An Analysis of Questions: Studies on Theoretical Paradigms.

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ABSTRACT

The thesis is concerned with seeking an adequate description of English questions within Transformational Generative Grammar. Since the study of questions has been carried out through the development of the theory of grammars in TG, our study observes various changes of theoretical concerns as well.

This thesis is composed of five chapters; the introduction and Chapter 2 are mainly concerned with setting up the scope of the study and discussing several aspects of questions in general. The discussion of the nature of indirect questions and the internal structure of wh-words appears in Chapter 2.

In Chapter 3, we concern ourselves with the syntactic description of questions - rule formations, the concern with well-formed structural descriptions, and the search for the universal properties of question-word movement. This chapter is divided into three parts: studies under Chomsky's Syntactic Structures model, analysis of questions with the Immunity Hypothesis proposed by Katz and Postal, and the studies carried out by Baker, Bresnan, Bach, and Langacker.

In Chapter 4, we discuss the formation and the operation of WH-Movement. This chapter is also composed of three parts: a study of constraints on the variables which appear in the structural description of WH-Movement, the rule formation and conditions on its operation under the structure-preserving hypothesis proposed by Emonds, and general characteristics of WH-Movement in relation to the trace theory.

An Analysis of Questions:
Studies on Theoretical Paradigms

being a thesis presented by Soon-pyo Moon
to the University of St. Andrews in application
for the degree of Master of Letters.

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Declaration

I hereby declare that the following thesis is based on work carried out by me, that the thesis is my own composition, and that no part of it has been previously presented for a higher degree.

The research was conducted in the Department of Linguistics, St. Andrews University, under the supervision of Dr. David Roberts.

signed

Academic Record

I matriculated as a research student in the Department of Linguistics, St. Andrews University, in October, 1978.

Certificate

I hereby certify that Soon-pyo Moon has spent 3 terms engaged in research work under my direction, and that she has fulfilled the conditions Ordinance No. 12 (St. Andrews) and she is qualified to submit the accompanying thesis for the degree of Master of Letters.

signed

TABLE OF CONTENTS

Chapter 1: Introduction.

The aim of this study is to analyse the various proposals for the treatment of questions within a transformational grammar framework. The study of questions not only has been of relevance on a purely descriptive level in terms of deepening our understanding of the phenomena in various languages but has also contributed to more theoretical developments.

There have been a number of studies of interrogative sentences in terms both of their formal aspects and of their functional aspects. Interrogative may be defined generally in two ways. Firstly, question sentences can be distinguished from other types of sentences by their formal characteristics such as subject-auxiliary inversion and the appearance of question-words, question-particles, or imposed supra-segmental phonemes. Secondly, in their functional aspects, questions request a special kind of linguistic response.

For the convenience of discussion, we may classify interrogatives into two groups by the above definitions, that is into normal questions and non-normal questions. Normal questions indicate a sentence type which satisfies both definitions. Non-normal questions, on the contrary, designate a type of sentence having interrogative structure but not being interpreted as having interrogative meanings or vice versa, e.g., rhetorical questions, tag questions, queclatives (that is, questions with the form of declaratives), and echo questions, etc. Although both groups of interrogatives share at least some common aspects of their syntactic structures, we shall narrow down our subject exclusively to normal questions in this paper.

The types of normal question, again, have been divided in two different ways. One is the division between direct and indirect questions, and the other is the division between nexus-questions like yes-no type question or alternative question and x-questions which begin with an interrogative noun phrase or adverb. The latter division has been named by Jespersen, but in this paper we will call them yes-no type question and wh-question respectively. Traditional grammarians had sought the differences among them and treated them differently. But the present transformational grammarians have tried to set up a certain common ground to describe all these different types of interrogatives.

The division between direct and indirect questions was based on the formal differences of the types. Indirect questions show two superficial differences in syntactic aspects from the corresponding direct questions. The one is the presence of subject-auxiliary inversion in direct questions and its absence in indirect questions. The other is the fact that either whether or if must occur in indirect yes-no questions, while neither may occur in the corresponding direct questions.

(1) (a) *{Whether / If} Alice comes?

(b) I asked {whether / if} Alice comes.

(c) Did Alice come?

(d) *I asked did Alice come.

Traditional grammarians have often used the term 'indirect question' to identify what seemed to be questions put inside ordinary declaratives or statement sentences. What they noticed was that for every 'direct question' like those in the (a) examples of (2) through

(6) there were corresponding sentences like (b) examples with ask, wonder, and other similar verbs, in which there was an embedded clause having much the same semantic force as the 'direct question'.

(2) (a) Did she buy apple?

(b) I ask you (to tell me) whether she bought an apple.

(3) (a) What did the man say?

(b) I wonder what the man said.

(4) (a) Who tracked mud through the kitchen?

(b) I ask who tracked mud through the kitchen.

(5) (a) How did he manage to plug the leak?

(b) I inquire how he managed to plug the leak.

(6) (a) Why did Bill leave his wallet at home?

(b) I asked why Bill left his wallet at home.

These "paraphrased" sentences of direct questions had been equivalent to the category of indirect questions. Their definition of indirect questions seemed to be that an indirect question is a certain kind of declarative sentence containing the embedded 'question' under a suitable performative verb. However, this definition of indirect questions led to their overlooking a certain type of subordinate sentence which shares many syntactic properties with direct questions and their paraphrased indirect questions, in spite of their lack of performative meanings. Chapter 2 will be devoted to a more detailed discussion on this matter.

Now, we turn to another division of interrogative types, yes-no type question vs. wh-question. This division was made by reference to their type of answer. While a yes-no type question requires an assertion about the truth or falsity of a proposition contained in

the question, a wh-question requires the speaker to supply information about an entity specifically marked in the question.

(7) (a) Did Columbus discover America in 800 A.D.?

(b) Is Bill unusually tall?

(8) (a) When is the next solar eclipse?

(b) What is the name of that artist?

The answers to most yes-no questions may be given by paraphrasing the question themselves, in sentences beginning with "It is true that..." and "It is the case that..." or "It is not true that..." and "It is not the case that..." But the answers to wh-questions are never made by "yes" or "no", rather these are normally related to a noun phrase or a prepositional phrase, as we see from the possible answers in (9) of the wh-questions in (8).

(9) (a) at 5 o'clock.

(b) Matisse.

In spite of these different aspects of answerhood between the two types of questions, many grammarians assume that they have to be treated at least on the same syntactic ground, since the meaning of any question sentence differs in one important respect from that of a declarative or statement sentence. If there were no differences in the structural descriptions of the two, a declarative and an interrogative, the grammar would not be able to account for the ability of all normal native speakers to distinguish between questions and statements.

Under this assumption, they try to seek the syntactic similarities that both types of question share and to generalize them in order to set up the same syntactic description. One property common

to both types of questions is that the subject NP and the auxiliary verb are inverted in both question types, except in the case of the subject itself being questioned in a wh-question.

(10) (a) He is a doctor.

(b) Is he a doctor?

(c) Who is a doctor?

(d) What is he?

Another aspect is that some sentence adverbs like certainly, or probably as well as yes, no, of course do not occur in either question type.

(11) (a) Of course, he is a doctor.

(b) He is {certainly / probably} a doctor.

(c) *Of course, is he a doctor?

(d) *Is he {certainly / probably} a doctor?

(e) *Of course, who is a doctor?

(f) *Who is {certainly / probably} a doctor?

Similarly there are negative preverbs and other elements which may occur in declaratives, but not in questions[1].

(12) (a) He {scarcely / hardly} eats.

(b) *Does he {scarcely / hardly} eat?

(c) *What does John {scarcely / hardly} eat?

Besides these, one further piece of evidence is provided by the fact that nearly all verbs which take indirect wh-questions as complements also take embedded yes-no type questions (whether-question). A verb which does not allow embedded wh-questions in general does not have

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1. There is a degree of acceptability between (12b) and (12c). (12b) is better accepted than (12c).

whether-questions either. This is illustrated in (13) and (14):

(13) (a) John knows what they serve for breakfast.

(b) John knows whether they serve breakfast.

(14) (a) *John assumes what they serve for breakfast.

(b) *John assumes whether they serve breakfast.

In the light of such data, it seems correct to assume that wh-questions and yes-no type questions should be assigned to the same syntactic category.

So far, we observed the general classifications of interrogative types in terms of their formal and functional aspects. As we mentioned, one general tendency of the study of interrogatives is to relate questions of one sort to the corresponding questions of the other type. In order to pursue this idea in the syntactic descriptions of English questions, in the next chapter, we will clarify the definition of a category of indirect questions and their interrogative properties by examining an assumption that this construction is different in nature from the relative clause construction, despite the superficial similarity between them. We will list a number of facts which support not only two different constructions for indirect questions and free relatives, but also the syntactic similarities of indirect questions to the corresponding direct questions. Then, our discussion will go on to find some explanations of the two superficial differences between direct and indirect questions in more general terms. Then, we will discuss the internal structure of wh-words available to the description of questions and relative clauses. The analysis of internal structure of wh-words will give an explanation to the different function of wh-words as an interrogative pronoun and a relative pronoun.

Then, Chapter 3 will be devoted to the discussions about the syntactic description of English questions which have varied with the development of theoretical principles and hypotheses. As we will see, the arguments for various descriptions of interrogatives rely upon the theoretical principles which have been developed by the theoretical consideration of grammar. According to the relevant theoretical backgrounds, we will divide our discussions into three parts.

In the first part, we will discuss the studies in the early stage of transformational grammar which was mainly presented in Chomsky's Syntactic Structures (1957) and followed by Lees (1960) and Klima (1964). The syntactic descriptions of questions in this stage laid a stress on the formation of Question rules which made many contributions to the generalization of phenomena of English interrogatives. But, at this stage, there was no explicit attempt to deal with semantics, nor any attempt to integrate a semantic theory with the given syntactic theory. So they derive questions by the application of singulary transformations on P-markers that underlied the corresponding declaratives. As a result of this treatment of questions, they allowed transformational rules the power of changing meaning, since it is obvious that a question and its corresponding declaratives differ in meaning. This treatment, however, was rejected by those who attempted to integrate a semantic theory with syntactic theory, since it caused unnecessary complications in the semantic interpretation rules.

The second part will be about Katz and Postal's proposals for the grammar of interrogatives. In the monograph An Integrated Theory in Linguistic Description (1964), they examine transformational rules

like Question and Negatives and set up the meaning-preserving hypothesis (Immunity Hypothesis):

> Transformations are meaning-preserving, in the following sense: if two surface structures derive from exactly the same underlying structure and if their derivations differ only in that an optional transformation has applied in one but not the other, then they must have the same meaning.

According to this hypothesis, K&P reformulate those basic meaning-changing singulary transformations like Question as obligatory rules contingent on the presence of certain elements in the phrase structure. In the case of interrogatives, they postulate deep structure constituents Q and WH, and argue their functions on the semantic and syntactic description of English questions.

