reach [_{NP}[_{NP} whatever height] his father did]
 (41) He'll get [_{AP}[_{AP} however tall] his father did]

If the *wh*-phrase does not satisfy this condition, ill-formed examples like (42) and (43) occur:

- (42) *He'll reach however tall his father did.
- (43) *He'll get whatever height his father did.

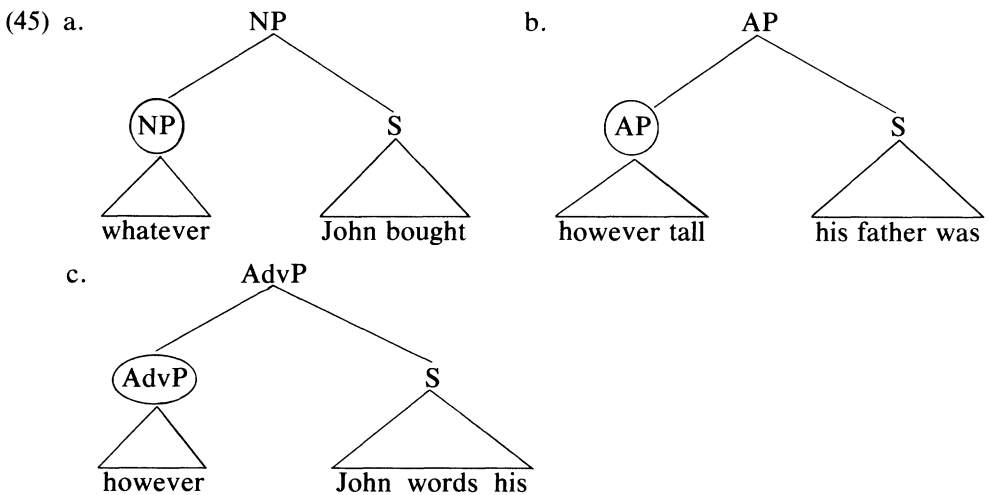
Unfortunately, this special constraint fails to provide any explanation for the well-formedness of interrogatives like (44), which may be assumed to have the structure of (39):

- (44) a. The storekeeper was uncertain about how tall my Dieffenbachia would get.
 - b. The storekeeper was uncertain about [_{NP}[_S[_{AP} how tall] my Dieffenbachia would get]]
- (Cf. *The storekeeper was uncertain about whether or not my Dieffenbachia would get taller.*)

Our point is not that the matching effect cannot be *described* by an ad hoc constraint, but that it is not *explained* in this way.

It is evident that interrogative clauses differ structurally from free relatives: in interrogative complements, the category of the preposed *wh*-phrase is entirely independent of the overall category of the construction. In other words, in interrogatives there is no relationship between the two occurrences of XP in (39). Given the assumption that free relatives are structurally identical to interrogative complements, the matching effect remains unexplained. The effect is unexpected and unrelated to other regularities of English grammar.

However, the matching effect is predictable under the hypothesis that free relatives are headed, the *wh*-phrase occupying the position of the head of the clause.⁵ Under this hypothesis, the free relatives in (38a-c) are assigned the structures given in (45).



⁵ This proposal was first advanced explicitly in Bresnan (1973b), although traditional grammarians also debated the issue (Jespersen (1927)). Hirschbühler (1976) proposes a headed structure for French free relatives and Allen (1977) for a class of Old English free relatives.

In each of (45a-c), the circled node is the head of the phrasal node that dominates it. (The exact number of bars on the topmost category and the head is not essential to our argument; on the choice of S or \bar{S} in (45), see fn. 10.) The fact that the head of a free relative matches the categorization of the entire construction follows from an independently required constraint on phrase structure rules:

(46) A phrase and its head have the same categorial specification.

This constraint has been formulated in terms of the \bar{X} theory of phrase structure (Chomsky (1970), Jackendoff (1977), Bresnan (1976a; 1977a)), although it is logically independent of other principles of that theory (Grimshaw (1977)).⁶

It is this principle that accounts for the fact that the head of the NP in (47) is nominal, and the head of the AP in (48) is adjectival:

(47) Bob will grow to [_{NP}[_{NP} the height] [_S that his father reached]]

(48) I've seen Bob fat, but this year he's gotten [_{AP}[_{AP} the fattest] [_S that I've ever seen him]]

This principle also accounts for a similar matching effect in comparative clause constructions:

(49) a. He uttered [_{NP}[_{NP} more homilies] [_S than I'd ever listened to in one sitting]]

b. Try to be [_{AP}[_{AP} as objective] [_S as I have become]]

c. They didn't word their proposal [_{AdvP}[_{AdvP} as skillfully] [_S as we worded ours]]

(On the syntax of comparatives, see Bresnan (1973a; 1975; 1976a); cf. Jackendoff (1977).)

Given the independently motivated principle (46), the matching effect in free relatives can be explained merely by hypothesizing that the *wh*-phrases in free relatives are generated as the heads to their clauses; that is, the structures of (45) have the form of base structures. We will refer to this as *the base hypothesis*.

4. Confirming Evidence for the Base Hypothesis

The base hypothesis is confirmed by a variety of grammatical phenomena in English.

4.1. Number Agreement

In subject position, the heads of ordinary relative clauses induce number agreement on the main verb:

(50) The books she has $\left\{ \begin{array}{l} \text{are} \\ * \text{is} \end{array} \right\}$ marked up with her notes.

However, in subject position the *wh*-phrase of interrogative complements does not

⁶ There are well-known (and possibly universal) deviations from (46): gerundive NPs appear to have verbal heads, and sentential NPs are headless (cf. section 1). See Jackendoff (1977) for a fuller discussion.

induce number agreement on the main verb:

- (51) What books she has $\left\{ \begin{array}{l} \text{isn't} \\ \text{*aren't} \end{array} \right\}$ certain.

The base hypothesis leads us to expect the *wh*-phrases of free relatives in subject position to induce number agreement, and this is what happens:

- (52) Whatever books she has $\left\{ \begin{array}{l} \text{*is} \\ \text{are} \end{array} \right\}$ marked up with her notes.

Assuming that number is a grammatical feature of nouns, we can hypothesize that the number feature of a category is added to the phrase of which it is a head. It then follows that the subject NPs of sentences (50) and (52) will be marked for plural number, like the head noun *books*, while the subject NP of sentence (51) will remain unmarked for number, being headless (cf. fn. 6). The main verb in (51) appears in the unmarked number for English, the third person singular.

4.2. *The Internal NP over S Constraint*

In internal NP positions, ordinary relative clauses occur freely:

- (53) a. Can the books Mary bought be on the table?
b. I found the books Mary bought unreadable.

However, as we pointed out in section 1, *wh*-complements are somewhat less acceptable in internal positions for some speakers:

- (54) a. ?Can whether you are right or not matter?
b. Can it matter whether you are right or not?
(55) a. ?I found what the consequences were unclear.
b. I found it unclear what the consequences were.

According to the Internal NP over S Constraint, the contrast stems from the phrase-internal occurrences of $[_{NP} \bar{S}]$ in (54a) and (55a). Interrogative complements have this structure, but relative clauses have a headed structure $[_{NP} \text{head } \bar{S}]$ that exempts them. If this account is correct, the base hypothesis predicts the acceptability of examples like (56) and (57):

- (56) Can what you want be on the table?
(57) I found what she cooked delicious.

4.3. *Independent Generation of wh-ever Phrases*

Wh-ever forms occur under certain circumstances without accompanying clauses:⁷

- (58) She wrote *whenever possible*.

⁷ Many speakers of American English also use *whoever possible*.

- (59) She'll go *wherever possible* (to promote her cause).
 (60) She vowed to do *whatever possible* to vindicate herself.

Any rule designed to derive these phrases transformationally from full clauses would require listing the well-formed outputs:

- (61) a. She wrote *whenever it was possible* →
 b. She wrote *whenever possible*.
 (62) a. She didn't write *whenever it was impossible* →
 b. *She didn't write *whenever impossible*.

The use of such rules as *To Be* Deletion and *Whiz* Deletion to perform such derivations would also represent an undesirable and unnecessary weakening of the theory of grammar (Bresnan (to appear)). We therefore assume that *wh-ever Adj* forms are base-generated as such.

Further evidence supporting this conclusion can be found in a type of example discovered by Jespersen (1927, 62). In discussing the use of free relatives in *who*, Jespersen points out that they are "not colloquial nowadays", and goes on to observe

There is however, one condition on which such relative clause primaries may be used in natural speech, namely that the generic meaning (i.e. indifference of choice) is expressly indicated. This may be done in one of two ways, either by means of the added adverb *ever* (*whoever*, with the archaic variants *whoso*, *whosoever*), or else by such a verb as *choose*, *please*, *like*, *would* in the clause itself. . . . It is possible to say "Tom may marry *whom he chooses (pleases, likes)*", but if *likes* is the verb used, it means the same thing as the two other verbs, and has no reference to Tom's personal feelings, for it is impossible to say, for instance, "He is going to marry *whom he dislikes*".

When we consider carefully the syntax of Jespersen's examples and other phrases like (*Tom does*) *what(ever) he pleases*, (*Go*) *where(ver) you like*, we come to recognize that they are not true relative clauses at all. Compare the examples in (63)–(64) with the true free relatives in (65)–(66):

- (63) a. Eat *what you please*. (pseudo-free relative)
 b. *Eat *what you seem to please*.
 c. *Eat *what you think you please*.
 (64) a. Go *wherever you like*. (pseudo-free relative)
 b. *Go *wherever you want to like*.
 c. *Go *wherever you suppose you like*.
 (65) a. Eat *what you enjoy*. (true free relative)
 b. Eat *what you seem to enjoy*. "
 c. Eat *what you think you enjoy*. "
 (66) a. Go *wherever you belong*. "
 b. Go *wherever you want to belong*. "
 c. Go *wherever you suppose you belong*. "

The italicized parts of the pseudo-free relatives in (63)–(64) behave not like the free relative clauses in (65)–(66), but like the conditional phrases in (67)–(68):

- (67) a. You can go naked if *you please*.
 b. *You can go naked if *you seem to please*.⁸
 c. *You can go naked if *you think you please*.
 (68) a. If *you like*, you can leave.
 b. *If *you begin to like*, you can leave.
 c. *If *you suppose you like*, you can leave.

Such conditional phrases provide no internal source for a *wh*-word:

- (69) a. *What does he please?
 b. *Where do you like?
 (70) a. *I'm going to inquire what he pleases.
 b. *I don't care where you like.

It might seem tempting to derive these conditional phrases by means of deletion from sources like *Why not go when you like (going)?* and *We'll tapdance if you wish (us to tapdance)*. However, one would again have to list the well-formed outputs of the hypothesized deletion rule, to prevent derivations like *Why go when you dislike going?* → **Why go when you dislike?* and *We'll tapdance if you don't wish us to tapdance* → **We'll tapdance if you don't wish*.⁹ Moreover, the use of verbal complements with some of these conditional phrases is simply archaic: *I say what I please (?to say)*, *John appears when he pleases (?to appear)*. We therefore propose to provide each of these verbs of conditional possibility with a special lexical entry specifying (i) that it is syntactically intransitive, and (ii) that it must occur as the main verb of a phrase that is semantically interpreted as a conditional. This will account not only for the pattern of facts in (63)–(64) and (67)–(70), but also for (71):

- (71) a. Eat anything you please.
 b. *Eat something you please.
 c. Leave anytime you wish.
 d. *Leave sometime you wish.

(See Cushing (1976) for a lucid exposition of the semantic relations between universal natural language quantifiers and conditionals.)

We conclude that *wh-ever* pronouns are generated independently of their relative clauses in at least two situations: with adjectives like *possible* (*She wrote whenever possible*) and with phrases of conditional possibility (*She writes whenever she likes*). Like other indefinite pronouns interpreted as universal quantifiers (*anyone, anywhere*,

⁸ There is a different (and completely irrelevant) reading of *please* that renders both (67b) and (67c) acceptable: *You can go naked if you seem to please (the spectators)*.

⁹ It is essential to distinguish the proposed ellipsis here from the rule of VP Deletion, which always strands an auxiliary verb or *to* (Bresnan (1976a)).

anything), *wh-ever* pronouns may also be generated as the heads of relative clauses:

- (72) a. I'd do *anything* $\left\{ \begin{array}{l} \text{possible to help} \\ \text{I please} \\ \text{you ask me to do} \end{array} \right\}$.
- b. I'd do *whatever* $\left\{ \begin{array}{l} \text{possible to help} \\ \text{I please} \\ \text{you ask me to do} \end{array} \right\}$.

These facts provide further confirmation of the base hypothesis.

4.4. *Pied Piping*

The *wh*-phrases of English free relatives behave differently from both interrogative phrases and relative pronouns with respect to pied piping (the preposing of a governing preposition along with a *wh*-phrase):

- (73) a. I'll read the paper *which* John is working *on*.
 b. I'll read the paper *on which* John is working.
- (74) a. I'll like to know *which paper* John is working *on*.
 b. I'd like to know *on which paper* John is working.
- (75) a. I'll reread *whatever paper* John has worked *on*.
 b. *I'll reread *on whatever paper* John has worked.

While in (73) and (74) a preposition may be preposed from the clause along with the *wh*-phrase, in (75) this is impossible: the (b) form, where the preposition *on* is displaced from its position in the clause, is ungrammatical. The point here should not be obscured by the fact that pied piping in indirect questions is sometimes rather marginal, perhaps overly literary in style. The difference between questions and free relatives is nevertheless apparent and can be demonstrated conclusively by considering the behavior of unstrandable prepositions in the two constructions. While in general in English it is possible to front either an entire PP or just the NP, with consequent stranding of the preposition (as in examples (73) and (74)), with some PPs the second option is not available, and the whole PP must always be fronted. An example of such a PP is given in (76):

- (76) a. John described the manner in which Dickens died.
 b. *John described the manner which Dickens died in.

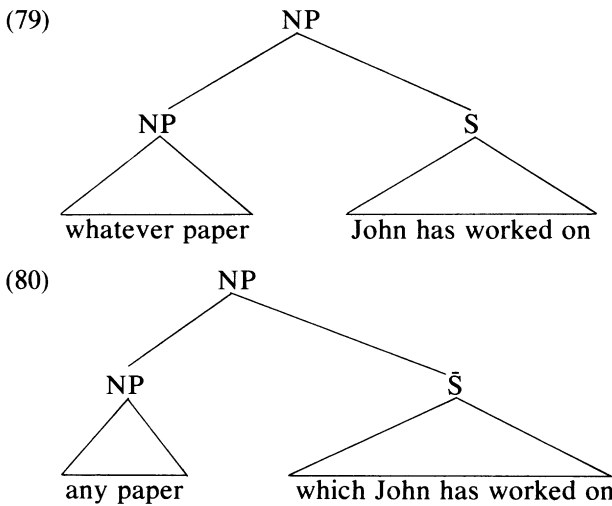
As (76) shows, it is impossible to strand the preposition *in* when it occurs in conjunction with the noun *manner*. In cases like this one, pied piping is impeccable in embedded questions:

- (77) a. I'd like to know in what manner Dickens died.
 b. *I'd like to know what manner Dickens died in.

The related free relative still does not allow pied piping of the preposition *in*; because *in* cannot be stranded, the net result is that there is no well-formed free relative corresponding to (76) and (77):

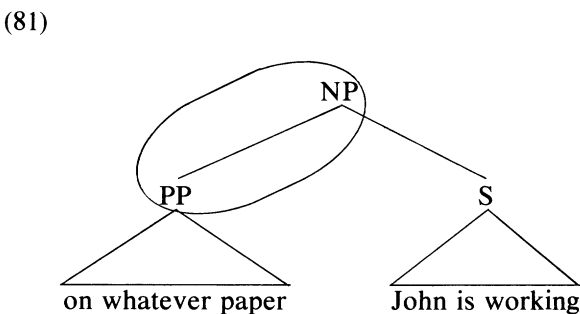
- (78) a. *John will describe in whatever manner Dickens died.
 b. *John will describe whatever manner Dickens died in.

This contrast is precisely what the base hypothesis predicts, since one would no more expect the pied piped preposition to be able to occur on the left of the NP head in (79) than in (80), which contains an ordinary ‘‘headed’’ relative:



In short, examples (75b) and (78a) are parallel to **I'll reread on any paper John has worked* and **John will describe in the manner Dickens died*.

Let us see exactly how this proposal relates to the condition on phrase structure rules (46). What would the structure of the ungrammatical (75b) have to be on the assumption that the *wh*-phrase occupies the position of the head? The structure is shown in (81):

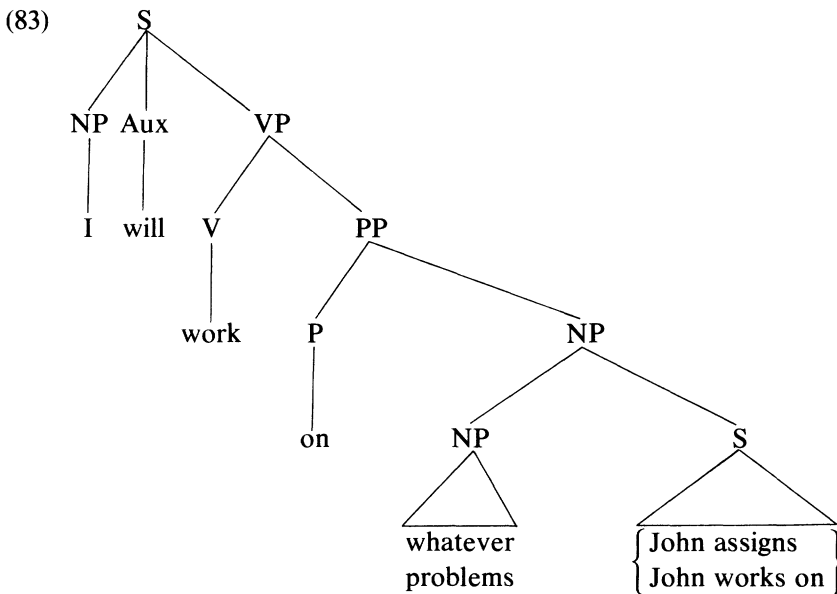


This structure is ruled out as ill-formed by condition (46): the categorial specification of the head of the NP and that of the NP itself are different. Thus, we can see that the prohibition against pied piping in free relatives is nothing more than a special case of the matching effect we have already examined, and is a direct consequence of condition (46).