In the third part of Chapter 3, we will consider the arguments proposed by Baker (1970), Bresnan (1970), Bach (1971), and Langacker (1974) which follow from K&P's analysis of questions in accordance with the meaning-preserving hypothesis. Although they generally accept the meaning-preserving hypothesis with respect to the necessity of a certain deep structure question element, they are more concerned with the universal properties of those elements than with their semantic functions. In this regard, Chomsky (1965: 35) writes:

> Real progress in linguistics consists in the discovery that certain features of given languages can be reduced to universal properties of language, and explained in terms of these deeper aspects of linguistic form. Thus the major endeavor of the linguist must be to enrich the theory of linguistic form by formulating more specific constraints and conditions on the notion "generative grammar".

According to this idea, they argue that the position of the postulated deep structure element in Question Formation can account for not only the relation between the types of word order among languages and the existence ofaquestion-word movement rule, but also for the general

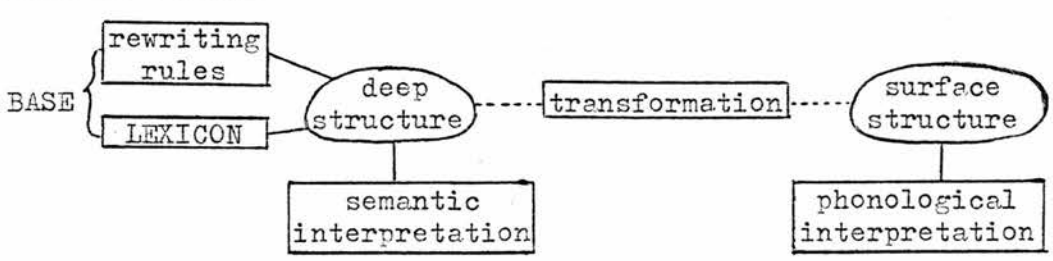
tendency of the movement rule, i.e., unbounded leftward movement hypothesis.

To seek the universal properties in description of WH-Movement has been carried out under the universal grammar hypothesis. Chomsky (1975) defines universal grammar as follows: "The general theory of grammar - call it "universal grammar" (UG) - is a system of principles that determines: (1) what counts as a grammar, and (2) how grammars function to generate structural descriptions of sentences." Furthermore, he specifies the study of universal grammar: "For heuristic purposes we may distinguish two aspects of universal grammar: (a) conditions on form, and (b) conditions on function - that is, (a) conditions on the systems that qualify as grammars, and (b) conditions on the way the rules of a grammar apply to generate structural descriptions" (Chomsky, 1973: 232). According to this distinction of aspects of UG, the studies on the well-formed structural description of interrogatives belong to the study of condition on form.

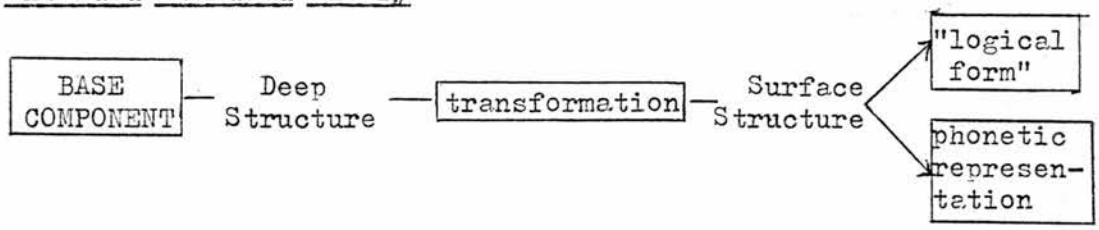
In the Chapter 4, we will discuss the study of conditions on the operation of rules of grammars, specifically focused on the operation of WH-Movement. This chapter will be composed of three parts: constraints on variables in the structural description of WH-Movement, and WH-fronting as a structure-preserving transformation, and WH-Movement within the trace theory framework. This division observes their different theoretical background. The study of constraints on variables in WH-Movement has been done mainly by Ross (1967) within the framework of the Standard Theory (ST) which was set up in Chomsky (1965). And the arguments in the next two parts have been carried out within the Extended Standard Theory (EST) framework.

Before we talk about our topics in Chapter 4, it seems necessary to discuss briefly the differences between ST and EST. One of the main differences is that EST allows semantic interpretation in the surface structure, while ST maintains the position of the meaning preserving hypothesis. Recently Chomsky (1975) proposes the term "logical form" which represents a system of semantic representations analogous to phonetic representation. This "logical form" seems to equate to the semantic interpretation in ST. Then, we can say that LF in ST is determined solely by the properties of deep structure, while in EST, it is determined by properties of both deep and surface structure. That means the function of deep structure has been changed. In ST, deep structure is generated by the base, and receives the lexical items, and undergoes semantic interpretation, and finally is converted to well-formed surface structure. EST also assumes that the rewriting rules of the base generate deep structure in which lexical items are inserted. So the "thematic relations" between the verb and the noun phrases which are grammatically related to it are defined at this level. But under EST framework, surface structure determines all other aspects of LF: anaphora (i.e., relationship between antecedent and pronoun), scope of logical operators, the subject-predicate relation, focus and semantic presupposition, and so on. Both theories can be visualized as follows:

Standard Theory:



Extended Standard Theory



Now we turn to the second part and the third part of Chapter 4. The second part will be about Emonds' study of WH-fronting. Emonds has developed a theory predicting that with the exception of well-defined classes of root transformations and local transformations, no transformation may result in a type of structure that is not given in the base rules. It is called the "Structure-preserving Constraint" which is regarded as a condition on applicability of arbitrary chosen transformations. Although this study has been done under the EST framework, Emonds' approach seems quite independent of the approach to semantics adopted. Rather his study is related to the base rules and transformational rules. We will discuss what kinds of restrictions on WH-fronting are predicted by the structure-preserving constraint.

The third section will be about the trace theory of movement rules which is also a part of EST studies. Recently, the EST has incorporated a new concept, the concept of "trace". Trace theory claims that when a phrase moves by transformation, its category remains as an "unfilled node", and that the moved phrase and the original position have the same index: i.e., the unfilled node labelled i is $t(i)$, the trace of P_i, the phrase from position i. For example, the deep structure sentence you saw $whom_i$ has a surface form $whom_i$ did you see t_i after WH-Movement applied. Trace can be defined as a sort of memory of deep structure recorded in the surface structure. Therefore, one can attribute the thematic relation of the surface structure,

because the order of the deep structure is still represented. In this aspect, the introduction of the concept of trace makes it possible that LF is derived directly from the surface structure by rules of semantic interpretations. For instance, in the case of WH-Movement, trace is not only bound by the moved constituent, but also considered as indicating the position of a variable bound by a kind of quantifier which is introduced into the logical form by rules applying to the surface structure.

Chomsky (1973, 1975, 1976) proposes various conditions on the operation of transformations and rules of semantic interpretation within the trace theory framework. We will discuss how WH-Movement conforms to the conditions proposed by Chomsky in the third part of Chapter 4. And Chapter 5 will be a brief comment of the topics discussed in the previous chapters.

Chapter 2: Indirect Questions vs. Free Relatives.

As we mentioned briefly in the introduction, the definition of indirect questions is inadequate, so it seems necessary to re-examine the category of indirect questions and to set up an adequate explanation for the data.

There is, in English, a certain type of subordinate clause which is introduced by a wh-word: two sub-types are recognized indirect questions and indefinite relatives (free relatives). Consider, then, the following examples:

(1) (a) Tell me who did it.

(b) I asked who did it.

(2) (a) Albert knows who he should see.

(b) Ronald guessed why his sister has no money.

(c) John's wife forgot whether she had let the cat out.

(d) The watchman told us what was missing.

(e) Alfred decided how he could have to spend his money.

(3) (a) Alice washed what John bought.

(b) He lives where the gang couldn't get at him.

Our problem concerns the distinction between the two constructions, for both have very similar surface forms and moreover some of the examples seem to be interpretable in both ways. In this chapter, first of all, we shall examine the existence of two independent constructions, an indirect question and a free relative clause, and set out criteria for both by investigating their distributional properties in English. Then we shall discuss what factors are involved in the

indirect question construction and what kind of generalization can be made in terms of the formation of English interrogative sentence.

If we consider the sentences in (1) which obviously have an interrogative meaning as being related to the question sentence "Who did it?", we may classify subordinate clauses of the type as indirect questions. If we apply this criterion to the sentences of the type in (2) and in (3), there is no ground for them to be grouped in this category since they have no evident interrogative meanings. Some grammarians like Curme have adopted this way of analyzing subordinate clauses. In Curme (1931), he justified this classification as follows (Curme, 1931: 182):

> As pure indefinites they are still widely used to introduce a substantive clause: 'It is not known who did it, when he did it, how he did it.' They are here called indefinite relative (i.e., conjunctive) pronouns or adverbs. They are interrogatives only when they call for an answer directly or indirectly. Direct question: 'Who did it?' An indirect question is an indirect way of asking a question, as in 'Tell me who did it,' or an indirect report of a question, as in 'I asked who did it.' These forms never cease being indefinites. Their use as interrogatives in direct and indirect questions is only a special function which they often perform. In countless expressions, however, these words, who, what, when, etc., are not interrogatives and have not developed out of interrogatives, as is so often claimed. For instance, in a sentence like 'I saw plainly who struck him' who indicates that the identity of the person doing the striking was known to the speaker but unknown to the hearer, so that it contains an element of indefiniteness and is properly called an indefinite.

According to Curme's definition, the sentences in (2) and in (3) appear to be free relatives. However, Jespersen (1909-49, III) has a different approach to the classification, giving some crucial evidence in each case. Instead of restricting himself to rather vague semantic intuitions as does Curme, Jespersen attempts to set forth criteria which will make it possible to distinguish interroga-

tive clauses from relatives.

One observation is expressed quite clearly in the following quotation:

> "I insist on knowing who planned this crime": interrogative, for if you had not heard exactly what was said you would ask the speaker, "What do you insist on knowing?", not, "Whom do you insist on knowing?" The sentence is not equivalent to "I insist on making the acquaintance of the man who planned this crime" (op.cit., 74).

He observed when an indirect question is itself questioned, the question word employed is always what, no matter what question-word appears at the beginning of the subordinate clause. It is not difficult to construct other example of the same sort.

(4) (a) John lives where the Cottonwood River joins the Neosho.

(b) Where does John live?

(c) *What does John live?

(5) (a) John knows where the Cottonwood joins the Neosho.

(b) *Where does John know?

(c) What does John know?

The subordinate clause in (4a) above, when questioned, can only be questioned by (4b), not (4c), whereas the subordinate clause in (5a), when questioned, can give (5c), but not (5b).

When we apply this criterion to the sentences in (1)-(3), we find that subordinate clauses of the types illustrated by sentences (1) and (2) are much more closely related to each other than either is to subordinate clauses of the type illustrated in (3). For instance, if we take (1b), (2b), and (3b) and apply to this criterion, then we have the result sentences as follows:

(6) (a) I asked who did it.

(b) *Who did you ask?

(c) What did you ask?

(7) (a) Ronald guessed why his sister has no money.

(b) *Why did Ronald guess?

(c) What did Ronald guess?

(8) (a) He lives where the gang couldn't get at him.

(b) Where does he live?

(c) *What does he live?

There is of course one situation in which this criterion does not distinguish the two constructions, namely, when the subordinate clause itself begins with what. For instance, sentence (11b) will not be distinguished from (9b) and (10b), as the following related questions show:

(9) (a) John asked what Anna said.