To forestall any possible confusion, it is worth mentioning at this point examples like (82), in which the appearance of a preposition before a *wh*-phrase does not result in ungrammaticality:

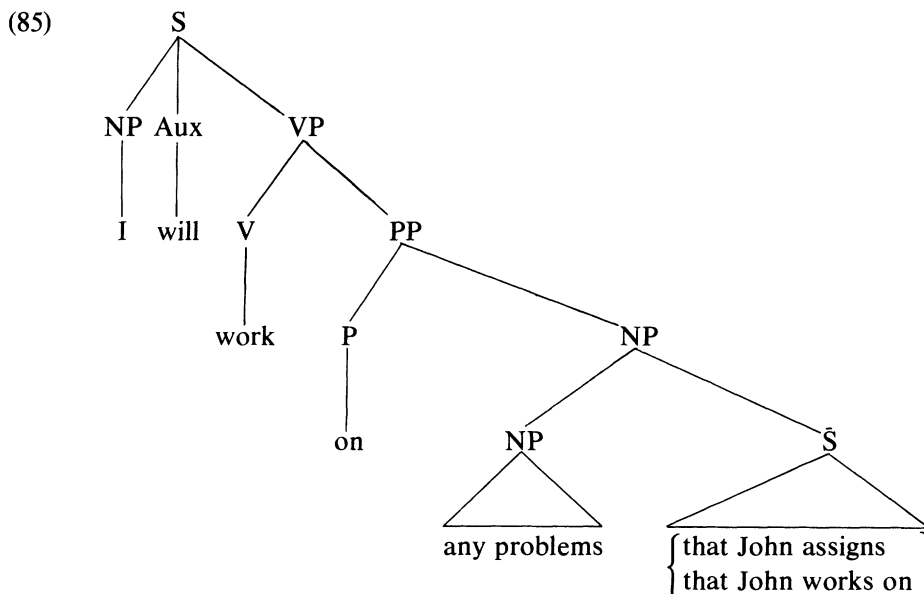
- (82) a. I'll work on whatever problems John assigns.
 b. I'll work on whatever problems John works on.

The examples in (82) do not constitute counterexamples to the claim that pied piping is impossible in free relatives: they are simply instances of NP free relatives that happen to occur within a PP, as shown in (83). In neither case has a PP been extracted from the clause; only an NP is missing.



These examples are parallel in structure to the examples of “headed” relatives given in (84) and diagrammed in (85).

- (84) a. I'll work on any problems that John assigns.
 b. I'll work on any problems that John works on.



The prohibition against pied piping in free relatives is to be interpreted as a special case of (46). That is, given (46), the base hypothesis already explains the failure of pied piping in these constructions. Nothing need be added to the grammar of English to account for this fact.

5. Locative and Temporal Free Relatives

Examples of locative and temporal free relatives are given in (86)-(89):

- (86) I can find *where you live* quite easily.
- (87) She dreams of *when she will finally have her Ph.D.*
- (88) I'll put my books *where(ver) you put yours.*
- (89) John will arrive *when(ever) Mary leaves.*

It is characteristic of locative and temporal phrases in English to share distributional properties of both NPs and PPs. Thus, the phrases in (86) and (87) occupy NP positions and those in (88) and (89) occupy PP positions:

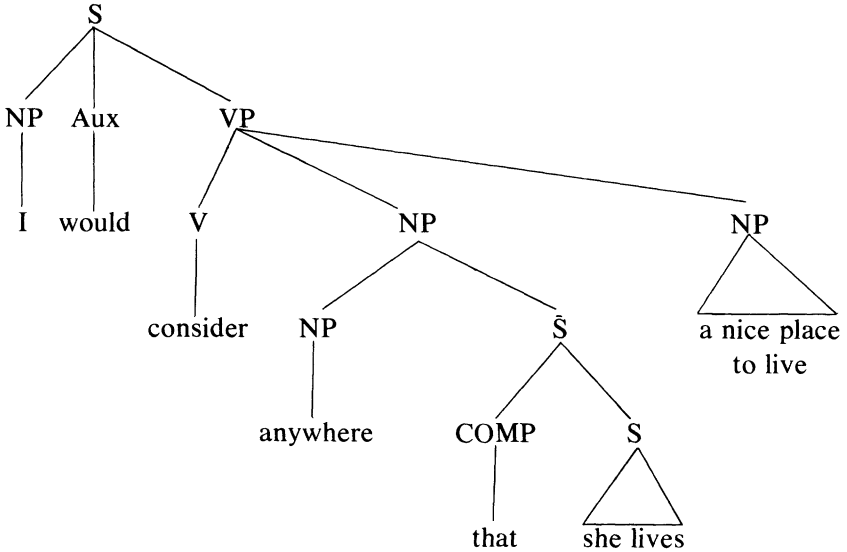
- (90) a. I can find *your place* quite easily. (NP)
- b. *I can find *at your place* quite easily. (*PP)
- (91) a. She dreams of *a time of peace.* (NP)
- b. *She dreams of *at a time of peace.* (*PP)
- (92) a. I'll put my books *in the cupboard.* (PP)
- b. *I'll put my books *the cupboard.* (*NP)
- (93) a. John will arrive *at a designated time.* (PP)
- b. *John will arrive *a designated time.* (*NP)

According to the base hypothesis, (94a,b) have the structures partially diagrammed in (95a,b):¹⁰

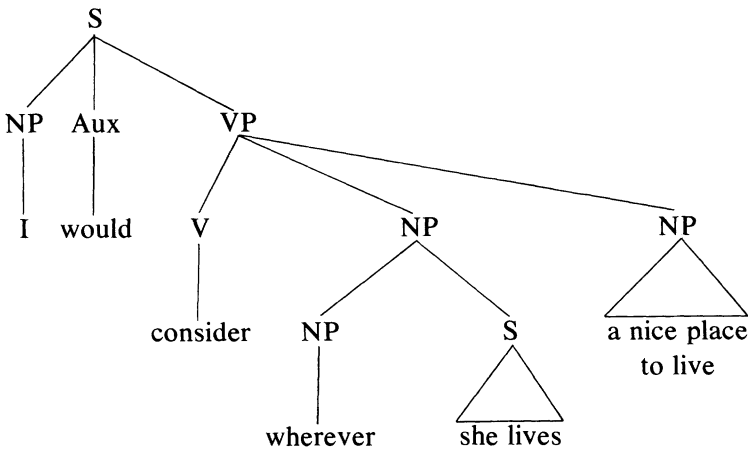
(94) a. I'd consider *anywhere that she lives* a nice place to live.

b. I'd consider *wherever she lives* a nice place to live.

(95) a.



b.



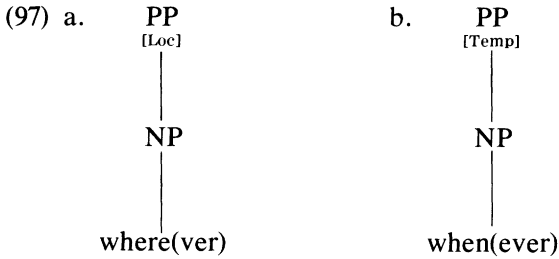
The relative clauses in (95) fit into an NP position as direct object of the verb *consider*.

¹⁰ Note that we are representing free relatives slightly differently from ordinary relative clauses: the latter have \bar{S} rather than S. Although complementizers occurred with free relative clauses in earlier stages of English (Allen (1977)), they are marginal in contemporary English. An example from Bresnan (1973b) is *Whatever food that there may be in that dusty pantry is probably infested with moth eggs*. As Gee (1974) has pointed out, however, *that* is unacceptable in examples like **Whatever food that is edible must be shared*. We assume that the very marginal appearance of *that* in English free relatives is evidence for reanalysis of \bar{S} to S. Such a reanalysis would also explain the failure of free relative clauses to extrapose from their heads: cf. **Whatever friends are gone (that) I once had, ?Any friends are gone that I once had*. (See fn. 15 below.)

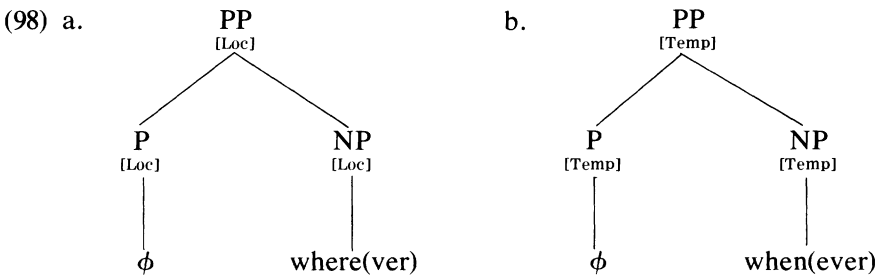
Note that a PP cannot occur in this position:

- (96) a. I consider *that place* a nice place to live.
 b. *I consider *in that place* a nice place to live.

On the other hand, to account for the PP-like behavior of such locatives and temporals, we will adopt the hypothesis that they also occur in the structures shown in (97).



Note the features [Loc] and [Temp] on the PP nodes in (97) and the absence of prepositions as heads of these nodes. Both properties of these structures can be attributed to a rule deleting locative and temporal prepositions before locative and temporal NPs. Assuming that [Loc] and [Temp] are categorial features of prepositions and nouns, we hypothesize that these features are added to phrase nodes whose heads bear the features. Then (97a,b) result from (98a,b) by a rule $P \rightarrow \phi / \text{---}_{+F} \text{NP}_{+F}$, where $F = [\text{Loc}]$ or $[\text{Temp}]$.



In (98), the feature of the deleted head preposition has been added to the PP node, and the feature of the *wh*-word has been added to the NP node, of which it is the head. (As we will see below, the features on these two phrasal nodes need not agree.)

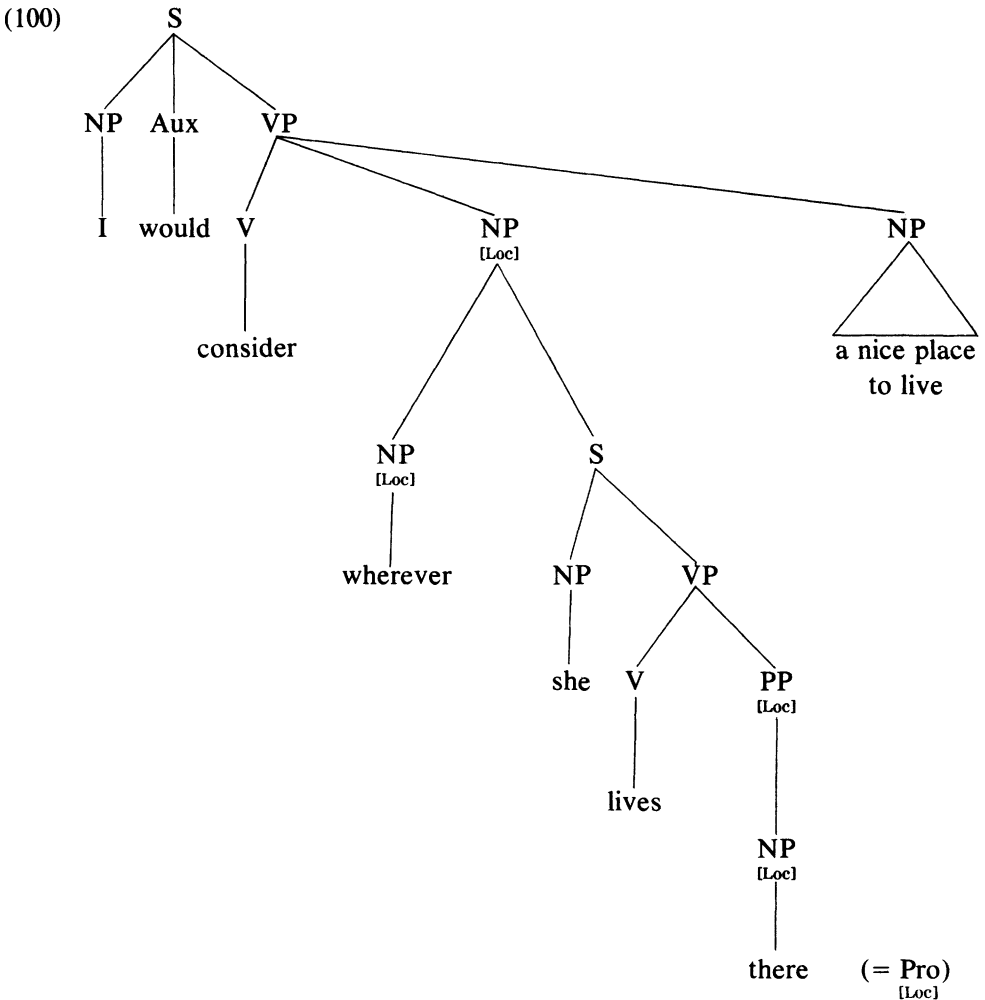
The idea for a P-deletion rule is due to Emonds (1976), who points out that various other noun phrases in English can be used ‘‘adverbially’’ with optional prepositions:

- (99) a. She wants to move (to) someplace new.
 b. I’m leaving (on) the day after tomorrow.

(A nearly equivalent analysis, which we suggest in section 6, assumes that inherently locative and temporal pronouns are lexically inserted with null prepositions in base

structures like (98), but nothing hinges on the choice between these analyses in what follows.) Finally, note that the rule for assigning the categorial features [Loc] and [Temp] is similar to the rule for assigning the number feature (section 4.2). Moreover, by reexpressing generalization (46) in terms of the feature decomposition of categories (Chomsky (1970), Bresnan (1976a; 1977a), Jackendoff (1977)), we obtain another instance of the same rule: a phrase is assigned the categorial features of its head. All three rules are instances of a single general principle of categorial feature induction. Thus nothing need be added to the grammar to obtain the correct distribution of the features [Loc], [Temp], etc., in what follows.

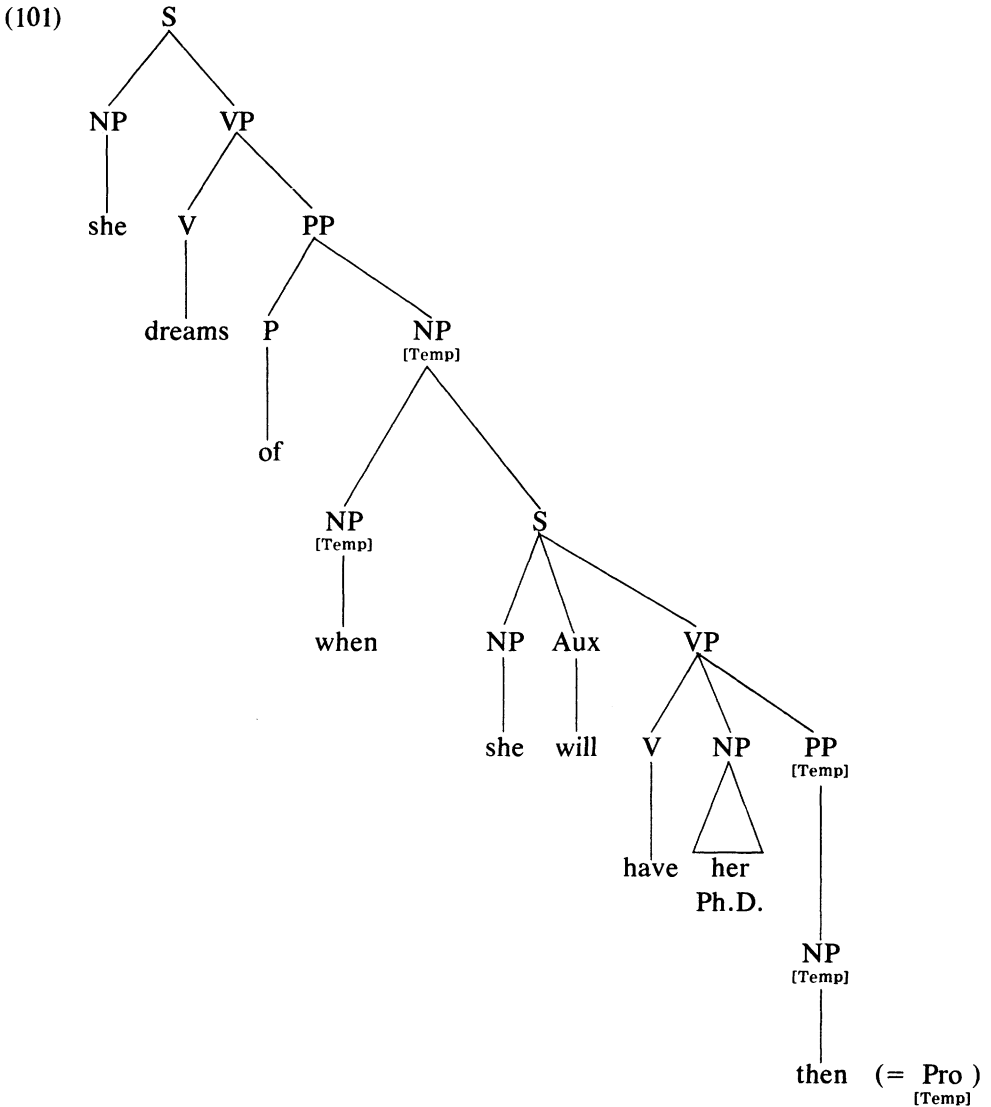
Our analysis of locatives enables us to complete diagram (95b) as shown in (100).



Note the presence of the locative pronoun *there* in (100). We hypothesize that the surface form of the relative clause in (100) is derived by a rule of *Controlled Pro Deletion*: $XP \dots [XP \text{ Pro}] \dots \rightarrow XP_i \dots [XP_i e] \dots$. Controlled Pro Deletion (which

will be formulated more precisely in section 6) deletes a pronoun and coindexes the structural residue (trace) with its antecedent (the controller). (For reasons for assuming that controlled deletion leaves a trace, see Bresnan (1976b; 1978).) The coindexed nodes must agree in grammatical features; this agreement condition is universal, although the exact range of features to which it applies may be a language-particular parameter.¹¹ In (100), the locative pronoun (*there*) is deleted and the locative NP that dominates it is coindexed with the locative NP head of the free relative construction.

A similar analysis is given to the temporal free relative in (101).

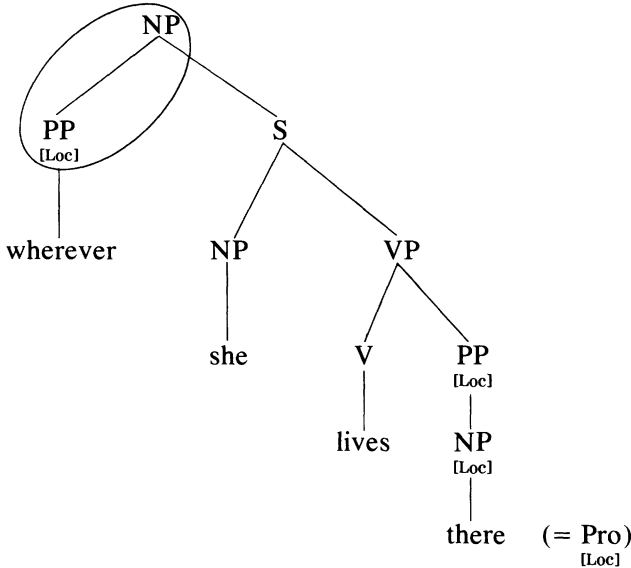


¹¹ In particular, languages may vary in whether case features are subject to agreement. See the discussion of Finnish in section 6.

Here the temporal pronoun (*then*) is deleted, and the temporal NP that dominates it is coindexed with the temporal NP head of the free relative construction.