(b) What did John ask?

(10) (a) John knows what Anna said.

(b) What does John know?

(11) (a) John believes what Anna said.

(b) What does John believe?

However, the fact that this criterion for distinguishing the two clause-types is not effective in every case in no way weakens the generalization on which the criterion is based.

When we observe two different definitions of the sentence-type in (2) and that of (3) given by Curme and Jespersen, it seems necessary to pursue further support for the classification suggested by Jespersen.

Lees (1960) observes an interesting case of an ambiguity.

(12) I know what he knows.

He gives us two different interpretations of the sentence in (12); one interpretation is "if he knows X, then I know he knows X," which is

the indirect question, and another meaning of the same shape is "if he knows X, then I know X", which is the free relative. This kind of ambiguity, rather than being evidence against the existence of two seperate constructions, is evidence in favour of it, since the assumption that two separate constructions exist serves as an explanation for the fact that this sentence can be understood in either of two quite distinct ways.

More detailed studies on this matter are found in Baker (1968) where he presents a number of insightful observations. First of all, he starts by setting up the condition under which indirect questions and free relatives can occur.

> (A) Indirect question occur as objects of such verbs as ask, wonder, know, forget, tell, decide, figure out, and teach (but not believe, assert, eat, or do). They also occur as subjects of such verbs and adjectives as matter, make a difference, clear, apparent, and obvious (but not begin, probable, true, or delightful).
>
> (B) Free relatives occur, headed by what, when, or where, in just those environments which call for non-human noun phrases, time adverbs and locative or directional adverbs, respectively.

The condition for the indirect questions in (A) seems to indicate that indirect questions subcategorize verbs and adjectives. The analysis of the types of verb which takes indirect question as their complement sentences has been carried out by Baker (1968) and Karttunen (1977). Baker classifies question embedding verbs to four basic types: i.e., know, decide, matter, and depend. He assumes that all the remaining predicates are synonymous with, or otherwise definable in terms of one of these four. Karttunen further divides the types of question embedding verbs into nine cagetories (op.cit.: 6):

> Verbs of retaining knowledge: know, be aware, recall, remember, forget, etc.

Verbs of acquiring knowing: learn, notice, find out, discover

Verbs of communication: tell, show, indicate, inform, disclose

Decision verbs: decide, determine, specify, agree on, control

Verbs of conjecture: guess, predict, bet on, estimate

Opinion verbs: be certain about, have an idea about, be convinced about

Inquisitive verbs: ask, wonder, investigate, be interested in

Verbs of relevance: matter, be relevant, be important, care, be significant

Verbs of dependency: depend on, be related to, have an influence on, be a function of, make a difference to

Baker observes another way to examine the claim of the independent structures for indirect questions and free relatives. In the treatment of conjunction by generative grammarians, two sentence elements can only be conjoined if not only their surface structures, but also their deep structures are parallel. Then, when two superficially similar sentence parts are joined, and the resulting sentence is deviant, we have strong grounds for suspecting a difference of underlying structure between the two elements conjoined. In particular, the deviance of (15) below can be explained by assuming that the two conjuncts are of different types entirely, one type being represented in both conjuncts in (13), the other being similarly represented in (14).

(13) At school, John learned what his math teacher was trying to teach him (FR), and what his history teacher asked him to learn (FR).

(14) At school, John learned what plastic is made of (IQ), and what the Eskimoes use for bait(IQ).

(15) *At school, John learned what his math teacher was trying to teach him (FR), and what the Eskimoes use for bait (IQ).

From now on, we will simply illustrate further differences in

the nature of the two constructions fact by fact and then try to explain some of the data.

A. In general, if there is an indirect question introduced by any wh-words in any environment, all other wh-words can occur. Thus, for example, although both know and believe take a clause beginning with the word what, only know takes clauses beginning with which, whether, and why.

(16) (a) John knows what Sally said.

(b) John believes what Sally said.

(17) (a) John knows which one she prefers.

(b) *John believes which one she prefers.

(18) (a) John knows whether she is coming or not.

(b) *John believes whether she is coming or not.

(19) (a) John knows why she threw the pie at him.

(b) *John believes why she threw the pie at him.

The acceptability of the (a) sentences is immediately explained by the assumption that the verb know takes indirect questions as objects. On the other hand, both acceptability of (16b) and the unacceptability of the other (b) sentences are explained by the assumption that only the words what, when, and where may introduce free relatives. We return below to the absence of who and which in free relatives.

One further condition should be stated for free relatives, namely, that the use of the relative pronoun in the main clause and its use in the subordinate clause must be semantically compatible.

(20) (a) What John said was not true.

(b) *What John ate was not true.

(c) What John ate was not obvious.

(d) What John said was not obvious.

Of those examples, the unacceptability of (20b) can be explained by the condition on the relative pronoun. That is the semantic content of the head in the relative clause must satisfy semantic interpretations at two points: within the relative clause itself and within the matrix sentence. The cause of the abnormality in (20b) is that be true in the matrix sentence and eat in the relative clause select different types of objects. This also occurs in the case of bound (ordinary) relative clause.

(21) (a) Something that John said was true.

(b) *Something that John ate was true.

In this sense, the subordinate clause in (20c) cannot be a free relative since it is a perfectly well-formed sentence in spite of the violation of the above condition for relative pronouns.

B. No verb permits two different when-clauses used as free relatives, nor, for that matter, does any verb permit two different time adverbials of any kind. Thus, for example, both (22) and (23) are deviant.

(22) *When Helen got to town, she bought a watch when the store opened.

(23) *When Jill crossed the street, she ran into a friend of hers at five minutes after four.

However, two when clauses are permissible with a single verb if one of the clauses is an indirect question:

(24) When Georgy arrived in town, he found out when his train would leave for Boston.

(25) When Georgy arrived in town, he asked when his train would leave for London.

Another observation to be made concerning with when-clause would be that we find sequences of tenses with indirect questions

which are not found with free relatives:

(26) (a) John does not intend to find out when Bill will come.

(b) *John does not intend to leave when Bill will come.

(27) (a) John knew when Anna would arrive.

(b) *John left the house when Anna would arrive.

C. Indirect questions, when they appear as subject of main sentences, take a singular verb, whether the wh-noun phrase is singular or plural. This is not the case with free relatives:

(28) Which boys are asked in the race $\left\{\begin{matrix} \text{is} \\ *\text{are} \end{matrix}\right\}$ clear.

(29) What were considered by Shakespeare to be his best plays (FR) $\left\{\begin{matrix} \text{don't} \\ *\text{doesn't} \end{matrix}\right\}$ appeal to Albert.

(30) What were considered by Shakespeare to be his best plays (IQ) $\left\{\begin{matrix} *\text{remain} \\ \text{remains} \end{matrix}\right\}$ uncertain to this day.

D. Sentences (31) and (32), but not (33), have corresponding cleft sentences.

(31) (a) Anna asked what Alfred ate for breakfast.

(b) Anna asked what it was that Alfred ate for breakfast.

(32) (a) Anna knows what Alfred ate for breakfast.

(b) Anna knows what it was that Alfred ate for breakfast.

(33) (a) Anna believes what Alfred told Morton.

(b) *Anna believes what it was that Alfred told Morton.

The kind of deviance illustrated in (33b) also occur with relatives having antecedents, as (34) and (35) show:

(34) *Take me to the restaurant where it was that you brought those delicious hot dogs.

(35) *John finally caught the fellow who it was that had dumped trash on his front garden.

On the other hand, the cleft sentences acceptable in indirect questions

are also acceptable in direct questions:

(36) (a) Why was it that the ice melted?

(b) How tall a man was it that came to the door?

(c) Which boy was it that caused all the trouble?

E. If we replace what by what else in (a) sentences of (31)-(33), we get acceptable sentences only in the first two clauses.

(37) (a) Anna asked what else Alfred ate for breakfast.

(b) Anna knows what else Alfred ate for breakfast.

(c) *Anna believes what else Alfred told Morton.

There is, of course a perfectly acceptable direct question corresponding to the indirect question in (37a) and (37b), namely (38):

(38) What else did Alfred eat for breakfast?

F. In free relatives, a repeated occurrence of an entire clause can be replaced by a definite pronoun, whereas in indirect questions, the repeated occurrence can only be deleted. Sentence (39) through (42) illustrated these contrasting possibilities:

(39) Anna didn't believe what Alfred told Morton, and Sarah didn't believe it either.

(40) *Anna didn't know what Alfred ate for breakfast, and Sarah didn't know it either.

(41) Anna didn't know what Alfred ate for breakfast, and Sarah didn't know either.

(42) *Anna didn't believe what Alfred told Morton, and Sarah didn't believe either.

A similar distinction arises with both where and when. The sentences below show this for where - where there substitutes for it of the above sentences.

(43) John lives where Bill lives, and Albert lives there too.

(44) *John knows where Bill lives, and Albert knows there too.

(45) John knows where Bill lives, and Albert knows too.

(46) *John lives where Bill lives, and Albert lives too.

We can make the generalization that indirect question can never be pronominalized to definite pronouns, whereas free relatives always can.

G. With indirect question, there is an optional reduction to infinitive form when (a) the subject of the embedded clause is identical with the subject or object of the main clause (depending on the particular verb in the main clause), and (b) the auxiliary of the embedded clause is something like should. Thus, for example, we have (48) corresponding to (47) and (50) corresponding to (49):

(47) Bill doesn't always know what he should believe.

(48) Bill doesn't always know what to believe.

(49) Anna told Alfred what he should believe.

(50) Anna told Alfred what to believe.

For a sentence like (51), which contains a free relative, no such reduction is possible:

(51) Bill doesn't always believe what he should believe.

(52) *Bill doesn't always believe what to believe.

Similarly, we find (54) corresponding to (53), but not (56) corresponding to (55):

(53) Bill forgot where he should go.

(54) Bill forgot where to go.

(55) Bill frequently fails to go where he should go.

(56) *Bill frequently fails to go where to go.

H. Indirect question, like direct questions, may contain more than a single wh-word:

(57) What happened to whom?

(58) What happened to whom isn't entirely clear.

Such clauses, however, are impossible as free relatives. For instance, while the free relative in (59) is completely acceptable, that in (60) is not.

(59) What happened to him shouldn't happen to a dog.

(60) *What happened to whom shouldn't happen to a dog.

I. Indirect questions have a paraphrase containing the noun answer as object of the verb. This is not the case with free relatives:

(61) (a) Alice didn't know what Albert bought.

(b) Alice didn't know the answer to the question: what did Albert buy?

(62) (a) Alice didn't wash what Albert bought.

(b) *Alice didn't wash the answer to the question: what did Albert buy?

The facts listed A through I above support the claim that indirect questions and free relatives are independent structures. Moreover, the cases A, D, E, H, and I show that indirect questions share many syntactic properties with direct questions, so we may claim that indirect questions must be treated in the category of interrogatives rather than any of declaratives. Although at the moment we cannot make any more conclusive claim about the above observation, we may push our discussion a little further to be concerned with some relations of syntactic structures among direct questions, indirect questions and free relatives.

First of all, as we noted in the introduction, there are two obvious syntactic differences between direct questions and indirect questions which have been regarded as the criteria for differentiating

one type from the other: i.e., subject-auxiliary inversion in direct questions and the presence of whether in indirect questions. If we want to describe direct and indirect questions by using the same structural description, how can these differences be explained? Although we are anticipating certain commonly-held notions about the treatment of questions which will be treated in more detail in the next chapter, here we will see some general arguments on these matters.

Several generative grammarians such as Klima (1965), Bresnan (1970), Baker (1970), and Emonds (1976) argue that both differences could be explained by a general aspect of sentence grammar, rather than by a specific characteristics of interrogatives. They observe that subject-auxiliary inversion occurs commonly in certain exclamations, wishes, and sentences with preposed negative constituents as well as direct questions.

(63) Is Mary coming?

Will they support us?

How would we escape?

Wasn't that brave of him!

Isn't it cold out!

May you always be as thoughtful as she was!

Never in my life have I spoken to him.

The common argument of this matter is that subject-auxiliary inversion occurs only at the highest S or nonembedded S.

(64) (a) We talked about how we would escape.

(b) *Bill didn't come to the party because neither did Mary.

(c) *Mary doesn't know why Susan is leaving, and we don't know why is she either.

Thus we can explain the lack of subject-auxiliary inversion in indirect question by its subordinate status. One interesting generalization is made by Emonds. In the course of setting up generalization of the relationship between transformational rules and the conditions on rule application, he puts the rule of subject-auxiliary inversion to the category of the root transformations. The definition of root transformations is simply a grammatical transformational rule which is applicable only to the root sentence; where a root sentence is an S that is not dominated by a node other than S. (See Emonds 1976) Then he notes that "Root S," as defined here, describes the context for subject-auxiliary inversion more exactly than "highest S," since this rule also applies in conjoined sentences immediately dominated by the highest S:

(65) (a) She didn't do the dishes, and why should she?

(b) I know it was expensive, but never in my life have I been so thrilled.

(c) When is he coming, and where is he from?

(d) Come in right now, or do I have to use force?

Whether-deletion in direct questions is also explained by the subordinate condition of the clause. In the analysis of yes-no type of questions, Katz and Postal analyse direct yes-no questions as well as indirect questions as having an underlying questioned constituent whether that causes auxiliary inversion like other WH constituents and that is obligatorily deleted when it is dominated by the highest S. More generalized discussion on this matter is given by Bresnan (1970). Assuming that every sentence has its deep structure complementizer, she analyses whether as one of the question complementizers.

Then she tries to explain whether-deletion in direct question as one of the general characteristics of complementizers: that is, in highest or nonembedded sentences, both WH and that are obligatorily deleted. (See Chapter 3 for further detailed discussion)

(66) *That John is here.

(67) *Whether is John here?

Thus, so far, the two superficial differences between direct and indirect questions do not appear to be any strong impediment to the generalizing of direct and indirect questions as members of the category Interrogative.

The problem arising from the analysis of indirect questions and free relatives is that, in spite of a number of different syntactic properties, both structures have very similar formal appearances. One thing easily noticed is that they share many of the same pronouns. Certainly this aspect is not limited to the question of indirect question and free relatives, but generalizes to a distinction between interrogative pronouns and relative pronouns. Since wh-words in both interrogatives and relatives not only are identical in form and have related meanings, but also are subjects of a movement rule, it seems worthwhile discussing the nature and structure of wh-words in the context of both interrogative structure and relative structure.

The interrogative pronoun in sentence (68) is identical in form to the relative pronoun in sentence (69); furthermore, these pronouns have a related meaning in that both refer to 'human (subject)':

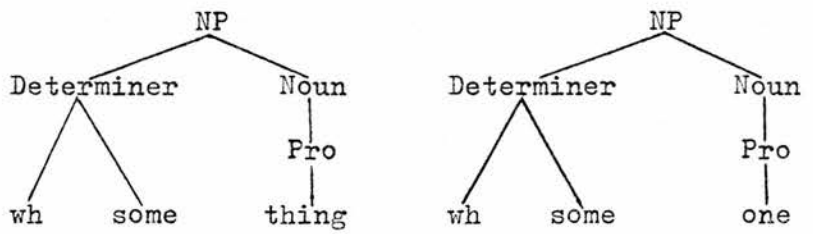
(68) Who cut the pie?

(69) The man who came yesterday cut the pie.

One way of accounting for these facts in grammar of English is proposed by Katz and Postal (1964): to derive each such set of wh-words from the same underlying structure and thus to claim that, since these sets of words are derived in the same way, they are one and the same word wherever they occur.

Katz and Postal observed several generalizations concerning wh-forms. Although Chomsky and Klima informally analysed wh-words such as what and who as wh+something and wh+somebody respectively, Katz and Postal extend and refine these early proposals for wh-forms. Adopting Klima's proposal that wh-words are special case of indefinite pronouns, K&P's analysis is both more specific in that they derive these forms from the structures given in (70) below and more general in that these structures are special cases of (71), which provides for a range of wh-structures including adverbs like where (analyzed as (72)) and adjectives like which (analyzed as the Determiner in (73)), i.e., of a Noun not subsequently spelt into a wh-form.

(70)



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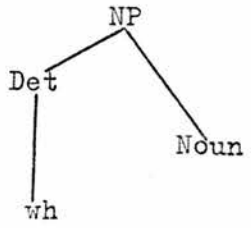

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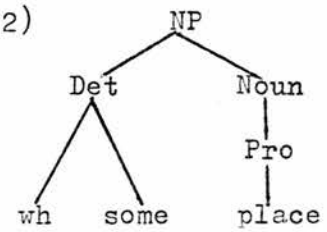

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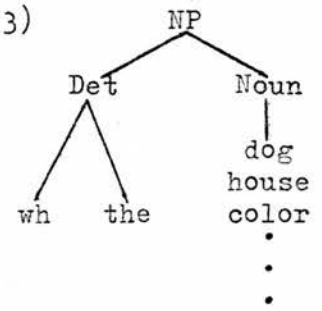
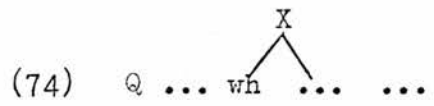


Katz and Postal explain their motivations of the above structures with respect to interrogative sentences. They claim, in brief, the wh-questions are characterized by the fact that their underlying structure contains a Q morpheme and a wh morpheme (1964:89). The Q indicates that the sentence is a question and occurs initially in a string and only if a wh is present (but not vice versa, since they claim that relative elements, for example, must also contain a wh morpheme, but not a Q morpheme, in their underlying structure). This is represented schematically as follow:

(74) 

The constituent X can be questioned only when it dominates wh, so the wh specifies which element or elements of the sentence are 'questioned': and, since the range of constituents to be questioned is restricted to the determiner constituent of a noun phrase, wh is dominated by that determiner. The single-word question forms who, what, where, when, etc., are generated from noun phrases containing a Noun Pro-form and a determiner dominating indefinite and a wh morpheme.

K&P provide several arguments for the assumption of indefiniteness of single-word wh-words. Firstly, they point out if the single-word wh-question forms are derived from indefinite articles with a preceding attached wh, the fact that they are single words follows automatically from the rule which must be in the grammar anyway to yield the non-question indefinite pro-forms someone, something, somehow, etc. Secondly, the single-word question forms in a number of cases fill a gap left by the absence of an actual what + pro-form

sequence. Hence, the absence of *what one (human) is who, and the absence of *what one's is filled by whose, etc. Some further evidence for the association of the single-word question forms with noun phrases containing indefinite articles and pro-forms follows from the distribution of else (which is evidently a reduced and repositioned form of other):

(75) (a) Someone else saw Harry.

(b) Harry saw him someplace else.

(c) *The man else saw Harry.

(d) *He else saw Harry.

(e) *Harry saw him at the place else.

(f) Who else saw Harry?

(g) Where else did Harry see him?

But if we take the above examples to support the indefiniteness of wh-words, it seems inapplicable to some relative pronouns. As we noted in the case E (examples in (37)), indirect questions allow what to be replaced by what else, but not in the case of free relatives:

(76) (a) I know what else you eat for breakfast.

(b) *Anna believes what else Albert told Morton.

Koutsoudas (1967) has argued that K&P's positing the same WH morpheme for questions and relative clauses is unjustified on any but morphological grounds and is therefore ad hoc, there being no apparent semantic equivalence of the two functions of the underlying WH. In addition, Koutsoudas pointed out difficulties in deriving both interrogative and relative pronouns from the same underlying source in K&P's analysis.

(77) (a) Where did he die?

(77) (b) Tell me where he died.

(c) Show me the house where he died.

According to K&P's analysis, both interrogative and relative pronoun where is derived from the same underlying form wh+some Pro (place). Although this analysis seems adequate to lead interrogative sentences, in the case of relative formation, particularly a relative pronoun modifying a noun other than the pro-form, it causes some serious difficulties. For instance, in (77c), where he died modifies the noun the house, but it seems impossible to combine two sentences by relative formation, since we cannot satisfy the condition for the relative formation that the two sentences must share identical nouns, that is we cannot modify the house with some place.

Koutsoudas goes on to argue that if we should meet the condition on relativization, we could no longer claim that the interrogative and the relative where are the same word, for it would no longer be true that they are derived from the same underlying structure: the interrogative where would be derived from wh+some+place, while the relative would be derived from wh+some+house. A further problem concerns how to categorized house: if house is a pro-form, then every noun that can be relativized will have a pro-form and a non-pro-form; but if house is not a pro-form, the identical noun deletion rule will delete it, and as a result we will be unable to derive the relative where, since there will no longer be a location feature in what remains after deletion.

However, Koutsoudas' argument seems not very persuasive, since we can account for this problem with the function of the special entity Pro, which is defined as a dummy terminal symbol with all proper

syntactic and semantic features. This entity is identifiable with any lexical noun by its feature complex, so it is not necessary for Pro to be replaced by the noun house. Then in the morphological rules, if we put Pro Deletion after the Pronominalization to wh-words, there will be no loss of information.

Besides Koutsoudas' criticism against the claim to derive interrogative pronouns and relative pronouns from the same underlying structure, Stockwell et. al (1973) also point out some inadequacies of this analysis and they conclude that there are two different sets of pronouns (op. cit.: 447):

> For interrogatives, we posit an underlying WH attached to the "questioned" element(s) and no Q: for relative clauses, we do not postulate an underlying WH, bur rather introduce it by transformation, so that on a deep level, we do not relate questions to relative clauses, and we must therefore claim the similarity to be one of a superficial nature.

They seem to regard the fact that both pronouns have the same form as a mere accident. But this approach seems to be too extreme since a mere accident in English in fact is a very common accident across languages. Kuroda (1968) argues that the formal similarity must not lead us directly to assign certain common semantic characteristics for both pronouns, nor be ignored as a mere accident. His main argument is that the formal similarity of the two sets of pronouns must be explained by a common term on the morphological ground. And in the deeper levels, the formal structure of wh-words may serve a significant role differently for each construction of questions and relatives.