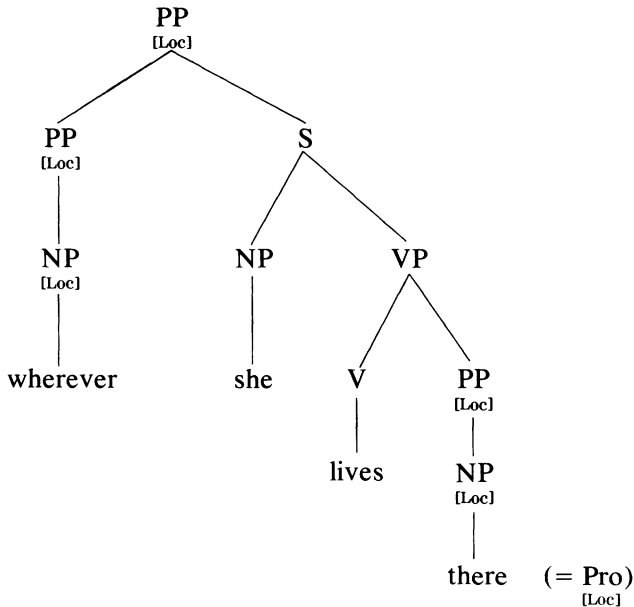
The base hypothesis does not permit structures like (102), because the constraint on phrase structure rules (46) would be violated:

(102)

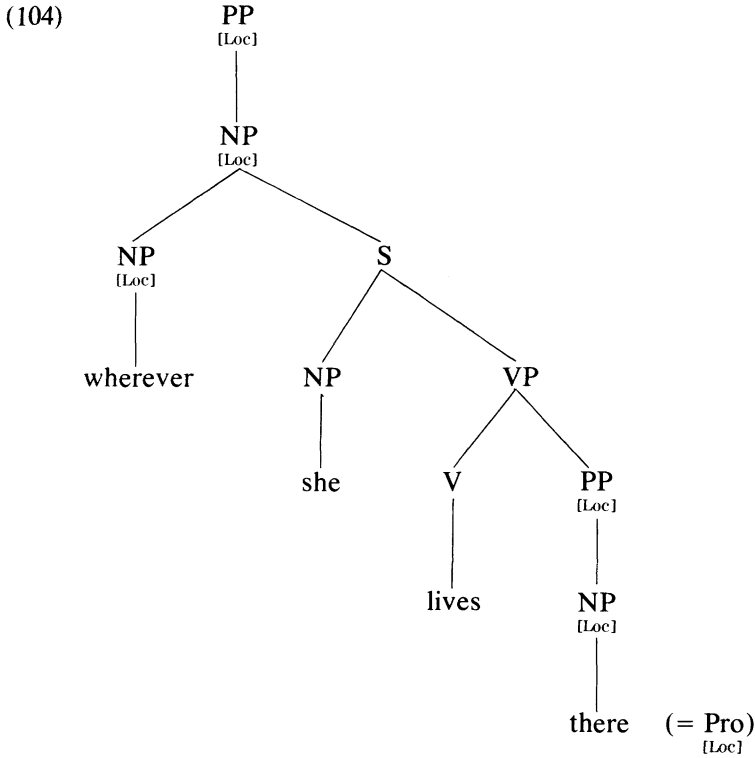


Recall that the ungrammatical example **I'll reread on whatever paper John is working* had this type of structure: cf. (75b) and (81). However, the base hypothesis does permit structures like (103), in which the head of the free relative PP is also a PP.

(103)



Structure (103) provides a plausible source for adverbial free relatives like those in examples (88) and (89). But structure (104) is equally consistent with the phrase structure constraint, and seems equally plausible:



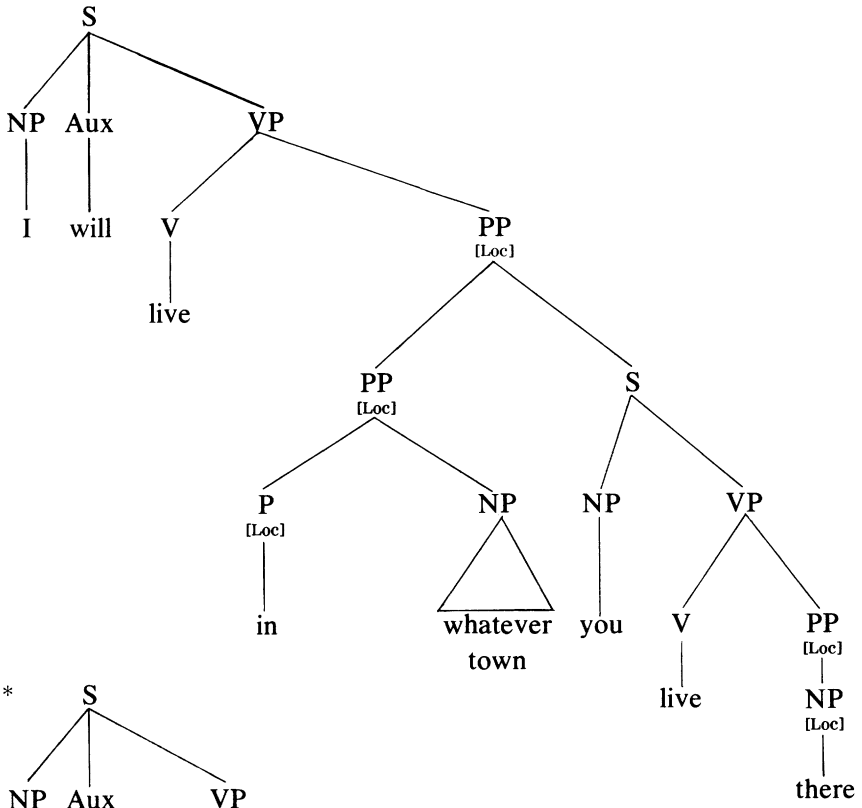
The head P of (104) is null (cf. (98)).

Which analysis is correct? The answer appears to be: both. To see this, let us first consider locative and directional free relatives having lexical heads, as in (105).

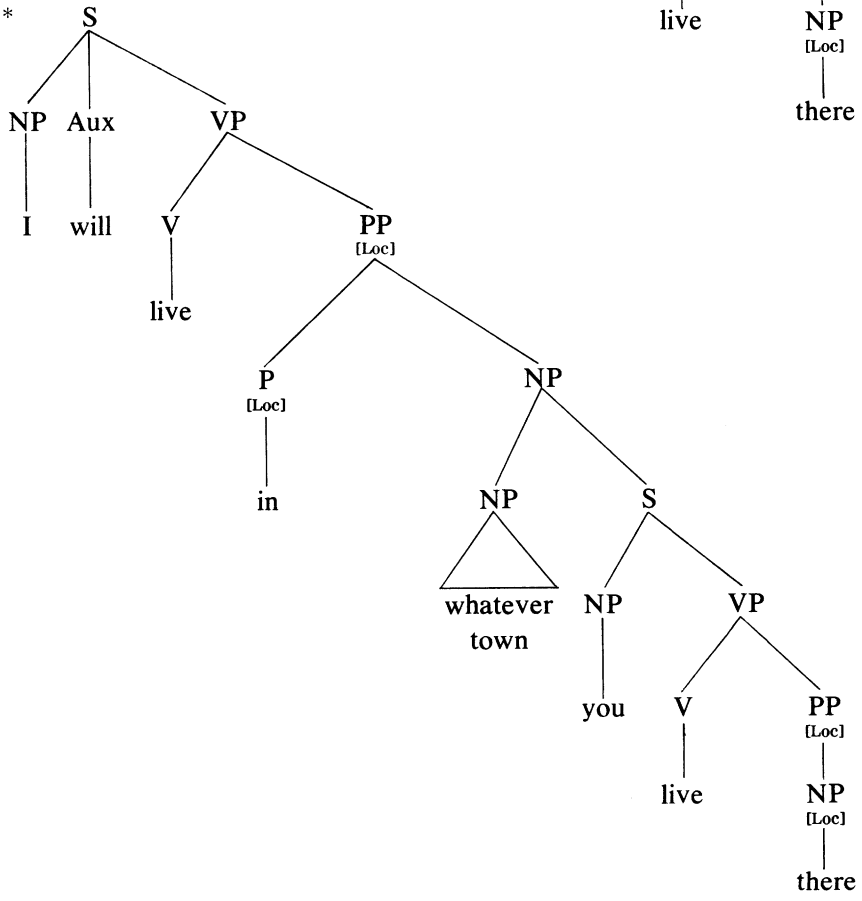
- (105) a. I'll live in whatever town you live.
- b. I'll put my books in whatever cupboard you put yours.
- c. I'll open an account at whatever bank you open an account.
- d. I'll move to whatever town you move.
- e. I'll send my books to whatever bookstore John sends his.

The pattern in (105) is just what the PP-headed structure (103) predicts, as can be seen in (106).

(106) a.

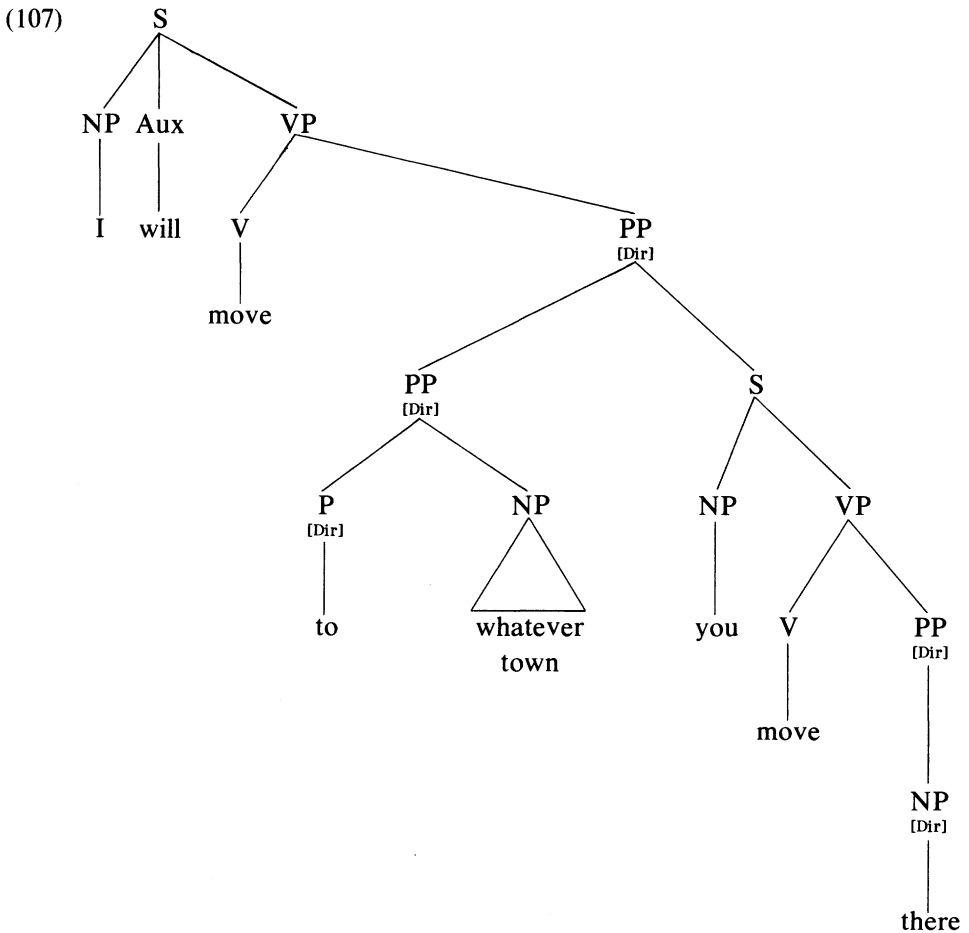


b. *



In (106a), the rule of Controlled Pro Deletion will delete the pronoun *there* and coindex the locative PP that dominates it with the locative head PP *in whatever town*. The head and the trace agree in grammatical features. In (106b), the head NP *whatever town* is not a possible controller because it is nonlocative in itself and there is no NP dominating a Pro that agrees with it in grammatical features. (If the subject pronoun *you* of the relative clause were changed to an appropriate anaphor of towns (say *it*), Controlled Pro Deletion could of course apply, yielding *I will live in whatever town lives there*. The result is syntactically well-formed but pragmatically bizarre, since we do not speak of towns living here or there; but compare *I will live in whatever town borders on this stream*.)

The agreement condition on Controlled Pro Deletion thus selects (106a) rather than (106b) as the correct source for sentence (105a). As further motivation for the agreement condition, consider (107).



(107) is the source for sentence (105d); Controlled Pro Deletion applies in the same way as in (106a). Now the same word *there* is used both as a locative pronoun and as a directional pronoun in English:

- (108) a. I lived *in some city* and Bill lived *there*, too. (Loc)
 b. I moved *to some city* and Bill moved *there*, too. (Dir)

But the locative and directional pronouns must be considered distinct to explain the paradigm (109):

- (109) a. I'll live in whatever town you live.
 b. I'll move to whatever town you move.
 c. *I'll move to whatever town you live.
 d. *I'll live in whatever town you move.

(It is necessary to exclude the transitive sense of *move* in assessing (109d); the example has a well-formed but irrelevant interpretation 'I'll live in any town such that you move it'.) In the ill-formed examples of (109), the deleted pronoun in the clause does not agree with the locativity or directionality of the head, and the result is a violation of the agreement condition on coindexing. The ungrammaticality of (109c,d) cannot be attributed to the mismatch of verbs in the matrix and the relative clause, for this does not lead to ungrammaticality in (110):

- (110) a. I'll work in whatever town you live.
 b. I'll live in whatever town you work.

Nor can it be attributed to the formal mismatch between the prepositions *in* and *to* associated with the verbs, for formal identity of prepositions does not save (111):

- (111) *She moves closer and closer to whoever she is talking.

Here the *to* associated with the matrix verb *move* is formally identical to the preposition *to* associated with the subordinate verb *talk*, but the latter is nondirectional (and nonlocative), as (112) shows.

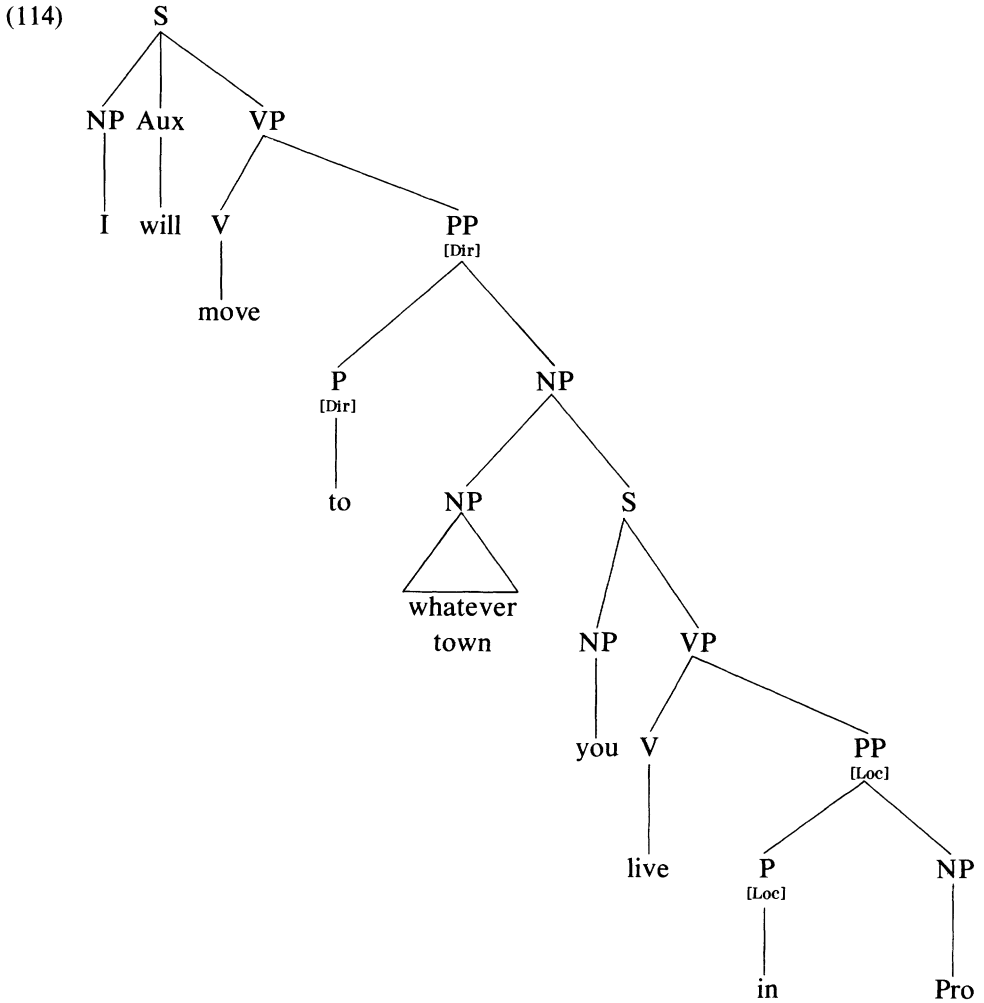
- (112) *Bill talks *to Mary* and Frank talks *there*, too.

It is the agreement condition on coindexing that explains (111), as well as (109).

Of course, the ill-formed examples (109c,d) and (111) can be rendered perfectly grammatical by inserting appropriate prepositions:

- (113) a. I'll move to whatever town you live in.
 b. I'll live in whatever town you move to.
 c. She moves closer and closer to whoever she is talking to.

These examples are derived, not from PP-headed structures like (106a), but from NP-headed structures like (114).



In (114), the free relative is headed by an NP rather than a PP; it corresponds to the structural form of (104) rather than (103). The rule of Controlled Pro Deletion applies to this structure by deleting a pronoun and coindexing the NP trace with the NP head *whatever town*. The two NPs agree in grammatical features: both are nonlocative and nondirectional.

We leave open the question of whether the Pro in (114) has the features of an

indefinite pronoun like *one* or a definite pronoun like *it*.¹² The important point is that this Pro differs from the locative and directional Pro's (*there*) in requiring that its governing preposition be expressed:

- (115) a. *I lived in some city and Bill lived $\left\{ \begin{array}{l} one \\ it \end{array} \right\}$, too.
 b. *I moved to some city and Bill moved $\left\{ \begin{array}{l} one \\ it \end{array} \right\}$, too.
- (116) a. I lived in some city and Bill lived in $\left\{ \begin{array}{l} one \\ it \end{array} \right\}$, too.
 b. I moved to some city and Bill moved to $\left\{ \begin{array}{l} one \\ it \end{array} \right\}$, too.

In this respect, this Pro shares the grammatical features of the head NP in (114):

- (117) a. I'll move to whatever town you live in.
 b. *I'll move whatever town you live in.

((117b) is ill-formed as a paraphrase of (114a).) In short, only the inherently locative, directional, or temporal NPs like *there*, *then*, *where(ver)*, *when(ever)* allow omission of the governing locative, directional, or temporal preposition.