Accepting the formal structure of wh-words, wh+some/the+Pro, which is given by K&P, Kuroda postulate two basic determiners, SOME and THAT. He claims that SOME can have as specific realizations

some and any, and that THAT can be realized as that, it, or the. Then he sets up various combinations with wh, Pro, SOME/THAT, e.g., SOME + Pro ⟶ something, wh + SOME⟶what, or wh + THAT⟶which, etc. What he tries to show in this analysis is that both relative pronouns and interrogative pronouns can be derived from a simple identical morphological base, and mainly that the morphological rules in English relativization such as that which⟶what can be explained under his analysis. According to Kuroda's analysis, sentences in (78b) and (78c) below are both derived from the basic form (78a):

(78) (a) THAT Pro (wh+SOME Pro lay on the table) was the tissue.

(b) That which lay on the table was the tissue.

(c) What lay on the table was the tissue.

Kuroda proposes independently motivated rules of "Definitization" and "THAT Pro Deletion"[1], and assumes that the former rule derives (78b) and the latter rule derives (78c) from the same base of (78a) respectively. But the interrogative pronoun what does not appear to be relevant to that which nor does it have any antecedent, so it is derived directly from the form of wh+SOME Pro.

(79) (a) What lay on the table was an issue.

(b) (wh+SOME Pro lay on the table) was an issue.

The formal analysis of wh-words may give an explanation of the difference in the constructions of free relatives and indirect questions.

One further piece of evidence of the different nature of these two sets of pronouns provided by Bresnan and Grimshaw (1978). They observe an interesting morphological difference of wh-words in inter-

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1. See Kuroda (1968) for further detailed discussion of rule formations and derivations of (78b) and (78c).

rogatives and free relatives. What they observe is that though the wh-words of free relatives often appear identical to those of interrogatives, the free relative pronouns can be suffixed by -ever, but this is not true of interrogative pronouns.

(80) (a) I'll buy buy what he is selling.

(b) I'll inquire what he is selling.

(81) (a) I'll buy whatever he is selling.

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

Further, they point out that with some free relative pronouns, -ever is obligatory; with others it is optional.

(82) (a) I'll take whichever you give me.

(b) *I'll take which you give me.

This aspect of free relative pronouns seems to give an answer to Baker's condition on free relatives (see page 17) that free relatives are only headed by what, when, and where, but not by who, which, how, etc. The restricted distribution of wh-words in free relatives could be accounted for by the fact that the latter group of wh-words appear to need -ever obligatorily when they are used in free relative pronouns. In the case of the former group, although the choice between what in (80a) and whatever in (81a) seems to reveal some slight semantic differences, there is no significant differences in their syntactic category.

In terms of the observations in this chapter, they all suggest that there is a structural difference between free relatives and indirect questions, although a full analysis of the difference lies outside the scope of this thesis.

Chapter 3: Various Proposals of Analysis of English Interrogative in Transformational Grammar.

The study of English interrogative construction has its origins in the earliest stages of transformational grammar. Malone (1978) recently divided the current approaches to the analysis of interrogatives into three parts; pre-Katz and Postal (e.g., Chomsky 1957, Lees 1960, and Klima 1962, 1964), Katz and Postal (1964), and post-K&P studies. This division shows the aspects of the evolution of generative ideas on English Interrogatives in accordance with the development of the hypothesis that cognitive meanings of Base-generated syntactic structures are immune to alteration by any transformational rules which subsequently operate upon those structures. Although this hypothesis was implicit in generative grammar at its launch, it was developed and made specific mainly by Katz and Postal. This led to the revision of various Base rules to provide sufficient conditions for the semantic interpretation of Base-generated syntactic structures, such interpretation to be provided by a semantic component specifically designed for this purpose.

Selecting English interrogatives as one of their major examples in defending the validity of the Immunity Hypothesis, the study by Katz and Postal constituted the most thorough generative treatment of English Interrogatives up to that time but also established the basic theoretical frame for most subsequent generative work in the area. For these reasons, K&P's work on the interrogatives will be taken as the turning point between the early stage and recent stage of works.

Recent studies of English interrogatives take various approaches, so we can hardly generalize in a simple term. However, we could point out the remarkable trends in the analysis of questions in accordance with the theoretical development in TG: one is the development of the universal base hypothesis through the inter-language analyses, and the other is the introduction of various descriptive devices such as syntactic features, logical operators, and indexical references.

1. Pre Katz and Postal's Approaches.

We can start our survey of the syntactic description of interrogatives by considering the types of interrogative sentences discussed by Chomsky in Syntactic Structures (1957). Three types are recognized, examplified by (2)-(4), each being a transform of the kernel sentence (1).

(1) John ate an apple.

(2) Did John eat an apple?

(3) What did John eat?

(4) Who ate an apple?

The following fragment of a grammar is given, which applying to the structure given as (5), will account for (1)-(4). Chomsky hypothesized that each of these interrogative types is derived from their commonly shared declarative counterpart and suggested the following interrogative transformations (6) and (7) that may be applied to the underlying structure (5).

(5) $[\text{John}]_{NP}\ [\text{Past}]_{C}\ [\text{eat}]_{V}\ [\text{an apple}]_{NP}$

(6) Tq: structural analysis: $\left\{\begin{matrix} \text{NP-C-V...} \\ \text{NP-C-M-...} \\ \text{NP-C+have-...} \\ \text{NP-C+be-...} \end{matrix}\right\}$

structural change: $X_1 - X_2 - X_3 \rightarrow X_2 - X_1 - X_3$

(7) Tw:

Tw_1: SA: X-NP-Y

SC: same as (6)

Tw_2: SA: NP-X

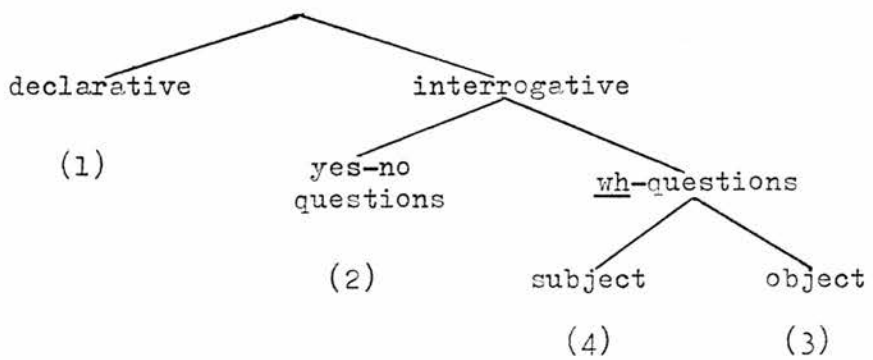
SC: $X_1 - X_2 \rightarrow$ wh+X_1 - X_2, where

wh+ animate noun ⟶ who
wh+inanimate noun ⟶ what

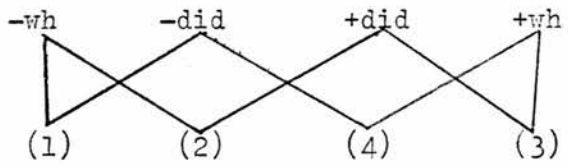
Rules (6) and (7) are optional, but (7) may only apply to the output of (6).

His analysis is based on the observation that the relevant English Interrogatives manifest in sentence-initial position specific constituents (a cross-section of auxiliary, nominal question words) whose functional counterparts in corresponding declaratives (an overlapping cross-section of auxiliaries, NPs) may occupy various non-initial positions. Moreover, formalizing Tq and Tw, he succeeded in explicating yes-no interrogatives from non-interrogative patterns as straightforward cases of FRONTING. Roughly the division of (1)-(4) can be diagramed as follow:

(8)



(9)



While the diagram (8) is a functional grouping, diagram (9) represents the possible combinations of +wh and +did to show the formal relationship among the sentences (1)-(4). The functional node "interrogative" provides a necessary condition for the formal node +did, via T_Q whose dislocation of $[\text{Past}]_C$ ultimately triggers the Do transformation. But this condition is not sufficient, since by a structural accident T_{W_1} in (7) neutralizes the effects of T_Q in the case of (4). Thus the structural meaning of the formal node -did differs from (1) to (4): in (1) the absence of <u>did</u> signals the absence of interrogativity whereas in (4) we are dealing with a neutralization of relevant signals.

Lees' work (1960) on interrogatives can be characterized in terms both of taking note of a variety of necessary restrictions or extensions of Chomsky's rules and of his expanding his analysis to cover embedded interrogatives. First, Lees informally mentioned some restrictions: e.g., "when a nominal is an adverbial prepositional phrase, it may not be pulled out by Lees' WH-rule" or "nominals which are within abstract nominalization may not in all cases...be questioned with WH." These restrictions are said to be illustrated by the ungrammaticality of (10) and (11).

(10) *What did John send the package [to ____]$_{PP}$

(11) *What do you believe [the claim that Otto was wearing ____]$_{NP}$

Other of Lees' explicitly formulated extensions and restrictions

within the basic Chomsky's framework (1957) mainly involved more refined specification of what may or may not be moved by the interrogative rules. For instance, (P) Noun (PNM), which he describes as permissible string to move with a noun attached to WH, allows WH-movement to front a preposition (P) or a post nominal modifier (PNM) along with their questioned nouns.

(12) With whom did Al go [___]$_{P}$ [___]$_{Noun}$

(13) What in the world does she want [___]$_{Noun}$ [___]$_{PNM}$

Lees extended his treatment to <u>where</u>, <u>why</u>, etc. as adverbials as well as the nominals <u>who(m)</u> and <u>what</u> within his WH-rule. But in order to include adverbials within his WH-rule, Lees has to complicate the structural description of the frontable term from (P) Noun (PNM) to $\begin{bmatrix}(P)\ \text{Noun}\ (PNM)\\ \text{Adv.}\end{bmatrix}$. This formal complication has been solved by the further study of <u>wh</u>-forms in Katz and Postal (see Chapter 2).

Although Chomsky's <u>Syntactic Structures</u> model does not discuss embedded interrogatives, Lees accommodates them in terms of a pair of generalized transformations which insert, in appropriate matrix slots, constituent sentences that have been processed by a WH-rule but not by the basic interrogative rule (Auxiliary Fronting). The first condition explains why embedded interrogatives normally share a <u>wh</u>-form with independent counterparts, while the second condition is designed to explain the absence in embedded interrogatives of the auxiliary fronting.

(14) (a) independent: What could Jack ____ do ____?

(b) embedded: (I don't know) what Jack could do ____.

However if this analysis relates independent and embedded <u>wh</u>-questions,

it fails to provide for a relationship between independent and embedded wh-less questions as exemplified in (15), since there is no common form to relate between them.

(15) (a) Could Jack do it?

(b) (I don't know) whether Jack could do it.

We shall return to a detailed analysis of this relationship. Klima (1964) appears to have made an insightful analysis of the interrogatives. Firstly, he introduces the underlying interrogative element WH, one of whose function is to relate questions grammatically to the declaratives that those questions correspond to. Secondly, Klima observes that several grammatical aspects in questions are common to other types of sentences such as negatives and restrictives, and he sets up a common grammatico-semantic feature, namely [+AFFECTIVE], to account for these aspects.