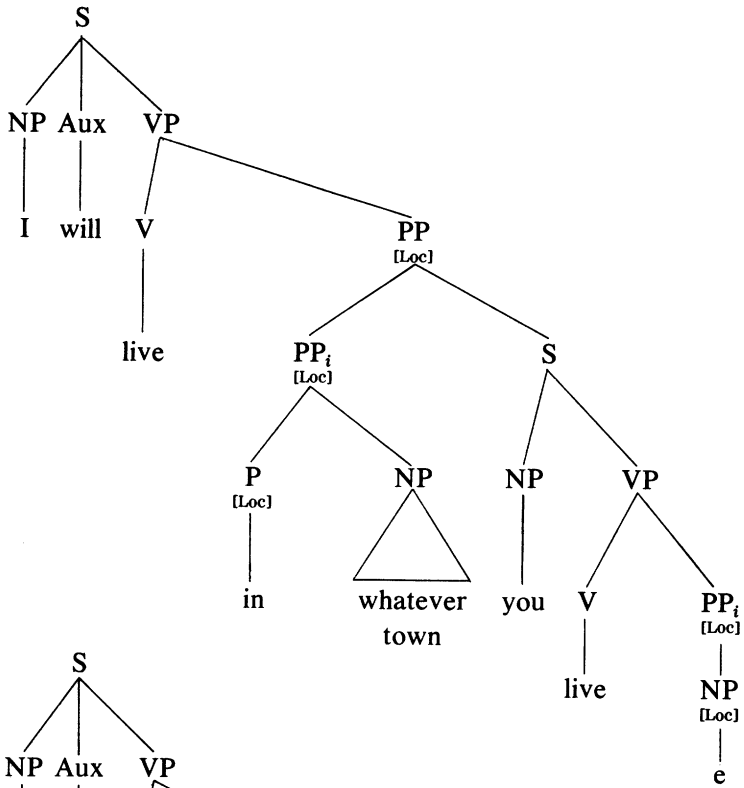
For every example in (105), there is a corresponding example having a stranded preposition:

- (118) a. I'll live in whatever town you live in.
 b. I'll put my books in whatever cupboard you put yours in.
 c. I'll open an account at whatever bank you open an account at.
 d. I'll move to whatever town you move to.
 e. I'll send my books to whatever bookstore John sends his to.

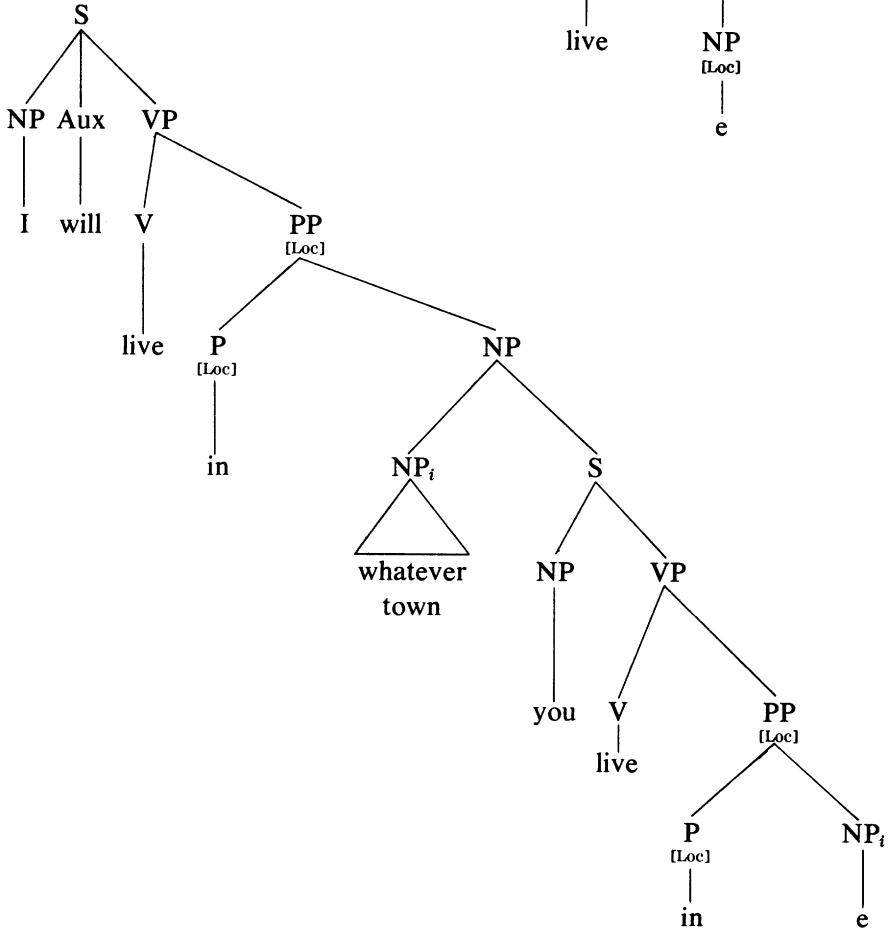
The PP-headed structure is the source of the pattern in (105), and the NP-headed structure is the source of the pattern in (118). Let us examine the two types of structures after Controlled Pro Deletion has applied:

¹² The deleted Pro cannot be identified with a phonologically realized anaphor in examples like *What little food there was was eaten by Goosie*. The appearance of *there* rules out the definite pronoun *it* (**There was it*), and the noncount feature of the antecedent rules out the indefinite pronoun *one*, which cannot be an anaphor of mass nouns (**I ate little food, and Goosie ate one, too*). This problem is not unique to free relatives, however: *Any food there was was eaten by Goosie*. For discussion of this phenomenon in relatives and comparatives, see G. Carlson (1977) and Andrews (1974). We refine our analysis of Controlled Pro Deletion in section 6.

(119)



(120)



Controlled Pro Deletion has deleted a locative Pro (*there*) in (119) and a nonlocative Pro (*one* or *it*) in (120). For Controlled Pro Deletion to apply as in (119), the locative Pro had to be exhaustively dominated by the locative PP trace coindexed to the head PP. For Controlled Pro Deletion to apply as in (120), the nonlocative Pro had to be exhaustively dominated by the nonlocative NP trace coindexed to the head NP in (120). The presence or absence of a stranded P is thus an indication of which structure a free relative has.

The hypothesis embodied in (119) and (120) has an interesting consequence. In (119), the string *whatever town you live* does not form a constituent (i.e. it is not exhaustively dominated by a single node), but the longer string *in whatever town you live* does form a constituent, because it is exhaustively dominated by PP. In (120), by contrast, the shorter string *whatever town you live in* does form a constituent NP. It is well known that only constituents undergo movement rules (Bresnan (1976a)). Therefore, our hypothesis predicts that it should be possible for topicalization to prepose *whatever town you live in* in (120), but not *whatever town you live* in (119). This prediction is correct:

- (121) a. Whatever town you live in, I'll live in.
 b. *Whatever town you live, I'll live in.
 (cf. c. In whatever town you live, I'll live.)

And it is quite general:

- (122) a. Whatever town you move to, I'll move to.
 b. *Whatever town you move, I'll move to.
 (cf. c. To whatever town you move, I'll move.)

((122b) is ill-formed only as a paraphrase of (122c).) These facts, which hitherto have not been explained, strikingly confirm our hypothesis.

In summary, locative and directional free relatives occur in both PP-headed and NP-headed structures. The PP-headed free relatives require that the trace of Controlled Pro Deletion agree with the categorial features of the head PP, which include locativity and directionality:

- (123) a. I'll move to whatever town you move.
 b. *I'll move to whatever town you live.

The NP-headed free relatives require only that the trace agree with the categorial features of the head NP, which may be unmarked for locativity or directionality. As a result, NP-headed free relatives permit a featural mismatch in the prepositions governing the head NP and the NP trace:

- (124) a. I'll move to whatever town you move to.
 b. I'll move to whatever town you live in.

Some speakers of American English prefer the NP-headed constructions with P-strand-

ing to the PP-headed constructions. We suggest an explanation for this fact in section 6 below.

These differences among free relatives having lexical heads are partly neutralized with free relatives headed by *where(ver)*. Even in an NP-headed structure, a locative NP dominating the inherently locative pronoun *where(ver)* would induce locative preposition deletion “higher up” (104), and the same rule would have applied to the locative NP trace (which must agree with the head in grammatical features). This explains the contrast in (125).

- (125) a. I’ll live in whatever town you live $\left\{ \begin{array}{c} \phi \\ \text{in} \end{array} \right\}$.
 b. I’ll live wherever you live $\left\{ \begin{array}{c} \phi \\ * \text{in} \end{array} \right\}$.

Nevertheless, for many speakers of American English, a *directional* preposition can optionally be expressed before an indefinite locative pronoun: *She wants to move (to) somewhere else*. For speakers of this dialect, the following sentences are possible:

- (126) a. I’ll move (to) wherever you live.
 b. I’ll move (to) wherever you move (to).

Here we see the featural-mismatch property (126a) and the strandability property (126b) that are characteristic of NP-headed free relatives.

Our analysis applies equally well to temporal free relatives, examples of which are given in (127).¹³

- (127) a. Mr. Brown died in whatever decade Mr. Smith died.
 b. I’ll leave on whatever date John leaves.

However, there is a complication in temporal free relatives that does not appear in locatives. In general, temporal prepositions may not be stranded. (There is some dialect variability in these examples, for which we suggest a possible explanation below; see the discussion of examples (142)–(144).)

- (128) a. *Mr. Brown died in whatever decade Mr. Smith died in.
 b. *I’ll leave on whatever date John leaves on.

We can provide two accounts of this fact. One is to add a simple filter of the form (129)

¹³ These particular examples of temporals are used because, unlike many others, they do not allow free deletion of a preposition; contrast (i) with (ii):

- (i) He left (on) that day.
 He died (in) that week.
 (ii) He left on that date.
 *He left that date.
 He died in that decade.
 *He died that decade.

to the grammar of English:

- (129) * $\left[\begin{array}{c} \text{PP} \\ \text{[Temp]} \end{array} \text{P } \left[\text{NP e} \right] \right]$

This filter would prevent the stranding of temporal prepositions by all rules that leave traces, whether they are controlled deletion rules or movement rules:

- (130) a. *Which decade did he die in?
 b. *Which date did he die on?
 (131) a. Which city did he live in?
 b. Which square did he land on?

Note that the prepositions *in* and *on* are temporal in (130) and locative in (131).

The defect of the filtering approach is that it simply stipulates that temporal prepositions cannot be stranded, and so hardly counts as an explanation. It would be just as possible to formulate a filter against stranding *locative* prepositions, or against *not* stranding temporal prepositions. If possible, it would be desirable to relate (128) and (130) to other principles of English grammar.

A possible explanation arises from considering examples like those in (132).

- (132) a. He died in that decade and she died *then/*in it*, too.
 b. He died on that date and she died *then/*on it*, too.

The examples in (132a,b) suggest that the NP objects of temporal prepositions cannot bear anaphoric relations to external NPs; if the coindexed traces produced by Controlled Pro Deletion and *Wh* Movement are taken to be in anaphoric relation to their antecedents, then the facts in (128) and (130) fall together with (132) as instances of the same generalization. Observe further that, in contrast to the objects of the temporal prepositions in (132), the objects of the locative prepositions in (133) can clearly be anaphoric:

- (133) a. He lived in that city and she lived in it, too.
 b. He landed on the red square and she landed on it, too.

The stranding filter (129) does not capture this generalization, because the temporal prepositions in (132) are certainly not stranded.

We therefore tentatively propose the following generalization as an explanation for examples like (128a,b):

- (134) *Temporal Anaphora Constraint*

The object of a temporal preposition cannot be in anaphoric relation with an external NP.

Note that (134) is intended to apply only to ‘‘external’’ anaphoric relations, as in (135).

- (135) a. *John will arrive on *Monday* because he wants to spend *it* with his friends.
 b. *John left on *Monday*, but Mary didn’t leave on *it*.
 c. *Because he wants to spend *Monday* with his friends, John will arrive on *it*.

It does not apply to anaphoric relations within a temporal PP, as in (136):

- (136) John arrived on *a day* that turned out to be very memorable for those of us who spent *it* with him.

Here the anaphoric relation between *a day* and *it* occurs within the entire NP object of the temporal preposition *on*. The constraint also accounts correctly for the contrast between (135) and (137).

- (137) John spent *Monday* in Medford, and Mary spent *it* in Cambridge.

Here the temporal NPs are not the objects of temporal prepositions, and anaphoric relations are possible.

We have deliberately avoided formulating (134) as an anaphoric island constraint (which would prohibit all anaphoric relations into or out of temporal prepositional phrases), because anaphoric relations between constituents of temporal prepositional objects are possible:

- (138) a. Bill will arrive on my birthday and Mary will arrive on yours.
b. Bill will come in a week and Mary will come in two.

In these examples, *yours* and *two* are specifiers of the NP objects of *on* and *in*: *on* [_{NP} *your birthday*], *in* [_{NP} *two weeks*]. The fact that relative *which* is a specifier may be what permits it to bear an anaphoric relation external to the preposition in examples like (139):

- (139) The day on which he died was a cold day.

Further support for our formulation comes from the contrast between the indefinite pronoun *one* and the cardinal number *one*; the former is an NP anaphor and the latter is an NP specifier:

- (140) a. You can marry a nurse if you want to marry one.
b. You can't marry two nurses—you can only marry *one* (nurse).

We correctly predict the following contrast:

- (141) a. *John may leave in a week, and Mary may also leave in one.
b. John may leave in two weeks, and Mary may leave in *one*.

Despite the evident value of the Temporal Anaphora Constraint, it must be admitted that it is subject to some variation. The examples in (142) seem much more acceptable than those in (128):

- (142) a. ?The government would have collapsed in any of the interwar decades if land reform, tax reform, and nationalization had not begun in them.
b. ?I was born on a historically important date, and I want my child to be born on one, too.

It appears that under certain conditions the object of a temporal preposition may be anaphoric after all, particularly if the antecedent NP is perceived as ‘referentially independent’ of the temporal PP. Given our hypothesis (134), we would then expect some corresponding variation in the strandability of prepositions, and indeed this seems to be the case:

- (143) a. *The patient died during the hour because the doctor had fallen asleep during it.
 b. ??The patient died during the operation because the doctor had fallen asleep during it.
- (144) a. *The patient died during the hour that the doctor had fallen asleep during.
 b. ??The patient died during the operation that the doctor had fallen asleep during.

We will therefore attribute variations in the acceptability of temporal preposition stranding to variations in the perceived ‘independence’ of the antecedent NP from its temporal preposition.

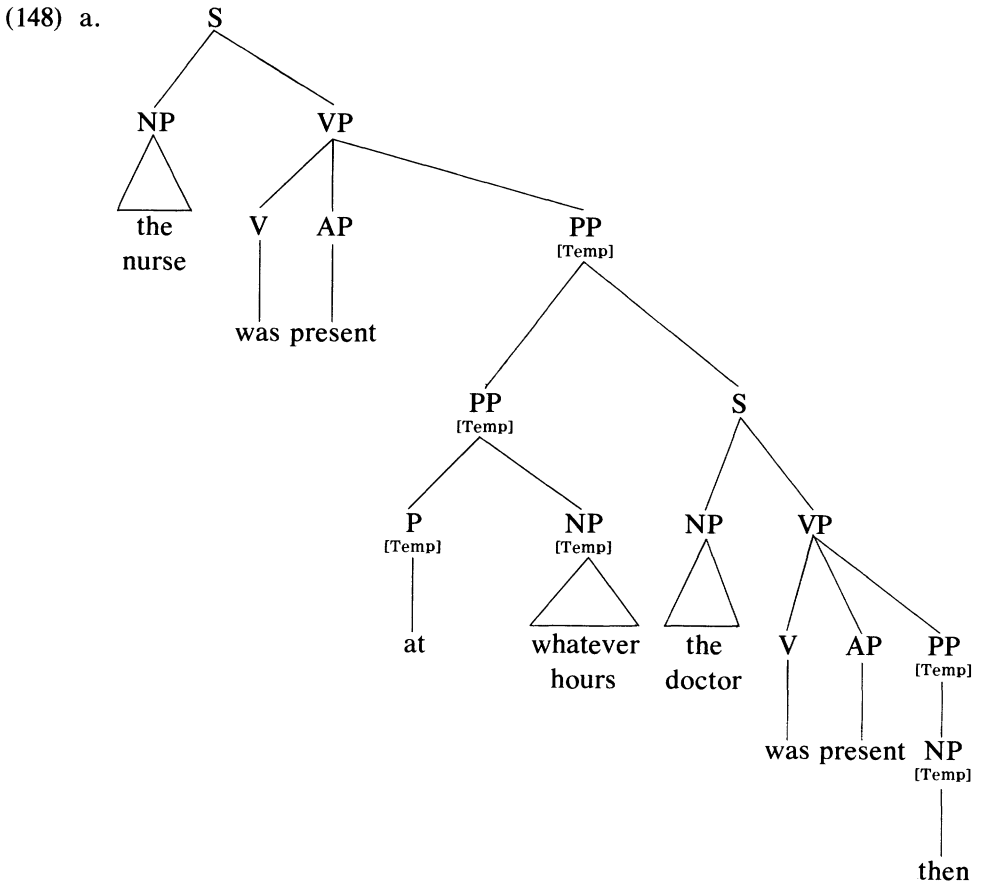
Although we cannot yet make precise this notion of ‘perceived independence’ of the object of a temporal preposition, we suggest that such objects can be independent only if they are unmarked for the categorial feature [Temp]. We propose that nouns designating units of time or temporal reference points can be inherently temporal; that is, in the lexicon such nouns as *week*, *Monday*, *date*, *hour*, *time*, *decade*, and *yesterday* are optionally marked [Temp]. (It is noteworthy that the class of inherently temporal lexical nouns is much larger than the class of inherently locative lexical nouns, which includes at least *place*. This may be a compensation for the comparative paucity of purely temporal prepositions.) The general feature induction principle will ensure that the NPs of which these temporal lexical nouns are heads will be assigned the grammatical feature [Temp]. Thus, the NP head of the relative clause in (144a) will be temporal, while the one in (144b) will not be. The noun *operation* does not designate a unit of time (although operations take time), and would not plausibly be marked [Temp] in the lexicon.

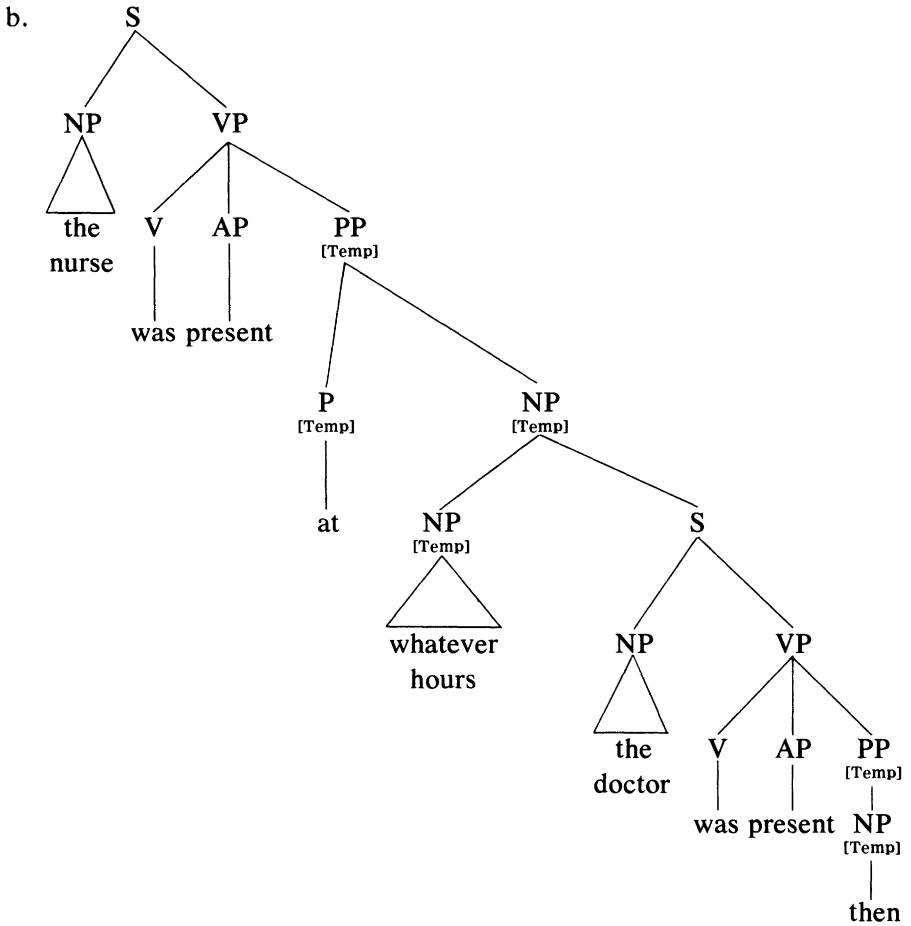
We have developed the theory of grammatical features this far because, in conjunction with our theory of free relatives, it provides a natural explanation for grammatical phenomena of English that seem at first sight to be irregular and unpredictable. Consider the following three sets of examples.

- (145) a. The nurse was present at whatever operations the doctor was present.
 b. The nurse was present at whatever operations the doctor was present at.
- (146) a. The nurse was present at whatever hours the doctor was present.
 b. *The nurse was present at whatever hours the doctor was present at.

- (147) a. The nurse was present during whatever operations the doctor was present.
 b. ??The nurse was present during whatever operations the doctor was present during.
 c. The nurse was present during whatever operations the doctor was present at.

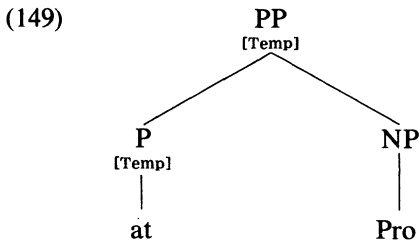
The pattern of grammaticality displayed here is explained by our theory. Examples (145a,b) contain locative free relatives. (145a) is derived from the PP-headed structure similar to (119), and (145b) is derived from the NP-headed structure similar to (120). Examples (146a,b) contain temporal free relatives. Since the head is inherently temporal, (146a) can be derived from either of (148a,b).





Controlled Pro Deletion applies to (148a) by deleting *then* and coindexing the trace PP with the head PP; these two nodes agree in grammatical features, as required by the universal agreement condition on coindexing. The feature [Temp] is distributed by feature induction from the lexical features on *at*, *hours*, and *then*. Controlled Pro Deletion applies to (148b) by deleting *then* and coindexing the trace NP with the head NP; these two nodes also agree in grammatical features.

Suppose now that we substitute the structure in (149) for the PP substructure dominating *then* in (148b).



The Pro object of *at* is not inherently temporal. If Controlled Pro Deletion applied, deleting Pro and coindexing the trace NP with the head NP *whatever hours*, the coindexed nodes would not agree in grammatical features. Moreover, the Temporal Anaphora Constraint (134) would be violated. This explains the contrast between (146a) and (146b).

The fact that there are two possible sources for the same example (146a) is an “accident” caused by the inherent temporality of the head NP, which allows controlled deletion of the temporal pronoun *then* in (148b). As we saw in (106b), the parallel locative structure (120) would not allow controlled deletion of a locative pronoun *there*, because the antecedent NP was not inherently locative. This difference is independently motivated by the contrast between (150a) and (150b):

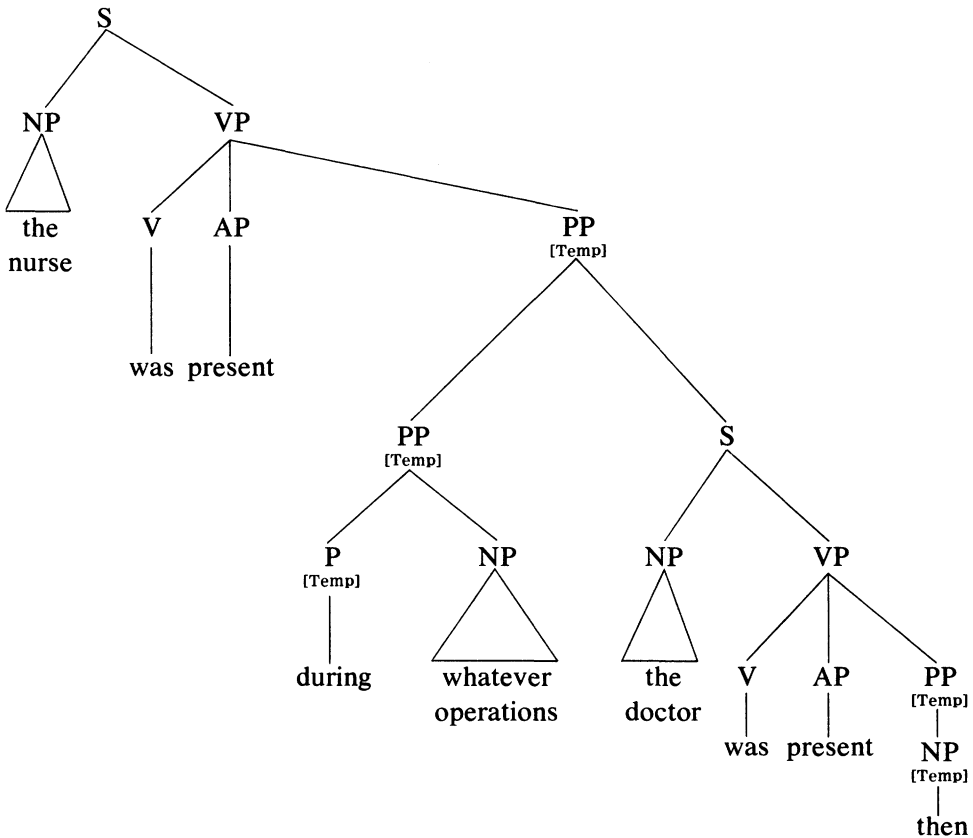
- (150) a. I’m looking forward with great pleasure to whatever day you’re coming.
 b. *I’m looking for whatever town you live.

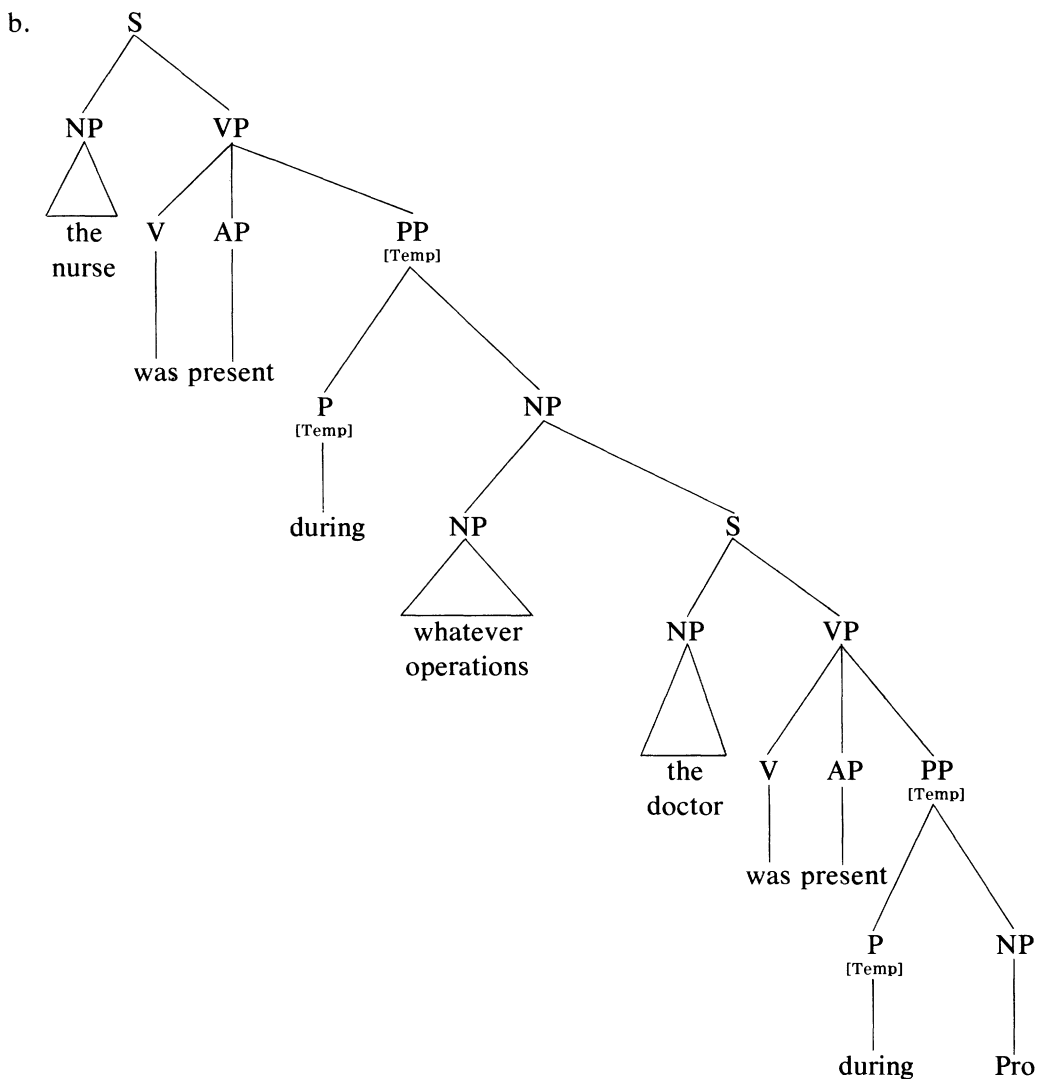
The antecedents of the free relatives in (150a,b) must be NPs, because the entire constructions are in NP positions as objects of the nontemporal, nonlocative prepositions *to* and *for*.

Finally, let us consider the examples in (147). (147a,b) must have the respective structures shown in (151a,b).

(151)

a.





Structure (151a) is parallel to (148a). Controlled Pro Deletion deletes *then* and coindexes the trace PP with the head PP; the two nodes agree in grammatical features. Structure (151b) contrasts with (148b) in that the head NP is here nontemporal. By the agreement condition, the corresponding Pro in the clause must also be nontemporal. It therefore demands the presence of a governing preposition. This explains the contrast between (150a) and (152):

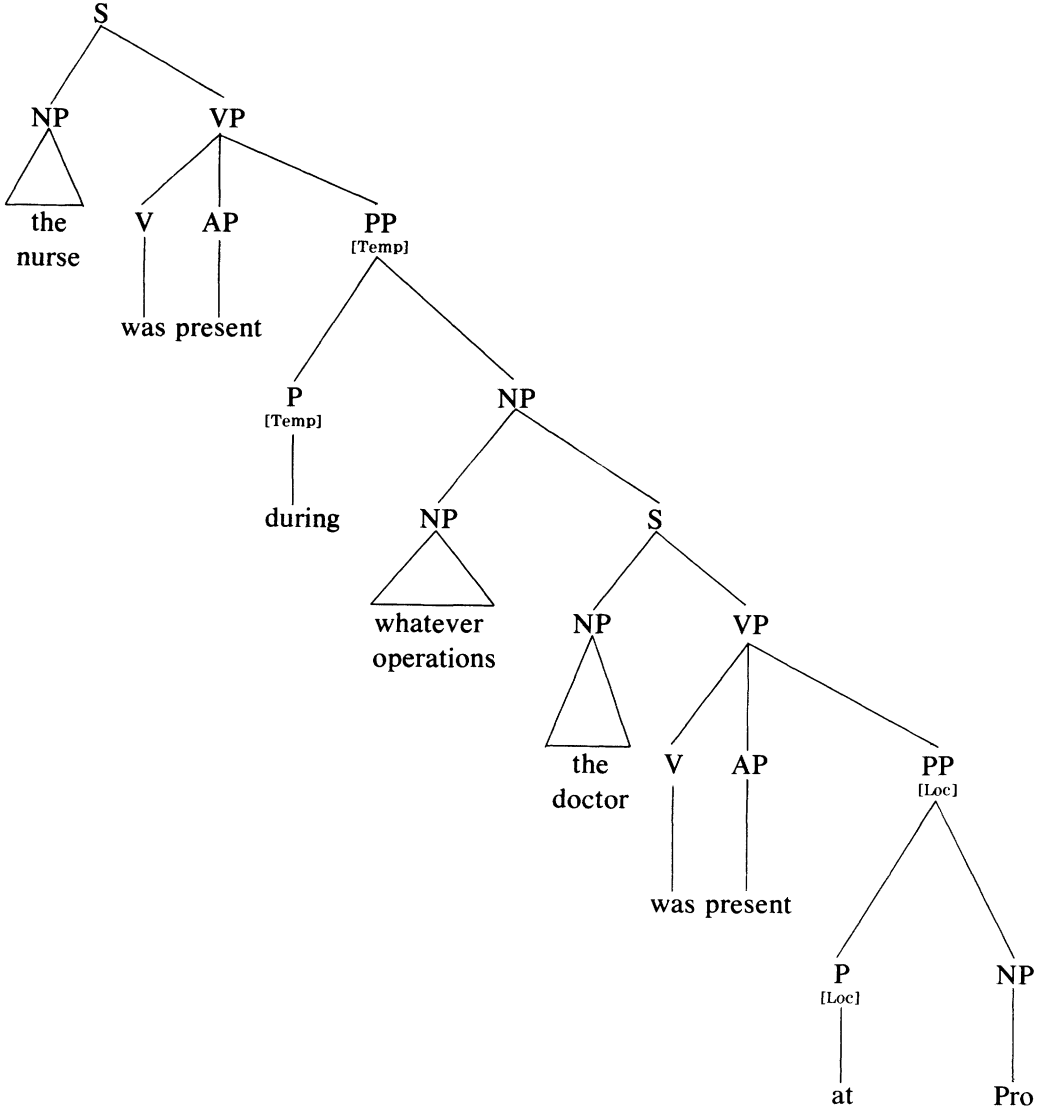
- (152) *I'm looking forward with great pleasure to whatever operations the nurse is present.

Controlled Pro Deletion can delete Pro in (151b) and coindex the trace NP with the head NP *whatever operations*. But the result is a violation of the Temporal Anaphora

Constraint (134): the trace object of the temporal preposition *during* now bears an external anaphoric relation.

Finally, consider (153).

(153)



In (153), Controlled Pro Deletion deletes Pro and coindexes the trace NP with the NP head of the free relative; the two nodes agree in grammatical features. The Temporal Anaphora Constraint is not violated.

This concludes our discussion of locative and temporal free relatives.

6. Controlled Pro Deletion

In the previous section, we described Controlled Pro Deletion as deleting a pronoun such as *there*, *then*, *it*, or *them* and coindexing its dominating node (trace) with the antecedent node (controller). However, as we have already pointed out (fn. 12), the set of possible anaphors under Controlled Pro Deletion cannot be *identified* with the set of phonologically realized pronouns of English. For this reason, we take the key property of Controlled Pro Deletion to be the identification and binding of a set of (nonterminal) pro-categories rather than a set of specific terminal strings. The set of pro-categories will be identified by the feature [Pro].

The pro-categories of English include NP, PP_[Loc], PP_[Temp], AP, and AdvP. All of these categories comprise phonologically realized anaphors of the language. Pro-NPs include the personal definite pronouns *she*, *it*, *them*. Pro-PPs and pro-PPs include *there*, *then*. The pro-APs are *so*, *such*; and the pro-AdvP is *so*:

- (154) a. She became *very rich*—so much *so* that she grew indifferent to worldly affairs.
 b. He worded his letters *pompously*—so much *so* that his secretary thought him a fool.

Note that the NPs in (155a,b) do not allow this.

- (155) a. She acquired *great wealth*—so much (**so*) that. . . .
 b. His letters suggest *pomposity*—so much (**so*) that. . . .

(*So* is possible in (155) as an adverbial modifier of the verb phrases, but it is not understood as an anaphor of the NPs *great wealth* and *pomposity*.) However, the anaphoric use of *so* is limited, and in examples like the following quite marginal:

- (156) a. ?She vowed to become *rich* since he had become *so*.
 b. ??He worded his letters *pompously* since she worded her letters *so*.

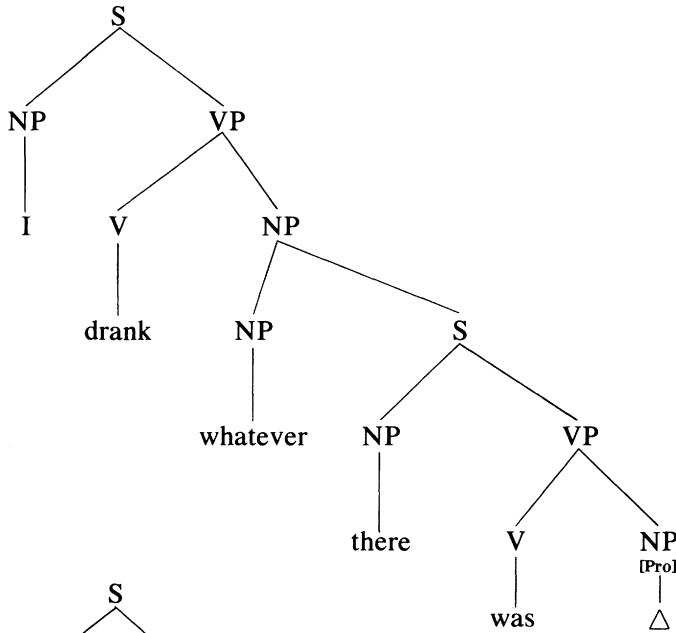
The marginal status of AP and AdvP anaphors in contemporary English may account for the fact that some speakers find adjectival and adverbial free relatives such as (32a)–(35a) rather marginal, compared with the nominal types.