As we have seen the rules in (6)-(7), Syntactic Structures model explicated WH-interrogatives with wh-objects as undergoing two frontings, frontings moreover which share precisely the same structural change, $X_1 - X_2 - X_3 \longrightarrow X_2 - X_1 - X_3$. The absence of the motivation for the manner of operation of these rules in Chomsky's formulation is underlined by Klima's analysis that all English Interrogatives contain a sentence-initial interrogative marker WH in their deep structures and that it is this element which triggers both frontings. Although this analysis was subsequently challenged by Katz and Postal for its violation of the Immunity Hypothesis, its syntactically motivated postulation of a deep structural element (WH) is just the sort of evidence which was soon to culminate in the Immunity Hypothesis itself.

Also, while Chomsky's model proposed that wh-forms are derived from wh+NP, for any arbitrary value of NP, Klima porposed that they be derived from WH + {somebody, something}. This analysis forms an insightful, initial approach in studying the internal structure of wh-forms, but also foreshadows matters raised by the Immunity Hypothesis such as unique recoverability of transformationally deleted elements.

Klima's analysis can differentiate the deep structures for the sentences in (1)-(4) as follows:

(16) $[\text{John}]_{\text{Nom}}\ [\text{Past}]_{\text{Tense}}\ [\text{eat}]_{\text{V}}\ [\text{an apple}]_{\text{Nom}}$

(17) $\text{WH}\ [\text{John}]_{\text{Nom}}\ [\text{Past}]_{\text{Tense}}\ [\text{eat}]_{\text{V}}\ [\text{an apple}]_{\text{Nom}}$

(18) $\text{WH}\ [\text{John}]_{\text{Nom}}\ [\text{Past}]_{\text{Tense}}\ [\text{eat}]_{\text{V}}\ [\text{something}]_{\text{Nom}}$

(19) $\text{WH}\ [\text{someone}]_{\text{Nom}}\ [\text{Past}]_{\text{Tense}}\ [\text{eat}]_{\text{V}}\ [\text{an apple}]_{\text{Nom}}$

The constituent WH in (18) and (19) incorporates into the indefinite nominals like something and someone and brings these elements to the sentence initial position which surfaces as what and who. WH in (17) shows its function of inverting word order, though it does not have a phonological form. The rule WH-Attraction brings $[\text{Past}]_{\text{Tense}}$ to the immediate right of WH before the latter is deleted by WH-Deletion. Klima sets a condition on WH-Deletion as follows: "In direct yes-no questions the constituent WH does not have a phonological form, i.e., a WH without incorporated constituents and which has not assumed the functions of a subordinate conjunction (i.e., whether) is deleted, i.e., Ø-will-somebody-see-something and not whether-will-somebody-see-something." Klima's postulation of underlying WH is purchased at the cost of introducing a rule not required by Chomsky's analysis, namely WH-Deletion. But this cost is offset by WH's non-

deletion in embedded sentences, where it eventually surfaces as whether, a factor which remedies the defect in Lees' treatment of embedded yes-no type questions discussed above.

Moreover, Klima observes that some syntactic aspects in interrogative sentences are also found in a number of other sentence types. For instance, he observes that the nature of NEG, which is the element to represent for negative sentences, is related to that of WH.

> NEG is similar to WH both in its constituent structure and in its relationship to the symbols with which it occurs. The effect of the preverbal particle NEG in motivating the occurrence of the indefinites is matched by the similar effect of WH, which similarly has as its scope the whole sentence. Moreover, NEG shares with WH not only the possibility of attachment with a great variety of constituents, but also the capacity of motivating inversion (op.cit.: 297).

He also points out similar aspects in restrictives, conditionals and adversatives. To account for these facts, Klima sets up a grammatico-semantic feature [+AFFECTIVE] which represents similar functions among the elements like WH, NEG, ADV. For instance, preverbs of the type ever, as well as some-any alternants, occur whenever a sentence is marked as containing [+AFFECTIVE].

(20) (a) Only young writers ever accept suggestions with any sincerity.

(b) Only his sister expects him to write any more novels.

(21) (a) ∅ (WH without incorporations) do young writers ever accept suggestions with any sincerity?

(b) Who (WH+somebody) expects him to write any more novels?

(22) (a) Nobody (NEG+anybody) ever accepts suggestions with any sincerity.

(b) Nobody expects him to write any more novels.

We have discussed three principal works on English Interrogatives

in the early stage of transformational grammar which provide many insights into the syntactic nature of interrogatives. Although there may be defects of the descriptive formulations, in particular, Klima's suggestion of the necessity of the deep structure element WH may be regarded as an important step in the analysis of interrogative formation.

2. Katz and Postal's Analysis.

Katz and Postal's treatment of English Interrogatives, as we mentioned above, is characterized by their coverage of semantics, both directly in the constructs they set up in the semantic component and indirectly in various aspects of their syntactic analysis (K&P, op.cit.). K&P proposed that questions be marked as such in deep structure, and that the constituent being questioned also be identified; they posited the deep structure morpheme Q to carry out the first of these functions, and WH the second. For instance, they posit distinct deep structures for the interrogatives (2)-(4), namely (23)-(25) respectively.

(23) $Q[\text{wh-either-or}]_{Adv}\ [\text{John}]_{NP}\ [\text{Past}]_{AUX}\ [\text{eat}]_{V}\ [\text{an apple}]_{NP}$

(24) $Q[\text{John}]_{NP}\ [\text{Past}]_{AUX}\ [\text{eat}]_{V}\ [\text{wh-some-thing}]_{NP}$

(25) $Q[\text{wh-some-one}]_{NP}\ [\text{Past}]_{AUX}\ [\text{eat}]_{V}\ [\text{an apple}]_{NP}$

But for the constituent $[\text{wh-either-or}]_{Adv}$ in (23), the deep structures (23)-(25) bear a clear similarity of form to Klima's (17)-(19). Specifically, K&P's Q replaces Klima's WH and K&P's WH is already a co-constituent of the NP, while in Klima's analysis the NP comes to be associated with WH by a transformation. The functional analog of Klima's Incorporation Into WH is K&P's rule (T1), by which a wh-constituent is fronted (K&P, op.cit.: 104-105):

(T1) # + (Q), X, Noun Phrase, Y ⟶ 1, 3, 2, 4 (optional except where 1 does not contain Q)

1 2 3 4

where 3 dominates a sequence which begins with WH.

K&P assume that this rule operates for relative phrases and certain complement phrases as well as for questions. This rule implies that the constituent Q is not a necessary condition for wh-word movement since wh-word movement may occur with or without the appearence of Q. K&P mention the condition of occurrence of Q and WH as follows:

> In no case does Q occur without an occurrence of WH, although the converse is not the case, since WH occurs in various nominalizations, relative phrases, certain complement phrases, etc. This indicates that they are independent elements (K&P, op.cit.: 97).

There is one major problem with the analysis proposed by K&P: if Q and WH can be independently chosen, strings containing only a WH will not yield a surface structure. K&P propose that such strings are, in any case, necessary for relative clauses and indirect questions. Here we may ask whether relative clauses and indirect questions can be derived from a same deep structure which is the condition for the rule (T1). Since, as we discussed in the previous chapter, relative clauses and indirect questions appear to have different structures. Moreover, if we follow K&P's proposal, then we may need some kind of "blocking" mechanism in cases where an S dominating WH but not Q is generated in non-embedded position.

Another assumption of this rule is that the 'questioned' NP include where, when, how, etc., which Lees classified as adverbials, as well as who and what. K&P assume that the questioned constituents are reduced versions of Preposition + Noun Phrase structures roughly of the form in what way, at what time, to what place, etc. This

revision of the deep structure of wh-words is to simplify the description of rules and to capture the indefiniteness of wh-words by introducing PRO-form such as place, time, way, one, thing, etc. in their deep structure.

K&P's rule (T2), which is in effect 'Q-Attraction', corresponds to Klima's WH-Attraction:

$$(T2)\ \#\ +\ Q,\ X,\ \underset{1}{\text{Noun Phrase}},\ \underset{2}{\text{Tense}}\ +\ \underset{4}{\left\{\begin{matrix}\text{null}\\ \left\{\begin{matrix}\text{have}\\ \left\{\begin{matrix}\text{be}\\ \text{Modal}\end{matrix}\right\}\end{matrix}\right\}\end{matrix}\right\}},\ \underset{5}{\left\{\begin{matrix}\text{Verb} + Y\\ Y\end{matrix}\right\}}$$

$$\longrightarrow 1, 2, 4, 3, 5 \quad \begin{matrix}\text{(obligatory except where is a}\\ \text{Sentential Adverbial)}\end{matrix}$$

where 2 dominates WH.

K&P explain this rule as follow: "Rule (T2) provides the shift of the Auxiliary constituent with the preceding Noun Phrase in cases of yes-no questions and cases where a WH-'questioned' constituent has been moved to the far left between Q and the subject Noun Phrase by Rule (T1)."

But further comparison shows an apparent complexity on the part of K&P, who posit two rules corresponding to Klima's WH-deletion: the rule (T5) which deletes Q and the rule (T3) which deletes $[\text{wh-either-or}]_{Adv}$ except in embedded interrogative where it surfaces as whether.

$$(T3)\ \#\ +\ Q,\ \underset{1}{\text{Sentential Adverbial}},\ \underset{2}{X} \longrightarrow 1,\ \text{null},\ 3 \quad \text{(obligatory)}$$

where 2 dominates WH.

$$(T5)\ \underset{1}{X},\ Q,\ \underset{2}{Y} \longrightarrow 1,\ \text{null},\ 3 \quad \text{(obligatory)}$$

where 3 is not equal to # .

Katz and Postal offer both syntactic and semantic evidence as

well as theoretical considerations in defense of their analysis. Their primary motivation for the meaning-preserving requirement is in order to simplify the process of relating syntactic structure to semantic representations: all meaning could be scanned from deep structure alone since every semantically different surface structure had a different deep structure. Their semantic arguments have to do with synonymity, paraphrase relations, and simplification of the projection rules. The fundamental constructs of the semantic component for interrogatives are an informally stated reading rule for Q as follows:

> (26) The speaker requests that the hearer provide a true sentence one of whose readings is identical with a reading belonging to the set associated with the constituent with which the reading of Q will be amalgamated except that any wh-bracketed substring of such a reading must have some additional semantic markers.

The theory that semantic interpretations are determined by the operation of projection rules exclusively on the sequence of underlying P-markers requires that those elements which are 'questioned' be specified in underlying P-markers. In brief illustration of (26), we can take (24) as the deep structure of (3). Since the "constituent with which the reading Q will be amalgamated" is always the right sister of Q under S, i.e., the Sentential Nucleus, which in this case is John Past eat wh-some-thing, then the "true sentence" requested must be synonymous (have an identical reading) with one sense of John Past eat wh-some-thing except that the "wh-bracketed substring" some-thing "must have some additional semantic markers", i.e., some-thing must be replaced by an appropriate noun.

Therefore, Q accounts for the paraphrase relation that holds between the questions in example (27) below, and the respective sentences in example (28):

(27) (a) Did Bill see John?

(b) Who saw John?

(c) Who(m) did Bill see?

(28) (a) I request that you answer: "X Bill saw John."

(b) I request that you answer: "X saw John."

(c) I request that you answer: "Bill saw X."