In English, the feature [Pro] is distributed according to the following rules:

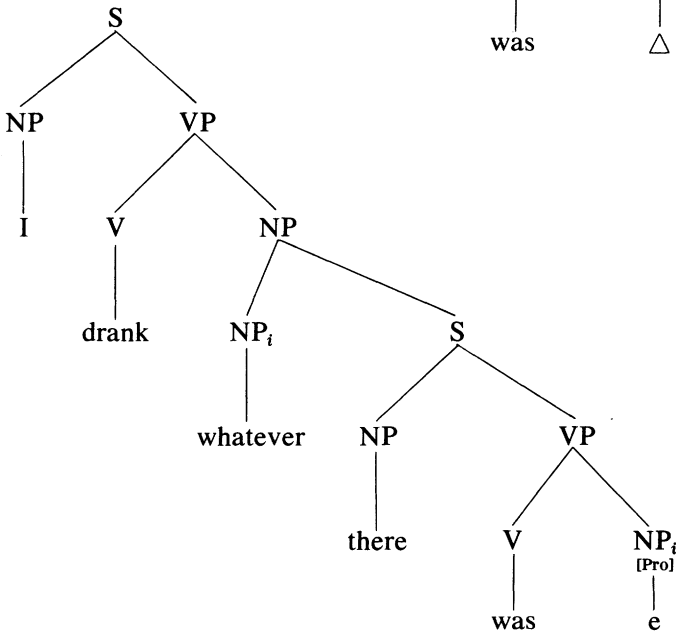
- (157) a. $XP \rightarrow \pm[\text{Pro}]$, $PP_{[\text{Pro}]} \rightarrow +[\text{Loc}]$, $PP_{[\text{Pro}]} \rightarrow +[\text{Temp}]$
 b. $NP_{[\text{Pro}]} \rightarrow \Delta$
 c. $AP_{[\text{Pro}]} \rightarrow \Delta$
 d. $AdvP_{[\text{Pro}]} \rightarrow \Delta$
 e. $PP_{[\text{Loc},\text{Pro}]} \rightarrow NP_{[\text{Loc},\text{Pro}]}$
 f. $PP_{[\text{Temp},\text{Pro}]} \rightarrow NP_{[\text{Temp},\text{Pro}]}$

Rules (157a) specify that any phrasal category XP (NP, AP, AdvP, PP) may be a pro-category, and that the pro-PPs are locative or temporal. Rules (157b)–(157d) rewrite the pro-categories (other than PP) as “ Δ ”, which is the terminal symbol of the phrase structure component of the grammar. Lexical substitution replaces Δ by lexical material (Chomsky (1965), Bresnan (to appear)); thus, pronouns, proadjectives, and proadverbs can be inserted into these categories. If no lexical form is substituted for Δ , and no rule removes it in the transformational derivation, it will cause the structure in which it occurs to be filtered out as ill-formed (cf. Emonds (1976)). Thus, a structure like (158a) would be filtered out but for the application of Controlled Pro Deletion, yielding (158b).

(158) a.



b.



English lacks a phonologically realized pro-NP having the indefinite noncount features required in (158): see Andrews (1974).

Controlled Pro Deletion is now formulated as shown in (159).

(159) *Controlled Pro Deletion*

$$\begin{array}{l} \text{XP} \dots \text{XP} \dots \rightarrow \\ \quad \quad \quad \text{[Pro]} \\ \text{XP}_i \dots [\text{e}] \dots \\ \quad \quad \quad \text{XP}_i \\ \quad \quad \quad \text{[Pro]} \end{array}$$

Once the structures in the preceding section have been modified by adding the feature [Pro] in conformity with (157), Controlled Pro Deletion will apply exactly as before. But where we earlier described Controlled Pro Deletion as identifying a terminal Pro, we now regard it as identifying a pro-category. The rule operates by deleting the terminal string of the pro-category and coindexing the pro-category node with the antecedent node; to ensure semantic interpretation of the free relative construction, the antecedent category must be the head. The coindexed head and trace nodes must agree in grammatical features.

All of these properties of Controlled Pro Deletion are hypothesized to be universal. Language-particular variations in the functioning of the rule must then be attributed to independently motivated differences in particular grammars; among these are the set of pro-categories of the grammar, the range of grammatical features subject to agreement, and the existence of other rules of anaphora. To illustrate how each of these language-particular parameters can affect the formation of free relatives, we will contrast several properties of free relatives in English with related constructions in French, Finnish, Old English, and Tok Pisin (a pidgin spoken in Papua New Guinea).

The pro-PPs of English are limited to locative, directional, and temporal PPs. This explains contrasts like the following ones (observed in Grimshaw (1977)):

- (160) a. I'll live in whatever town you're willing to live.
 b. We'll move to whatever place you think we should move.
 c. Mr. Brown died in whatever decade Mr. Smith died.
 d. I'm leaving on whatever date John arrives.
- (161) a. *I'm interested in whatever subjects I think I should be interested.
 b. *I'll speak to whatever group you're willing to speak.
 c. *I'll work on whatever problems you don't work.
 d. *John will be arrested by whoever Bill was arrested.

The locative, directional, and temporal PPs in (160) serve as controllers of locative, directional, and temporal pro-PPs. But the nonlocative, nondirectional, and nontemporal PPs in (161) cannot control an appropriate pro-category in the relative clause. (As shown in the preceding section, the corresponding examples with stranded prepositions can be derived from NP-headed sources, because NP is a general pro-category of English.)

It might be thought that (162) is a counterexample to this hypothesis:

(162) I'll give my money to whatever institution you give yours.

The dative *to* in (162) is not a locative or directional preposition, yet the example is well-formed. But (162) has another source in which no preposition need appear in the clause:

(163) I'll give my money to whatever institution you give ^[Pro] yours.

We can test this hypothesis by substituting for *give* in (162) a verb that does not have the prepositionless dative alternation, such as *donate*:

(164) a. You give your money to it.

b. You give it your money.

(165) a. You donate your money to it.

b. *You donate it your money.

We then find the following contrast:

(166) a. I'll donate my money to whatever institution you donate yours to.

b. *I'll donate my money to whatever institution you donate yours.

French free relatives differ from English in this respect. Hirschbühler (1976) cites the following examples:

(167) a. Je le dis *pour qui* je dois le dire.

I it say for whom I must it say

'I say it for whom I must say it.'

b. Pierre s'est battu *avec qui* tu voulais qu'il sorte.

Pierre fought with whom you wanted that he go out

'Pierre fought with the person you wanted him to go out with.'

c. Je ne reviens pas *de chez qui* tu crois que je reviens.

I do not come back from whose place you think that I come back

'I am not coming back from whose place you think I am coming back.'

In these examples, a PP is missing from the free relative clause; the corresponding examples are ill-formed in English. But French is similar to English in not allowing pied piping of prepositions into head position of the free relative (cf. section 4.4):

(168) a. *J'ai rencontré *à qui* tu m'as dit de parler.

I met to whom you me told to speak

b. *Prevenez *avec qui* je me suis battu que je l'attends.

warn with whom I fought that I for him am waiting

c. *J'ai invité *contre qui* tu as voté.

I invited against whom you voted

We can explain these facts simply by hypothesizing that PP is a general pro-category

in French: $PP \rightarrow P NP$. When P is *à* or *de*, the pronoun may appear cliticized to the verb, causing deletion of P by a language-particular rule of French (Kayne (1975)):

(169) J'ai parlé *à Jean* et tu *lui* as parlé aussi.

But in examples (167a–c), the P is deleted as an automatic consequence of Controlled Pro Deletion, which deletes the terminal string of PP and coindexes the trace PP with the controller PP in head position. The examples in (168) are ungrammatical because the free relatives are direct object NPs, whose heads must also be NPs (cf. section 3).

In Old English, the elision of prepositions in relative clause constructions was not restricted to locative, directional, and temporal prepositions (Allen (1977)). This fact suggests that PP was a more general pro-category in Old English than in Modern English. Independent evidence for this hypothesis is provided by the existence of such Old English anaphors as *þærto* 'thereto', *þærymbe* 'thereabout', etc., in nonlocative senses that are no longer productive in Modern English (Allen (to appear)). In Modern English, some speakers do not permit elision of directional prepositions (*I'll move to whatever town you move*), while accepting locative elision (*I'll live in whatever town you live*); and others reject both types. These facts may indicate that the category pro-PP is gradually narrowing its extension in English, and may eventually be lost altogether.

The fact that Controlled Pro Deletion applies to pro-categories distinguishes it from the rule of *Wh* Movement, stated in (170):

(170) *Wh* Movement

$$\begin{array}{ccc} \dots & XP & \dots \rightarrow \\ & \text{[wh]} & \\ XP_i & \dots [XP_i e] & \dots \\ \text{[wh]} & & \end{array}$$

When the set of pro-categories in a given language is coextensive with the set of *wh*-categories, the difference in the domains of application of the two rules may be obscured. The language-particular limitation on the set of English pro-categories is thus revealing of an aspect of Universal Grammar that has not been fully recognized:

- (171) a. *I'll discuss philosophy with whoever we go jogging. (Controlled Pro Deletion)
 b. With whom will we go jogging? (*Wh* Movement)
- (172) a. *She used to explain her ideas to whoever she could talk in bed. (Controlled Pro Deletion)
 b. To whom could she talk in bed? (*Wh* Movement)
- (173) a. *John may have been kidnapped by whatever group we were being sniped at. (Controlled Pro Deletion)
 b. By what group were we being sniped at? (*Wh* Movement)
- (174) a. *He always seems to be interested in whatever he's least successful. (Controlled Pro Deletion)
 b. In what is he least successful? (*Wh* Movement)

Another language-particular parameter that can affect the formation of free relative constructions is the range of grammatical features subject to the universal agreement condition on coindexed nodes. Since a *Wh*-moved category retains its case features (modulo language-particular case-attraction rules), a language in which case features as well as categorial features are subject to the universal agreement condition will provide no direct evidence from case marking to distinguish the application of Controlled Pro Deletion from the application of *Wh* Movement. Finnish provides an interesting example of this situation. L. Carlson (1977) cites the following examples of free relatives in Finnish:

(175) a. Valitsen *mitä* *sinäkin* valitset.
 choose-I what-Partitive you-too choose-you
 ‘I choose what you choose.’

b. [[*mitä*] [_S *sinäkin* valitset [*e*]]]
 NP NP_i NP_i
 [Part] [Part] [Part]

(176) a. Pidän *mistä* *sinäkin* pidät.
 like-I what-Elative you-too like-you
 ‘I like what you like.’

b. [[*mistä*] [_S *sinäkin* pidät [*e*]]]
 NP NP_i NP_i
 [El] [El] [El]

(177) a. Valitsen *mistä* *sinä* pidät.
 choose-I what-Elative you like-you
 ‘I choose what you like.’

b. [[*mistä*] [_S *sinä* pidät [*e*]]]
 NP NP_i NP_i
 [Part] [El] [El]

(178) a. *Pidän *mistä* *sinä* valitset.
 like-I what-Elative you choose-you
 ‘I like what you choose.’

b. *[[*mistä*] [_S *sinä* valitset [*e*]]]
 NP NP_i NP_i
 [El] [El] [Part]

As indicated in the (b) parts of these examples, the verb *valita* ‘choose’ takes a partitive object (it may also take an accusative object), while *pitää* in the sense of ‘like’ requires an elative object. When the case requirements of the matrix and subordinate verb conflict, the head of the free relative clause agrees with the subordinate verb (177). Yet this is not the whole story, for, as Carlson observes, example (179) is also ill-formed:

(179) a. *Pidän *mitä* *sinä* valitset.
 like-I what-Partitive you choose-you
 ‘I like what you choose.’

b. *[[*mitä*] [_S *sinä* valitset [*e*]]]
 NP NP_i NP_i
 [El] [Part] [Part]

Despite the case agreement between the head and the subordinate verb, the example is ungrammatical. Carlson suggests that nominative (the case of subjects and objects of impersonal constructions), accusative, and partitive (the cases of objects of transitive verbs) are unmarked cases in Finnish; the case of a free relative may disagree with that of its head only when the relative has unmarked case; and the head must agree in case with the subordinate verb that governs its trace. These assumptions explain the pattern of grammaticality noted above, but they are as consistent with Controlled Pro Deletion as they are with *Wh* Movement. The heads of Finnish free relatives might be preposed by *Wh* Movement and Head-Raising (see Vergnaud (1974), Schachter (1973), and the appendix), or they might be base-generated in head position with variable case marking. In the latter situation, the agreement condition on coindexing would account for (178) and the disagreement condition on the heads of free relatives would account for (179).

In Old English, by contrast, case features were clearly not subject to the universal agreement condition. Old English relative clauses could be formed both by Controlled Pro Deletion and by movement of a relative pronoun to clause-initial position before the optionally present invariant relative marker *þe*, as Allen (1977; to appear) shows. The relative pronouns, which were morphologically identical to the demonstrative pronouns, agreed in person, gender, and number, but not case, with the heads of the relative clauses. The case of a relative pronoun was determined by its within-clause function. Examples of the two types (which we have drawn from Allen (1977, 76, 87)) are given in (180) and (181).

(180) a. Gemyne he þæs yfeles þe he worhte.
remember he the evil-Gen. that he wrought
'Let him remember the evil that he wrought.'

b. [\bar{s} [NP_i [Gen] þæs yfeles] [\bar{s} þe [_s he worhte [e]]]

(181) a. Ure Drihten arærde anes ealdormannes dohtor,
our Lord raised an alderman's daughter-Acc.
seo þe læg dead.
who-Nom. that lay dead

b. [\bar{s} [NP [Acc] [NP [Gen] anes ealdormannes] dohtor] [\bar{s} [NP_i [Nom] seo] þe [_s [NP_i [Nom] e] læg dead]]

In (180), the head of the relative clause has been bound to the clause directly by the application of Controlled Pro Deletion. In (181), the head of the relative clause is interpreted as the antecedent of the relative pronoun *seo*, which in turn has been bound to the clause by the application of Relative Pronoun Movement. The case of the moved pronoun is that of its within-clause function as subject of *læg dead*; but the case of the heads of both types of relatives is determined by their matrix clause function. Because nodes coindexed through Controlled Pro Deletion need not agree in case, while moved

constituents normally retain their case features, case marking here provides an indication of whether deletion or movement has applied.

In Old English free relatives occurring within a matrix clause, the *wh*-phrase bears the case appropriate to its function in the matrix clause. Just as in ordinary relatives derived by Controlled Pro Deletion, this case may disagree with the within-clause case marking; the following example (from Allen (1977, 114)) illustrates this.

- (182) a. Fæder and moder moton heora bearn to swa hwylcum
 father and mother must their child to so which-Dat.
cræfte gedon swa him leofost byð.
 occupation put him as him liefest is
 'Father and mother must put their child to whatever occupation is most
 pleasing to him.'

- b. [*swa hwylcum cræfte*] [_S swa [_S [e] him leofost byð]]
 NP_i NP_i
 [Dat] [Nom]

This is the opposite of the case-marking pattern produced by *Wh* Movement in interrogatives. In the interrogative corresponding to *Which occupation is most pleasing to him?*, the *wh*-phrase would be in the nominative. Old English provides independent evidence that Controlled Pro Deletion applies in the formation of free relatives, for all movement rules in Old English were subject to obligatory pied piping of prepositions, while Controlled Pro Deletion was not. Preposition stranding is absent in interrogative constructions, but does occur in free relatives.¹⁴

¹⁴ Chomsky and Lasnik (1977) have disputed the evidence from preposition stranding, drawing on factual claims from a secondary source that is misleading in this respect. Primary research by Allen (1977; to appear), Wende (1915), and Maling (1977; 1978) supports our conclusion as well as that in Grimshaw (1974). The alternative analyses of preposition stranding proposed by Chomsky and Lasnik are criticized in Allen (1977; to appear); cf. Maling (1978).

A defense of Chomsky and Lasnik's position has recently been put forward in an article by Jan Vat (to appear). The author of this work correctly observes (as did Allen (1977)) that Old English locative *þær* was used as a relative pronoun. Vat further observes (as did Allen (1977)) that *þær* could be split from a governing preposition by an independently motivated local rule. Vat proposes that this split *þær* was the source of all *þe* relatives containing stranded prepositions in Old English and goes on to question why Allen herself did not draw this conclusion from her data. The reason may be that in Old English *þær* was used as a locative anaphor as well as a nonlocative anaphor of inanimate antecedents. Examples of *þær* with an animate antecedent NP are not cited by Vat and none are found in Wende's (1915) comprehensive study. Thus, if deletion of relative *þær* were the source of Old English *þe* relatives containing stranded prepositions, as Vat proposes, we would expect such *þe* relatives not to occur with animate antecedents. But they do:

- (i) Stephanus, þe we ymbe sprecað. . . . (Aelfric *Homilies* II 34,12; cited in Wende (1915, 41))
 'Stephanus, who we are speaking about, . . .'

(We are grateful to Joan Maling for providing us with this example.) The abundance of examples of this type, together with the absence of examples of the type **Stephanus, þær we ymbe sprecað. . . .*, provides reason to reject Vat's ingenious movement analysis. We also note that Vat's analysis fails to account for the crucial evidence from Old English topicalization that, as Allen (1977) and Maling (1978) argue, is inconsistent with Chomsky and Lasnik's proposals; see Allen (to appear) for a full discussion. Regarding the claims advanced by Vat for the explanatory superiority of the movement analysis, see section 7 and the appendix below.

Our final illustration of language-particular parameters that affect the formation of free relative clauses concerns the existence of other rules of anaphora in the grammar of a language. Many languages allow the retention of pronouns as an alternative to Controlled Pro Deletion in relative clauses; see McCloskey (1978) and Fassi Fehri (1978). And in many languages, pronouns are subject to free pronoun deletion. Free Pronoun Deletion, or ‘‘Pronoun Drop’’, is a strictly local rule whose applicability depends primarily upon the relation of the pronoun to its governing lexical item. For example, the subject of a verb in Italian may undergo Pronoun Drop, but not the object; in Tok Pisin, both subjects and the objects of transitive verbs may undergo Pronoun Drop, but not objects of prepositions (Woolford (to appear)). Free Pronoun Deletion is subject to discourse constraints, but not to the conditions on syntactic binding that account for the so-called Island Constraints (Perlmutter (1972)). By contrast, Controlled Pro Deletion is not a strictly local rule, in the sense that the well-formedness of its output depends upon grammatical information not locally available at the deletion site: the controller of the deletion may occur arbitrarily far from the deleted pro-category (subject to Island Constraints).

With this in mind, we note that it would be extremely interesting to find a language that lacked both Controlled Pro Deletion and *Wh* Movement. As we have just remarked, many languages use retained pronouns as an alternative to controlled deletion; and there are languages that form interrogatives without *Wh* Movement simply by generating a *wh*-phrase in place (deRijk (1972)). A language that lacked both Controlled Pro Deletion and *Wh* Movement would thus provide a ‘‘window’’ to the underlying structures of its free relative clauses. Would the free relatives resemble interrogative clauses, with the *wh*-phrase in place in the context

[_{NP}[_S . . . *wh* . . .]],

or would they have the form

[_{NP} *wh* [_S . . . *pro* . . .]],

resembling relative clauses with *wh*-heads and retained pronouns?

Tok Pisin is such a language (Woolford (1978; to appear)). In Tok Pisin, questions are formed by base-generating an interrogative pronoun in place:

- (183) Dispela tupela man i go *we*?
 this two man go where
 ‘Where did those two men go?’

The interrogative word occurs preposed only when it belongs to a constituent that is independently preposable in noninterrogative sentences (Woolford (to appear)). Relative clauses are formed in Tok Pisin by base-generating the head NP with a relative clause

containing a pronoun in anaphoric relation to the head:

- (184) Yutupela olsem *wanpela pikinini bilong mi em idai pinis*.
 you-dual like one child of me he die Aspect
 'You two are like one of my children who died.'

The pronoun may be omitted only in the contexts of free pronoun deletion, and neither interrogative nor relative constructions are subject to Island Constraints (Woolford (1978)).

Tok Pisin also has free relative constructions. These are formed by base-generating a *wh*-phrase as the head to a relative clause that retains an anaphoric pronoun. As in ordinary relative clauses, the pronoun may be omitted in the contexts of free pronoun deletion. It is retained in the following examples from Dutton (1973), cited in Woolford (to appear):

- (185) Bai emtupela i lusim *wanem samting yu wokim em long en*.
 Fut. 3-dual lose what thing you make it for 3
 'Those two will lose whatever you make [it] for them.'
 (186) Mi inap painim yu long *wanem ples yu hait long en*.
 I able find you in what place you hide in it
 'I will be able to find you in whatever place you hide in [it].'

Although Tok Pisin lacks a definite locative pronoun corresponding to English *there*, it does use the interrogative form *we* as an indefinite locative pronoun meaning 'anywhere', 'somewhere'. In the following example from Woolford (to appear), this indefinite pronoun is used in a free relative headed by the phrase *wanem hap* 'whatever place':

- (187) Na i laik go wok gadin o *wanem hap i go we*, em tanim man na i go.
 and want go work garden or what place go where he turn man and go
 'And if he wants to go work the garden or whatever place he goes [there], he turns into a man and goes.'

Note that the pronoun *we* is construed as an anaphor of *wanem hap*. (188) is an example of its use as an indefinite pronoun 'somewhere'.

- (188) Mi go *we* mi save wari long ples bilong me na mi kam bek
 I go where I Aspect worry about village of me and I come back
 kwik.
 quick
 'If I go somewhere I tend to worry about my village and come back quickly.'

In short, *wh*-headed free relatives containing an anaphoric pronoun in the clause exist in an English-based pidgin that lacks both *Wh* Movement and Controlled Pro Deletion. This fact strikingly confirms our hypothesis that despite their superficial similarities to

interrogative clauses, free relatives occur in a relative-clause-like structure, the *wh*-phrase being base-generated as a head and controlling deletion of a pronoun within the clause.

In conclusion, both Controlled Pro Deletion and *Wh* Movement belong to Universal Grammar. The choice of which rule to employ in the grammar of a particular language depends upon the properties of the constructions in which it is applied. If a construction gives evidence of being headed and containing a bound pro-category, Controlled Pro Deletion will lead to the simplest grammar overall, because universal conditions restrict Controlled Pro Deletion to headed structures that contain an appropriate pro-category. We have shown that despite their superficial similarities to interrogative clauses, such evidence exists for English free relatives in, for example, the ‘‘matching effect’’, the failure of pied piping, and the locative–temporal restrictions on PP-headed free relatives. The evidence may differ in other languages because of language-particular variations in pro-categories, featural agreement, or rules of anaphora.

Of course, it is not logically necessary for free relative constructions to be headed, any more than it is for interrogative constructions to be headless. Both possibilities—‘‘headless’’ free relatives and ‘‘headed’’ interrogatives—may in fact exist. In Moroccan Arabic, free relatives fail to exhibit the matching effect and allow pied piping with the relative morpheme: an example provided to us by A. Fassi Fehri is *ja: m^a mn dwiti* (came with whom talked-you: ‘With whom you talked came’). In such headless constructions, *Wh* Movement may lead to the simplest grammar overall (Fassi Fehri (to appear)). In Modern Irish, by contrast, there is evidence that Controlled Pro Deletion applies in interrogative constructions (McCloskey (1978)). Thus, the choice among ‘‘competing’’ rules of Universal Grammar is the problem of determining, for each language, the simplest grammar that is descriptively adequate.

7. Conditions on Syntactic Binding

As we remarked in the preceding section, Controlled Pro Deletion (unlike free pronoun deletion) is subject to conditions on syntactic binding that further limit the formation of free relative clauses in English. Examples are given in (189).

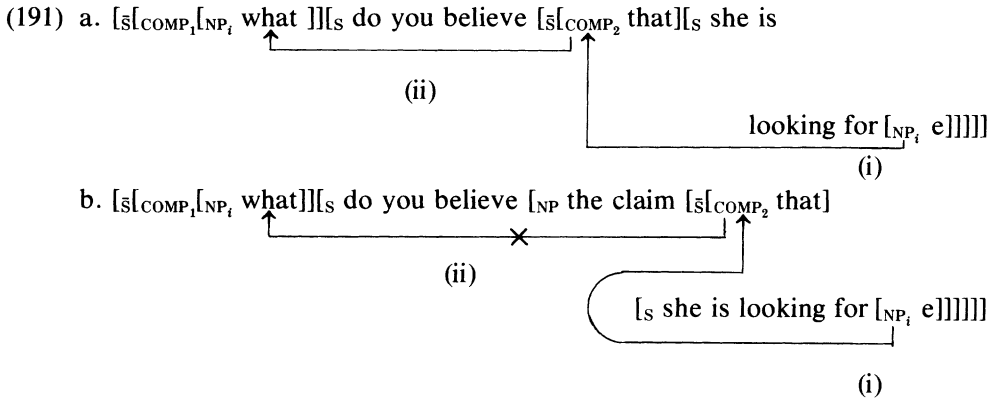
- (189) a. She may not really be looking for what you believe that she is looking for.
 b. *She may not really be looking for what you believe the claim that she is looking for.
 c. *She may not really be looking for what she is asking who will give her.

Examples (189b,c) involve Controlled Pro Deletion into a complex NP, *the claim that she is looking for Pro*, and a ‘‘*wh*-island’’, *who will give her Pro*. As is well known, *Wh* Movement is subject to the same restrictions in English:

- (190) a. What do you believe that she is looking for?
 b. *What do you believe the claim that she is looking for?
 c. *What is she asking who will give her?

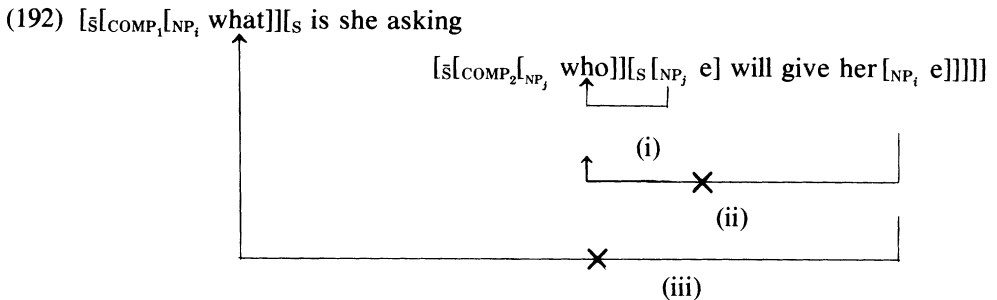
Chomsky (1977) has argued that the appropriate condition governing the applicability of *Wh* Movement is the Subjacency Condition, which restricts the movement of an interrogative constituent to subjacent nodes. Nodes A and B are said to be *subjacent* if they are separated by no more than one bounding node C. The bounding nodes for English are hypothesized to be NP and S.

As shown in (191), the Subjacency Condition can account for the ungrammaticality of *Wh* Movement from complex NPs if it is assumed that *Wh* Movement iteratively moves the interrogative constituent from COMP to COMP.



In (191a), movement (i) into COMP₂ is possible because COMP₂ and [_{NP_i} e] are subjacent nodes; similarly, movement (ii) from COMP₂ into COMP₁ is possible because COMP₂ and COMP₁ are subjacent nodes. Movement directly from [_{NP_i} e] into COMP₁ is impossible, however, because the two nodes are separated by more than one bounding node S. In (191b), movement (i) is in accordance with Subjacency, but movement (ii) is impossible because the two COMPs are separated by two bounding nodes, NP and S.

The same assumptions account for the ungrammaticality of *Wh* Movement from interrogative clauses, if it is further assumed that *Wh* Movement into a COMP already filled by a *wh*-constituent is impossible:



In (192), movement (ii) into COMP₂ is prohibited by the assumption that a *wh*-filled COMP cannot be re-filled. Movement (iii) into COMP₁ is prohibited by the Subjacency Condition, because two bounding nodes S separate [_{NP_i} e] and COMP₁.

Although these hypotheses adequately account for examples (190a–c), they do not explain examples (189a–c), in which no *Wh* Movement has taken place. The theory of successive cyclic *Wh* Movement cannot in principle explain why controlled deletion should obey the “Island Constraints”.

Since Controlled Pro Deletion and *Wh* Movement both serve to “bind” an antecedent to a clause by coindexing the antecedent with its trace, it is natural to assume that examples like (189)–(190) reflect conditions on syntactic binding rather than conditions on syntactic movement. We propose that the Subjacency Condition be interpreted as a condition on syntactic binding. The simplest way to express this reinterpretation—one that can exactly duplicate the effects of the former interpretation of the condition (if desired)—is by means of an indexing procedure.

Suppose we are given a structure of the form (193), which is derived by *Wh* Movement.

(193) [_S[_{COMP}[_{NP_i} what]] [_S do you believe [_S [_{COMP} that] [_S she is looking for [_{NP_i} e]]]]]

The indexing procedure connects the syntactic binding produced by *Wh* Movement as follows. Starting with the antecedent NP_i *what*, the procedure checks the constituents subjacent to NP_i for a coindexed node. If there are none (as is the case in (193)), but an unfilled COMP is among the subjacent nodes, the procedure coindexes the COMP with the antecedent. The result is shown in (194).

(194) [_S[_{COMP}[_{NP_i} what]] [_S do you believe [_S[_{COMP_i} that]

Now the procedure reapplies to the substructure (195), taking $COMP_i$ as the antecedent.

(195) [_S[_{COMP_i} that] [_S she is looking for [_{NP_i} e]]]]]

The procedure again checks the constituents subjacent to the antecedent for a coindexed node; it now finds one in the trace [NP_i e]. The syntactic binding is now connected and so determined to be well-formed.

Exactly the same procedure applies to the structure produced by Controlled Pro Deletion in (196).

(196) [_{NP}[_{NP_i} whatever] [_S you believe [_S[_{COMP} that] [_S she is looking for [_{NP_i} e]]]]]

NP_i
[Pro]

Starting with the antecedent NP_i *whatever*, the procedure checks the constituents subjacent to NP_i for a coindexed node. Since there are none in (196) and since an unfilled COMP is among the subjacent nodes, the procedure coindexes the COMP with the antecedent. The result is shown in (197).

(197) [_{NP}[_{NP_i} whatever] [_S you believe [_S[_{COMP_i} that]

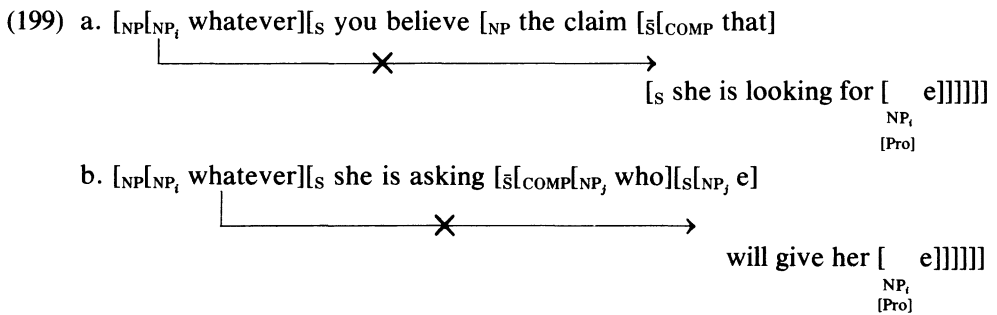
Now the procedure reapplies to the substructure (198), taking $COMP_i$ as the antecedent.

(198) [_{COMP_i} that] [_S she is looking for [_{NP_i} e]]]]]

NP_i
[Pro]

The procedure again checks the constituents subjacent to the antecedent for a coindexed node; it now finds one in the indexed pro-category. The syntactic binding is now connected and so determined to be well-formed.

A syntactic binding will be unconnected when there is neither a coindexed node nor an unfilled COMP among the constituents subjacent to an antecedent. A COMP is filled when it dominates an indexed node. Thus, the syntactic bindings in (199a) and (199b) will be unconnected.



In these examples, we have followed Chomsky (1977) in taking NP and S (but not \bar{S}) as the bounding nodes for Subjacency. By varying the set of bounding nodes, we obtain different results from (199). For example, if \bar{S} and NP are taken as the bounding nodes for Subjacency, it will be possible to bind a trace within a *wh*-island, but not within two *wh*-islands or one complex NP. We can thus obtain the configuration of facts in Italian reported in Rizzi (1978).¹⁵ We can also account for the stylistic inversion phenomena discussed in Kayne and Pollock (to appear), without assuming that a *wh*-phrase is moved successively from COMP to COMP: stylistic inversion is possible only in those clauses whose COMPs are bound by the indexing procedure.

Our reinterpretation of the Subjacency Condition thus provides a uniform explanation for the behavior of rules of movement and controlled deletion with respect to the Island Constraints. It is not necessary to stipulate that *Wh* Movement and Controlled Pro Deletion are governed by these constraints: this follows from the universal form of these rules ((159) and (170)), together with the universal condition that all syntactic bindings be connected. It follows that a rule of free deletion (such as Pronoun Drop) will not be subject to Island Constraints. The advantage of our theory is that it also provides an explanation for the asymmetries of movement and deletion that have posed

¹⁵ If S and NP are bounding nodes in English, it does not matter whether the free relative clause is S or \bar{S} (cf. fn. 10); in either case, free relatives will themselves be "islands", since they are complex NPs. If \bar{S} is a bounding node in Italian, the Italian free relative construction must be of the form $[_{NP} \text{NP } \bar{S}]$, since it behaves exactly as a complex NP and not as an interrogative *wh*-island, according to Rizzi (1978).

One bounding node exhaustively dominating another is not distinguished by the binding conditions. Thus, an NP that exhaustively dominates an \bar{S} is not counted as a bounding node (Bresnan (1976b)). This must certainly be assumed for languages like Basque that permit Controlled Pro Deletion into sentential subjects but not into complex NPs (deRijk (1972)).

such severe problems for the interpretation of Subjacency as a constraint on movement alone.¹⁶

In conclusion, Universal Grammar makes available to the language learner a limited set of rules that have the effect of syntactic binding; among them are syntactic movement rules such as *Wh* Movement, and rules of controlled deletion. Thus, what has to be learned is which of the universally specified rules is operative in a given case. Language-particular details aside, variation between constructions will follow from this initial choice. Thus, for example, when the relationship between a *wh*-phrase and a "gap" is established by Controlled Pro Deletion, it will be restricted by the set of pro-categories of the language and (subject to featural agreement) the trace may display syntactic properties distinct from those of the antecedent. The relationship between a *wh*-phrase and trace linked by *Wh* Movement will not vary in these ways. The existence of properties common to both kinds of rule can be attributed to their shared form and function: both Controlled Pro Deletion and movement rules will be subject to conditions on syntactic binding, for example. Such a model of grammar, we believe, can substantially restrict the space of potential grammars available to the language learner to those that are simplest and descriptively most adequate.

Appendix

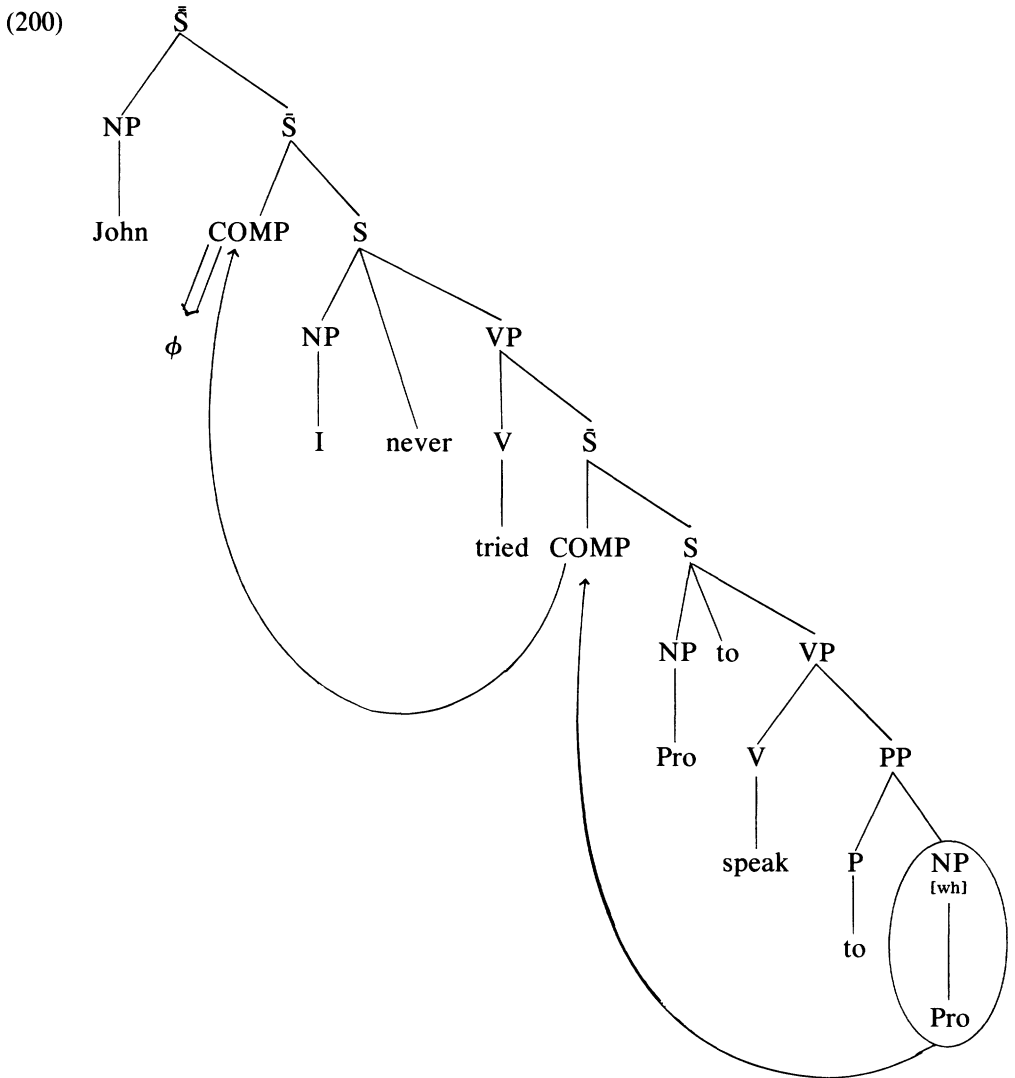
The need for a restrictive theory of Universal Grammar is widely recognized in linguistics. Only by narrowing the space of possible grammars or providing an evaluation measure with sufficiently scattered values for grammars in that space can we begin to solve the fundamental empirical problem of language acquisition. Abstractly formulated, this is the problem of specifying a function from the primary data available to a learner of natural languages into the set of descriptively adequate grammars for those languages. Other things being equal, a more restrictive theory of Universal Grammar is preferable to a less restrictive theory, in that it more closely approximates a solution to the problem of language acquisition. In this appendix, we will argue that a theory of Universal Grammar that includes a rule of Controlled Pro Deletion is more restrictive than one that does not. Specifically, we will assume that the constraints on phrase structure rules, lexical rules, and interpretive rules are identical in two theories, A and B; the theories differ only in the constraints imposed on the form and functioning of transfor-