K&P assume that X in (28a) is one of a special class of sentence adverbs including yes, no, of course, etc., while X in (28b) and (28c) is a nominal.

In the syntactic justification for their analysis, K&P take Klima's analysis to task for its inability to cover wh-questions which have more than one wh-form, like (29).

(29) Who brought what?

The criticism can be justified on two arguments. Firstly, Klima did not mention whether his WH can incorporate into two different nominals at the same time, so it is uncertain how more than one wh-word can appear in a simple sentence. Secondly, although his WH could incorporate into more than one constituent at the same time, it still cannot help to derive correct sentences like (29). Since Klima's Incorporation Into WH rule in effect makes fronting a necessary condition for the introduction of WH, his rule may derive wrong sentences like *Who what brought. K&P solved this problem by associating WH with the NP at the deep structure level and formulating their rule (T1) such that only one wh-constituent may be fronted. Then, while Klima viewed yes-no questions as just those interrogatives whose presentential interrogative marker WH has not incorporated any constituent, K&P elaborate the constituent in yes-no questions to wh-either-or for

a variety of considerations including the morphological similarity and syntactic relations between interrogative whether and declarative either...or.

Katz and Postal give further syntactic justification in the form of facts relating to selectional restrictions. They note, first, that questions exclude sentential adverbs such as certainly and probably. Among the examples they give are the following:

(30) Certainly he is a doctor.

(31) *Certainly is he a doctor?

(32) *Certainly who is a doctor?

They note further that declaratives and questions do not imposed the same restrictions on the occurrence of such words as scarcely and hardly and such pairs of related indefinites as some-any and sometimes-ever. Among other examples, they cite the following[1]:

(33) (a) He scarcely eats.

(b) *Does he scarcely eat?

(34) (a) He sometimes eats.

(b) *Does he sometimes eat?

(35) (a) *He ever eats.

(b) Does he ever eat?

K&P remark that "these selectional facts can evidently best be stated if there is a Q morpheme in the underlying P-markers of simple truth-value questions" (K&P, op.cit.: 88), and then go on to assert the same for wh-questions.

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1. For some speakers, the examples like (33b) and (34b) appear to be grammatical in a suitable contexts.

However, Stockwell et al. (1973) pointed out the inadequacy of this argument:

> The sentence adverbials do not really constitute a clear case, because some of them (e.g., probably) are acceptable in questions, while others (e.g., certainly) are not, as shown in the following:
>
> a. Will he {probably / *certainly} come?
>
> b. When will he {probably / *certainly} come?
>
> c. Why did he {probably / *certainly} come?
>
> For this reason, it seems to us that there is not a grammatical cooccurrence at work here, as K&P think, but a semantic incompatibility. In that case we do not want to ascribe the incompatibility to any one node, but we want to have the semantic component declare the whole sentence as unacceptable.

K&P also argue that the trigger node Q provides a form of explanation for the inversion of auxiliary and the subject and for the fronting of WH. However, as Klima observed, the inversion of auxiliary depends on the sentence-initial position of any [+AFFECTIVE] morpheme, including NEG and WH. And also wh-fronting can occur without Q-morpheme by their own rule (T1). Therefore, both auxiliary inversion and wh-fronting can not be explained solely by the presence of Q.

There seems, then, to be little firm evidence to support K&P's claim that Q is necessary in the description of syntactic aspects of interrogatives. Moreover, we can find further inadequacies by examining their postulation of Q in indirect questions. This leads to serious difficulties in their account of the semantic properties of questions. The performative reading of their Q, while appropriate for direct questions, is quite inappropriate semantically for indirect questions such as those in (36).

(36) (a) I wonder where all the flowers have gone.

(b) Jack told Lyndon where all the flowers had gone.

(36) (c) Where all the flowers have gone is a difficult question.

(d) Where all the flowers have gone is beside the point.

In none of these sentences is the speaker requesting information from the hearer, and when an embedded question is in fact used to request information such as I ask you who did it, this semantic value is supplied by the main clause containing the controlling predicate. Clearly, then, positing a Q with performative value for the embedded questions in (36) would lead to incorrect semantic predictions.

Most of the problems may arise from K&P's adoption of the Immunity Hypothesis and in particular its corollary that deep structures must contain all the information relevant to semantic interpretation. With specific reference to Q and WH, the following passage is relevant.

> The function of Q is to indicate that the P-marker containing it underlies a question. Question-relevant occurrences of WH in a P-marker that contains Q have the function of picking out those elements in the P-marker which are 'questioned'. In other words, WH operates as a scope marker for Q (K&P, op.cit.: 113).

K&P's original motivation of postulating Q and WH in deep structure seems to rely entirely on explaining semantic aspects of interrogatives. But since K&P represent it as the form of grammatical category, they try to assign them syntactic functions later. This approach may lead to the poor justifications of Q and WH in the syntactic side of interrogatives. And also it causes incompatibility between the semantic and the syntactic functions assigned to the same elements for the description of interrogatives.

3. Recent Studies on English Interrogatives.

Katz and Postal's analysis of interrogatives has not remained unaltered

by the recent studies, mainly because their proposal of Q, which has both syntactic function and semantic reading, cannot be fully justified on either syntactic or semantic grounds. K&P's ideas on the description of interrogatives are developed in two different ways: one in terms of Q-morpheme, the other in terms of the performative analysis.

Baker (1970) takes the sentence-initial segment Q for his analysis of interrogatives. Noting a number of similarities between direct and indirect questions, Baker postulates an abstract Q-morpheme for both types of questions. This Q-morpheme would not have an illocutionary force, since K&P's Q was not adequate to apply to both direct and indirect questions in a parallel way simply because of its performative function. Baker also assigns a significant syntactic role to the Q-morpheme. Its first function is to account for such universal properties of questions as the presence or absence of wh-question movement in various languages. Its second function is to account for the matter of scope in questions.

Baker begins by observing that the data given in Greenberg (1966) suggest a strong correlation between the position of yes-no particles and other question words such as who, what, etc. referred to as wh-words. All the VSO languages have an initial yes-no particle and usually put their wh-words at the beginning of the sentence[1]. The SOV languages usually place their yes-no particles at the end of the sentence, and rarely move their wh-words to the beginning of the sentence. In this type of language, some languages, like Japanese and Korean,

---

1. Baker also observes that no SVO language simultaneously marked its yes-no questions with a sentence-final particle and moved other question words to sentence-initial position.

usually retain their yes-no particles in wh-question, as the following examples show:

(37) Kore wa anata no desu ka?
this as-for yours is Q-particle
'Is this yours?'

(38) Dare desu ka?
who is Q-particle
'Who is it?'

But also many other languages which have a question-final particle of this sort for yes-no questions do not retain it in questions containing other question words.

Baker's main concern is with languages which have question-word movement. He observes that languages which do move their wh-words to the clause-initial position never have a yes-no particle together with wh-words. Thus, in English it is impossible to have both if or whether and wh-words such as who or what in the same simple sentence. E.g., (39) is ill-formed.

(39) *Mary knows whether who(m) Magdalene saw.

Moreover, in the languages that Baker considered, only one wh-word could be moved to the beginning of the sentence.

(40) (a) Who gave what to whom?

(b) *Who what gave to whom?

(c) *Who what to whom gave?

Baker argues that all these facts can be explained by the existence of Q and the restrictions on the transformational behaviour of particular constituents Q and WH. In order to account for these facts Baker proposes the following mechanism.

I. There is an abstract Q-morpheme which in the SVO and the VSO languages is placed at the beginning of the sentence, and in SOV languages at the end of the sentence,

II. if we view the Question Movement transformation such as a replacement of the Q-morpheme, then there can only be a single replacement of the Q-morpheme,

III. morpheme such whether or if are introduced into trees as lexical realization of the Q-morpheme.

Among these three assumptions, the position of Q-morpheme in (I) is to justify a movement rule for questions as a universal rule in accordance with Baker's hypothesis that "only languages which position their particles for yes-no questions in clause-initial position permit a movement rule for questioned constituents; in such languages, the only permitted structural change is the moving of the question constituent to clause-initial position" (Baker, 1970: 133).

The assumptions in (II) and (III) provide an explanation of how the generation of the ill-formed sentences like (39), (40b), and (40c) can be blocked in his analysis. The assumption in (II) makes it impossible to perform another wh-movement because there is no Q-morpheme left after the replacement has occurred. So his analysis can block the generation of sentences like (40b) and (40c). The assumption in (III) also offers a blocking mechanism for ill-formed sentences like in (39): one cannot introduce such words as if or whether after the application of wh-question movement - that is the replacement of the Q-morpheme - because these words are lexical realizations of the Q-morpheme itself.

Though Baker's postulation of sentence-initial morpheme Q accounts for several syntactic aspects in English Interrogatives, his Q-morpheme hypothesis based on universal grammar is weak in that we can find counter examples. Baker himself noted the conditions under

which a language might qualify as a counterexample to his Q replacement hypothesis (op.cit.: 136):

(a) Some question-particles are found sentence-initially in both yes-no and constituent questions.

(b) Movement rule operates to move questioned constituent to position adjacent to question particle.

We find discussion of this matter in Epee (1976) and Wachowicz (1978). Epee gives some data from Duala, which is a Bantu language spoken in Cameroun, to argue against Baker's hypothesis. More specifically, Epee notes that although Duala has a yes-no particle that occurs clause initially, the rule of wh-movement (which moves questioned constituents leftward) cannot replace Q. He observes the following sentences in which the yes-no particle nga and a preposed wh-word cooccur.

(41) (a) nga Kuo a pula nde nje, momene nde a bi
Q Kuo he want Focus what himself Foc. he know
'What Kuo wants only he knows'

(b) nga nje Kuo a pula no, momene nde a bi
Q what Kuo he want himself Foc. he know

(42) (a) nga a wa njika buna, a si langwedi mba
Q he return wh-day he not tell me
'When he will return, he did not tell me.'

(b) nga njika buna a wa no, a si langwedi mba
Q wh-day he return he not tell me

In the above examples, we find differences between two forms of the same question: in (41a) Focus particle nde occurs before nja 'what' but not in (41b). On the other hand, the (b) sentences above, unlike their (a) counterparts, contain the marker no, which shows, according to Epee, that the wh-word has been moved leftward past the main verb. Epee argues the weakness of Baker's hypothesis with these examples as follows:

> If we follow Baker in assuming that the yes-no particle nga is the lexical realization of the Q morpheme, and that WH Movement applies only in the presence of that morpheme (the argument used to block multiple wh-preposings), then there will be no way of accounting for the well-formedness of the sentences in (41b) and (42b).

Another discussion against Baker's hypothesis is found in Wachowicz (1978). He illustrates examples in Polish and Russian which perform several question movements.

(43) Kto co powiedział? Polish
who what said
'Who said what?'

(44) Kto cto skazal? Russian
who what said
'Who said what?'

The counterexamples discussed above show that the Q-morpheme hypothesis cannot be maintained to be universal, though this analysis still appears to work for English.