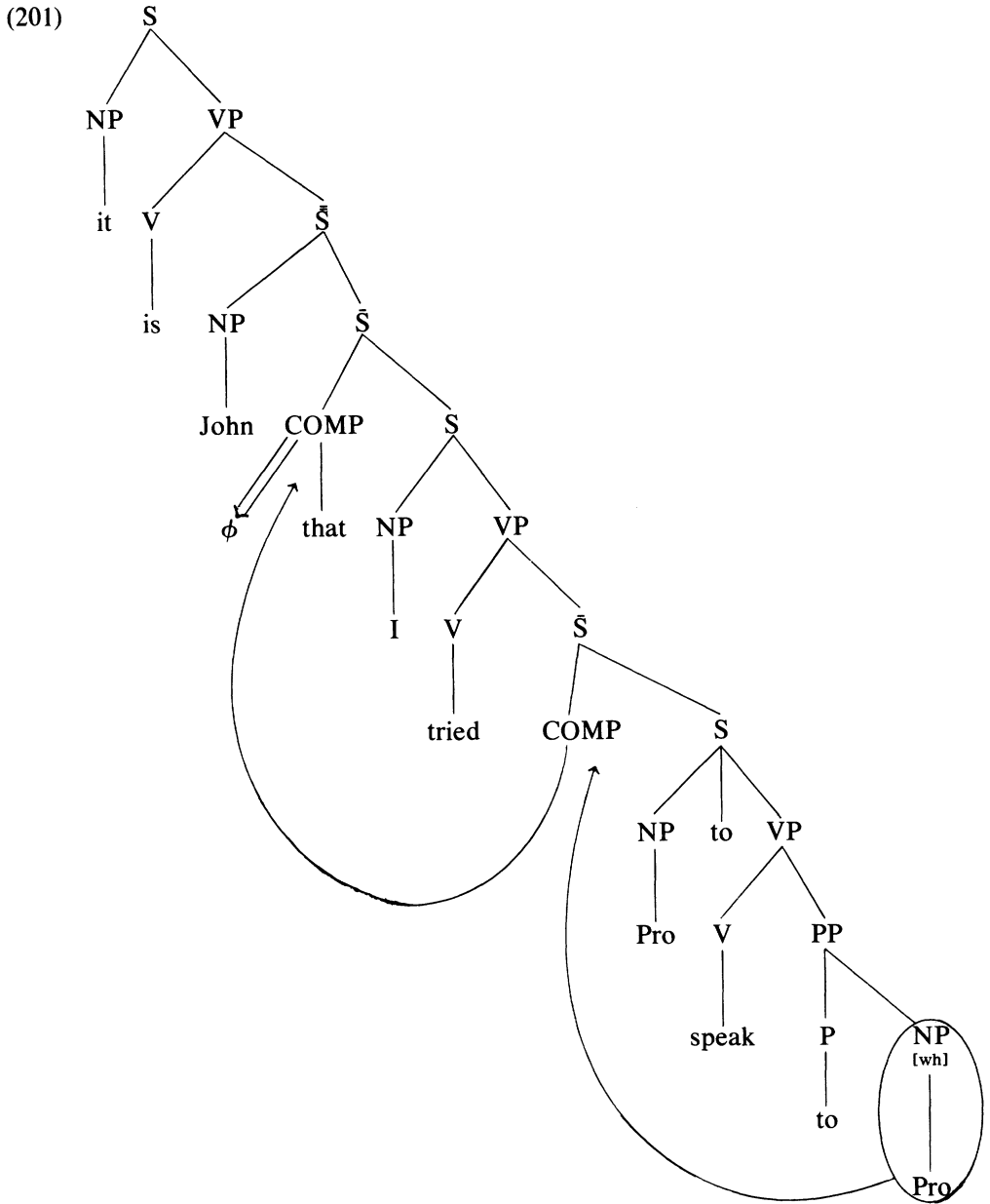
¹⁶ The important idea of applying a surface structure binding condition to traces produced by movement, deletion, or base-generation is due to Woolford (1978). Our adaptation of this idea is designed to capture the specific results of the Subjacency Condition for grammars that include controlled deletions. However, there are problems remaining which may indicate that the Subjacency Condition (however it is interpreted) expresses an incorrect generalization. Different generalizations follow from the binding condition proposed in Woolford (1978) and from alternative proposals such as Bresnan (1976b) and Zwarts (1977). The differing empirical consequences of such alternatives provide an important set of problems for further research.

Maling (1978) has shown that in several Scandinavian languages complex NPs are islands for both *Wh* Movement and Controlled Pro Deletion, while *wh*-clauses are islands only for *Wh* Movement. Her research supports our conclusion that Controlled Pro Deletion and *Wh* Movement are distinct rules of Universal Grammar, and further suggests that the choice of bounding nodes may vary with rule types or rule domains. Other evidence of asymmetries between movement and deletion can be found in Morgan (1972), deRijk (1972), Grimshaw (1974), Bresnan (1975; 1976a; 1976b; 1977a; 1977b), Maling (1977; 1978), Allen (1977; to appear), McCloskey (1977; 1978), Fassi Fehri (1978).

mations. Theory A admits a small set of unbounded rules of movement and controlled deletion as transformations, including (159) and (170); these rules are constrained by universal conditions on syntactic binding, as outlined in section 7 above. Theory B admits rules of *Wh* Movement into COMP and deletion in COMP, but no unbounded rules; the Subjacency Condition is interpreted as a condition on the applicability of movement transformations. We will argue that to account for the properties of free relative constructions in English, Theory B must admit a larger set of possible grammars than Theory A.

According to Theory B, free relative constructions in English must be derived by means of *Wh* Movement, because they are subject to the Island Constraints: see Chomsky (1977) for the rationale of this inference. Chomsky (1977) has proposed an analysis of cleft and topicalized constructions in which the focused phrase is base-generated in clause-initial position and *Wh* Movement applies as shown in (200) and (201).





Once in the topmost COMP position of a topicalized construction, the *wh*-pronoun must be deleted. For although *wh*-pronouns appear in appositive relatives (*John, who I never tried to speak to, is terribly handsome*), they never appear in topicalized constructions in English: **John, who I never tried to speak to* is ill-formed as a complete sentence. To ensure deletion in this construction, a negative filter must be added to the grammar

of English, ruling out the sequence [\bar{S} . . . [\bar{S} [COMP . . . *wh* . . .] . . .], when \bar{S} is a root node. The same sequence is permissible in clefts: *It is John who I never tried to speak to*. On the other hand, when a PP occurs in focus position in a cleft, a *wh*-pronoun never appears in the adjacent COMP: **It is with John who I wanted to go jogging with*, **It is with John with whom I wanted to go jogging*. Thus, another negative filter must be added to rule out the sequence [\bar{S} PP [\bar{S} [COMP . . . *wh* . . .] . . .]. The latter filter cannot apply to relative constructions: *With John, with whom I wanted to go jogging, you never know what will happen next*.

Now it might be proposed that English free relatives should be derived similarly, by base-generating a *wh*-phrase in the head position of a relative clause (as we have proposed) and then applying *Wh* Movement to a *wh*-pronoun in the clause, followed by obligatory *Wh* Deletion in COMP (ensured by specific filters). But this proposal can be rejected on the basis of the contrasts between the clefts in (202) and the corresponding free relatives in (203).

- (202) a. It is *with John* that I hoped to go jogging.
 b. It isn't *for your job* that I'm going to apply.
 c. It is *about Bill* that we should talk.
 d. It is *by the police* that Bill was arrested.
- (203) a. *I'll go *with whoever* I hope to go jogging.
 b. *You shouldn't apply *for whichever job* I'm going to apply.
 c. *I'll talk *about whoever* you talk.
 d. *You'll be arrested *by whoever* Bill was arrested.

If *Wh* Deletion in COMP derives (202), it will derive (203) as well, without some further additions to the grammar. As we have already observed, the Controlled Pro Deletion hypothesis correctly explains the ill-formedness of the examples in (203): because the PPs in (203) are nonlocative and nontemporal, they cannot serve as antecedents to (or controllers of) the locative and temporal pro-PPs of English under the rule of Controlled Pro Deletion. The same examples are well-formed with the missing prepositions restored, for the reasons that we have already given.¹⁷ We see, then, that an analysis of free relatives in accordance with Theory B must admit additional rules or filters to the

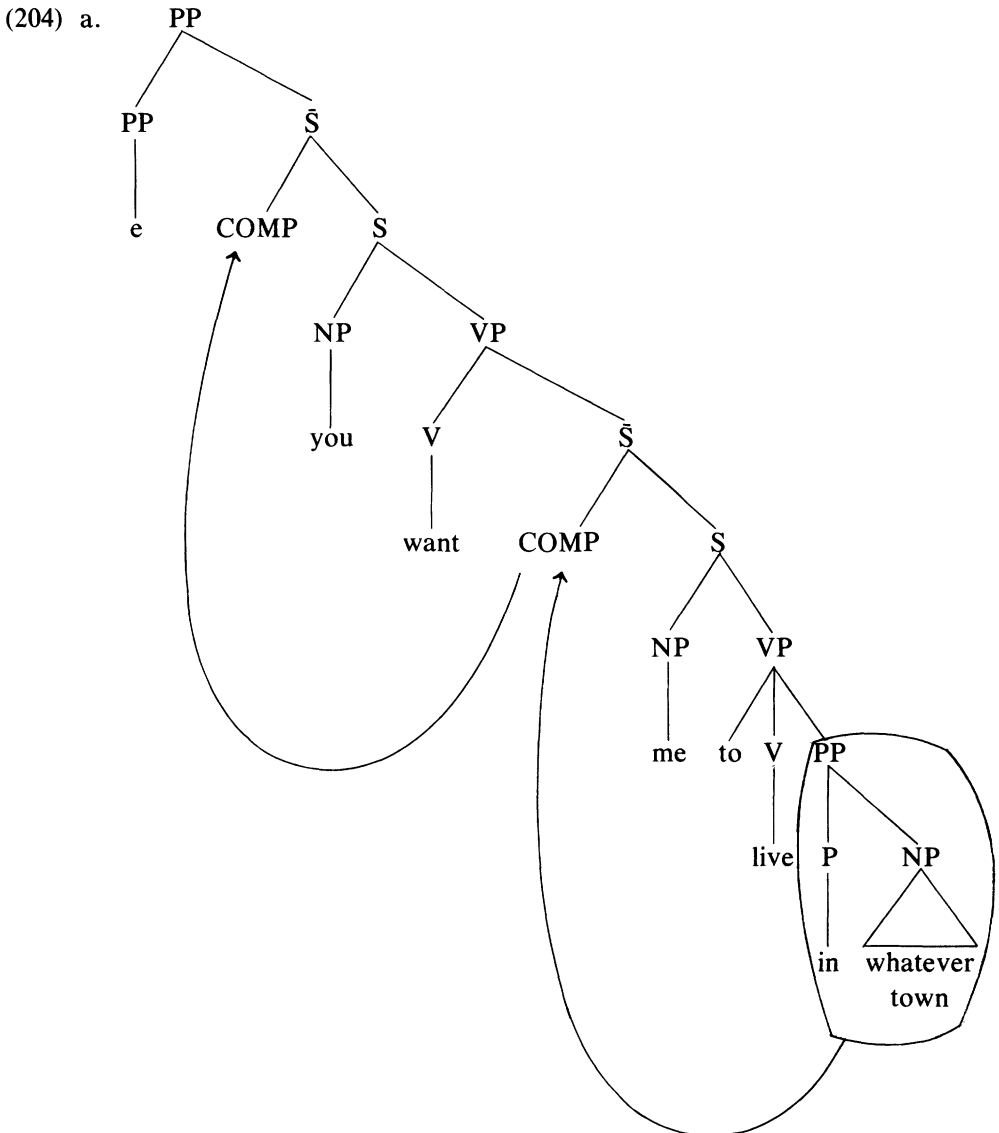
¹⁷ It is rather interesting to observe that even when locative and temporal PPs are clefted, *wh*-pronouns may not appear:

- (i) *It is only on Sundays when you can read the Sunday papers.
 (ii) *It is only in heaven where true peace can be found.

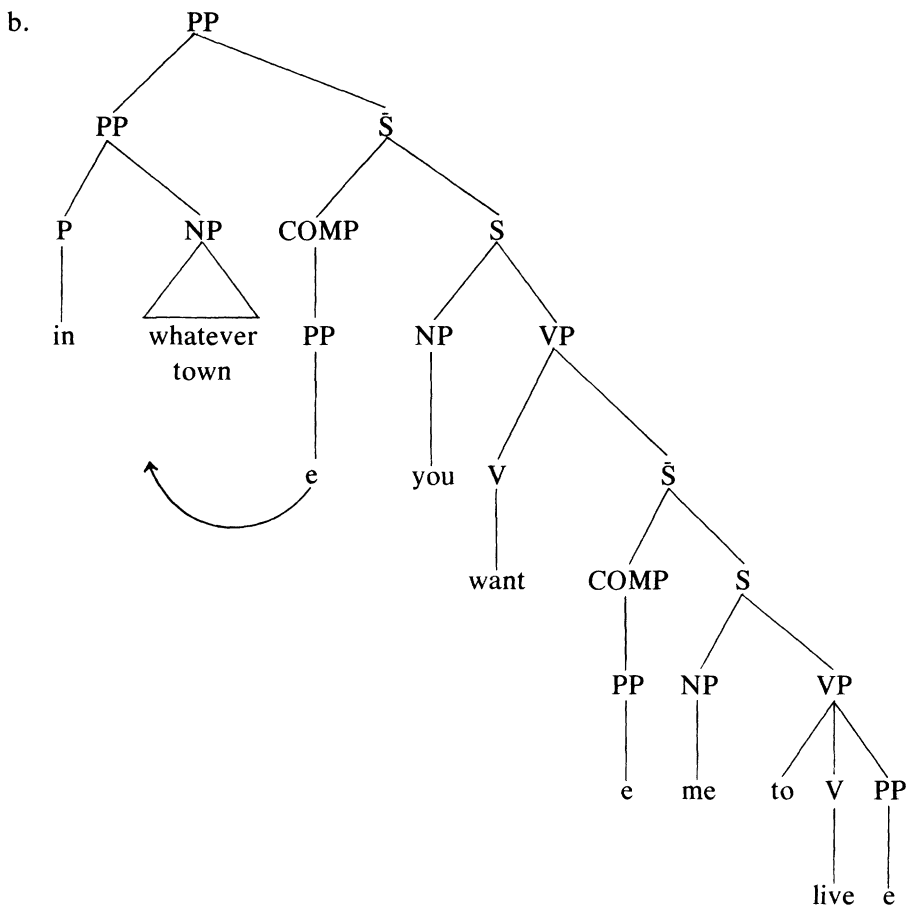
This fact suggests that clefting may involve a universal focusing rule distinct from both *Wh* Movement and Controlled Pro Deletion. The latter hypothesis has been recently advanced by Woolford (1978), who shows that topicalization and clefting occur in Tok Pisin as in English, despite the fact that Tok Pisin lacks both Controlled Pro Deletion and *Wh* Movement. (Further support for Woolford's hypothesis can be found in McCloskey's (1978) study of Irish.)

grammar, while Theory A requires no such additions. Theory B thus increases the set of possible grammars relative to Theory A.

Now let us consider an alternative analysis of free relatives consistent with Theory B. In this alternative, free relatives are derived in two stages, as shown in (204).



Stage 1: Successive-Cyclic Wh Movement into COMP



Stage II: Structure-Preserving Movement from COMP into Head Position

This is the “head-raising” analysis alluded to in section 6 above. The rule shown applying in Stage II is a structure-preserving movement from COMP into the head position. Although this rule correctly permits the derivation of well-formed examples like that in (204), it incorrectly derives ill-formed examples of the type in (203). Further additions must be made to the grammar to rule these out. For example, a rule adding a feature [Pro] to the trace in (204b) might be added, together with a filter, as shown in (205).

$$(205) \text{ a. } XP_i [COMP[XP_i, e]] \rightarrow XP_i [COMP[\overset{XP_i}{e}]]$$

- b. * PP , * PP
- | | |
|--------|---------|
| [Pro] | [Pro] |
| -[Loc] | -[Temp] |

However, the addition of such pronominalizing transformations represents an undesirable weakening of the theory of transformational grammar (Bresnan (1978)), and the use of such filters as (205b) restates information already given by the base rules (157). (If Pro-Marking were made part of the Head-Raising rule itself, it would, of course, no longer be a structure-preserving transformation.) Once again we see that the analysis compatible with Theory B must add rules to the grammar that are unnecessary in Theory A: namely, the Head-Raising rule (204b), the Pro-Marking rule (205a), and the filters (205b).

It might be supposed that the two-stage movement analysis of (204) is justified by examples like (206) and (207), in which ‘‘idiom chunks’’ appear in the head position of free relatives and relatives:

- (206) a. The headway that we made was insufficient.
 b. *The headway that we enjoyed was insufficient.
 (207) a. Whatever headway we made was insufficient.
 b. *Whatever headway we enjoyed was insufficient.

It is commonly assumed that idiomatic verb-object constructions must be base-generated together: *make headway*, **enjoy headway*. But if this assumption provides evidence for Head-Raising in (206) and (207), it provides evidence against Head-Raising in (208)–(211), as pointed out in Bresnan (1973b):

- (208) a. We didn’t make the amount of headway that was expected of us.
 b. *We didn’t enjoy the amount of headway that was expected of us.
 (209) a. We didn’t make whatever headway was expected of us.
 b. *We didn’t enjoy whatever headway was expected of us.
 (210) a. We were fired because they expected more headway from us than we were able to make.
 b. *We were fired because they expected more headway from us than we were able to provide.
 (211) a. We were fired because we made less headway than they had expected from us.
 b. *We were fired because we provided less headway than they had expected from us.

In short, the assumption that idiomatic verb-object constructions must always be base-generated together is false. The separation of idiom chunks from their verbs cannot be a function of movement transformations alone. Further support for this conclusion is provided by the ‘‘telescoping’’ free relatives in (212) and (213), which clearly require an interpretive analysis:

- (212) a. Unfortunately, we made what the President considered to be insufficient headway on that problem.
 b. *Unfortunately, we provided what the President considered to be insufficient headway on that problem.

- (213) a. She took what everyone thought was unfair advantage of him.
 b. *She wanted what everyone thought was unfair advantage of him.

(We owe examples like these to Roger Higgins.) Indeed, Fassi Fehri (1978, n. 31) cites examples of idiom chunk heads in Moroccan Arabic relative clauses with resumptive pronouns, which could not be derived by *Wh* Movement.

We see that analyses of free relatives compatible with Theory B require unnecessary and unmotivated additions of various rules and filters to the grammar. Theory A is more restrictive, permitting the simplest grammar that is descriptively adequate.

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