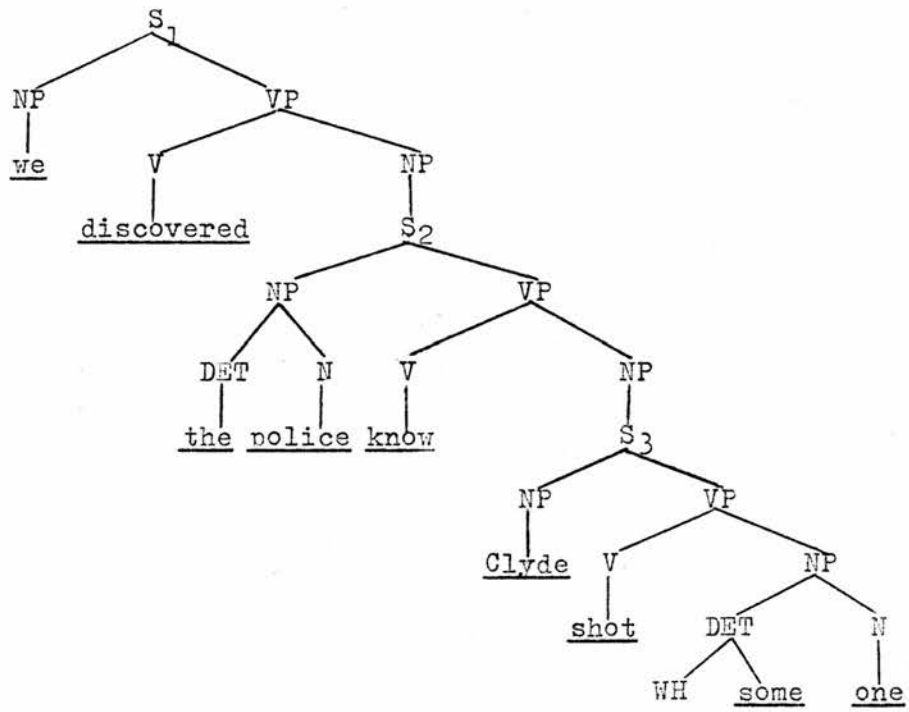
Another important assumption in Baker's Q-morpheme hypothesis is that he regards the Q-morpheme as an operator which makes it possible to describe the connection between the operation of the movement rule in a particular sentence and the semantic interpretation given to that sentence. In order to account for this function, Baker begins by noting that each question word such as who or where that appears in a complex sentence is understood as being associated with some particular clause within that sentence, in addition to being understood as originating at a particular node in a deep structure. Moreover, he notes that the associated clause is not necessarily the one which most immediately contains the node at which the questions word or constituent originates. Then he gives sentences (45) and (46) which are not synonymous, despite the fact that in each of them the word who is understood as an object of the verb shot.

(45) We discovered that the police know who Clyde shot.

(46) We discovered who the police know Clyde shot.

Baker claims that an analysis which posits a question morpheme Q only for direct questions and which derives indirect questions only from the presence of WH in certain noun phrases cannot represent the difference between (45) and (46). If there is no Q morpheme for embedded sentence, both (45) and (46) would share the same deep structure given in (47).

(47)



The questioned constituent originates at the same node in both structures but it is associated with the clause whose Q it replaces; that is with S_3 for (45) and with S_2 for (46). Therefore Q-morpheme is necessary to be introduced in the deep structure of indrect questions as well as direct questions to refer to the scope of the moved wh-words.

He goes on to argue for the necessity of the operator-view that this clause-initial Q must be an operator which binds one or more underlying noun phrases, to account for the putative ambiguity of sen-

tences like (48), sentences with two or more interrogative clauses and several question words.

(48) Who remembers where we bought which book?

Both the main and subordinate clauses in (48) are interrogatives, and the sentence contains three question words, who, where, and which. The putative ambiguity pertains to semantic scope. On one interpretation, the primary one, who is associated with the (direct) interrogation of the main clause, while both where and which are associated with the (indirect) interrogation of the subordinate clause. (49a) would be an appropriate answer to (48) under this interpretation; only question words associated with direct interrogation are replaced when a question is answered. On the other interpretation, both who and which may be associated with the main clause interrogation, and only where with the interrogation of the subordinate clause. (49b) would therefore be an appropriate response to (48) on this second reading.

(49) (a) Elvin remembers where we bought which book.

(b) Elvin remembers where we bought the philosophy book, and Merle remembers where we bought the physics book.

If this is a true ambiguity, it follows that the Q and WH posited for interrogative deep structures by K&P are not sufficient to determine the semantic representations of questions. Using only Q and WH as deep structure markings, (48) will have precisely the same deep structure under either interpretation:

(50) [Q WH+some one remembers [Q we bought WH+some book at WH+some place]]

Baker proposed remedying this difficulty by treating Q as an operator. In the deep structure of an interrogative sentence, each questioned constituent is indexed to correspond to some particular occurrence

of Q. A questioned constituent is then said to be semantically in the scope of the Q whose index it bears. The respective deep structures of (48) under the two alternate interpretations are given in (51).

(51) (a) [Q_i some-one$_i$ remembers [$Q_{j,k}$ we bought some-book$_j$ at some-place$_k$]]

(b) [$Q_{i,j}$ some-one$_i$ remembers [Q_k we bought some-book$_j$ at some-place$_k$]]

If Q serves as an operator, WH is superfluous as a deep structure marker, for indices are sufficient to specify which constituents are being questioned. Baker, therefore, posits a transformation which inserts the semantically redundant WH on every determiner marked with an index.

So far, we have observed Baker's several arguments about Q-morpheme: that is, Q-morpheme is replaced or lexicalized by the rules and it functions as an indexed operator. Now, we will discuss a couple of arguments against Baker's analysis.

One criticism raised by Langacker (1974) concerns the ad hoc nature of Baker's rule that Q is lexicalized as the question particle whether or if by rewriting rule. Langacker pointed out that though we can write such a rule, Baker does not provide any reason why we should write such a rule, nor does his rule have any explanatory value. Further arguments are given as follows (Langacker, 1974: 21):

> From the point of view of morphology, this rule fails to reveal that whether is a WH word or that it is related to the either-or disjunction; both points were accommodated in K&P's 1964 analysis. From the point of view of semantics and lexicon, this rule fails to explain why Q, with no semantic value other than its indexing function as operator, should have segmental representation at all, let alone as the particular items whether and if (as opposed, say to dog or and).... Finally, the rule does not do justice to the question-particle phenomenon from the standpoint of universal tendencies or historical development.

K&P's analysis of whether as wh+either-or maintains that yes-no questions are special cases of the much larger class of alternative questions, illustrated in (52), and that the latter in turn are special cases of WH questions, in which WH happens to be attached to either-or rather than to some. According to this analysis, then, (52d) will have the derivation sketched in (53).

(52) (a) Is it raining, or is it snowing, or is it just getting dark outside?

(b) Did you buy this car, or did you steal it?

(c) Can he swim, or can't he (swim)?

(d) Can he swim?

(53) (a) WH+either-or [[he can swim] [not [he can swim]]]

(b) [WH+either-or [he can swim]] [WH+either-or [not [he can swim]]]

(c) [WH+either-or [he can swim]] [WH+either-or [not [he can]]]

(d) [WH+either-or [he can swim]] [WH+either-or [not]]

(e) [WH+either-or [he can swim]]

(f) [WH+either-or [can he swim]]

(g) Can he swim?

However, according to Baker's assumption that whether is the unanalyzable lexicalization of Q, whether neither contains WH nor bears any relation to the either-or conjunction. One consequence of this assumption is that the ungrammaticality of sentences like (54) is unexplained and must be accounted for by some ad hoc restriction or an ad hoc rule that deletes either in the presence of whether.

(54) *I wonder whether either it will snow or not.

In an analysis that derives whether from WH+either-or, the inability of whether and either to cooccur is automatically explained. Although the restriction can be stated simply enough, it does not follow from

anything in Baker's analysis.

Another criticism of Baker's analysis relates to the proposal of the index mechanism is proposed to account for the WH-Q binding relation. Kuno and Robinson (1972) argue that the indexing mechanism is neither necessary nor sufficient to account for the binding relationship between Q's and WH words. Their assumption on this matter comes from the observation of general aspects of WH-Q movements in multiple WH-questions.

Then they set up several constraints on Q-binding mechanism such as the Clause Mate Constraint on Multiple WH words: that is, multiple wh-words bound by the same Q must be clause mates at the time of application of WH-Q movement, and constraints on WH crossing and double dislocation. But they find that Baker's mechanism of Q-binding made in (51b) allows a Q to bind two or more wh-words that may not be clause mate, so it appears to violate their constraint. To explain this interpretations, they begin their examination of Baker's (w0)n example. Kuno and Robinson maintain that sentences like (48) are not really ambiguous. They observe that the only evidence adduced for the ambiguity of (48) is the possibility of answering it in either of two ways, e.g., by (49a) and (49b). However, they point out that the same two kinds of answers are possible even when the sentence has no scope ambiguous question word; hence either (56) or (49b) could be used to answer (55).

(55) Who remembers where we bought those books?

(56) Elvin remembers where we bought those books.

The fact that the question like (55) can have an answer like (49b) has nothing to do with Q-binding because it cannot be the case that the

matrix Q binds those books, which does not involve any WH word. It suggests that the possibility of answering (48) in either of two ways should not be accounted for in terms of any structural ambiguity requiring deep structure indexing.

In spite of all the above criticisms, it is true that Baker's analysis of questions has achieved a number of generalizations through his universal Q-morpheme hypothesis which is based on the relationships between the underlying word order and a group of transformational rules. Moreover, his treatment of Q-morpheme as an operator for scope relations gives new ideas for the analysis of interrogative structures. However, the postulation of Q-morpheme itself has been attacked in terms of the general descriptions of grammar, since the hypothesis of deep structural question elements implies the markedness of interrogatives, whereas the declarative sentences have no such special element triggering transformation. When we remove Q and WH from the deep structure of interrogatives, then it turns directly into the deep structure of corresponding declarative sentence. If an analysis is possible in which the syntactic and semantic effects of Q can be derived without the need for the special marker or at least with the marker which is shared by other types of sentences, the grammar will obviously be simplified. Further, such a simplification could lead to a simplification of grammatical theory as well.

There have been at least two analyses to assimilate the deep structure of interrogatives to that of declaratives from this point of view: one is Bresnan's COMP hypothesis, another is the governing performative-predicate hypothesis initiated by Bach. Both approaches which are based on a universal base hypothesis seek a certain parallel

way to describe interrogatives and declaratives with a common term.

Bresnan (1970) observes several facts suggesting that the COMP-node for complementizers in English must be specified in deep structure not only for the complement sentences but also for matrix sentences. Further she assumes that WH (=Q), as well as <u>that</u> and <u>for</u>, is one of the subtypes of sentential complementizers in English. She justifies this assumption by the following facts.

Firstly, both COMP and WH occur in the clause initial position. In English complementizers maintain clause-initial position: this is true in all types of complement constructions and for all types of complementizers, so that if WH is a complementizer, the following paradigms are to be expected (Bresnan, 1970: 313):

(57) OBJECT COMPLEMENTATION

I know that he is wise.
I prefer for you to speak English.
I am asking whether you will accompany me.

(58) SUBJECT COMPLEMENTATION

That he was alone was obvious from the report.
For you to leave right now would be inconvenient.
Whether he eats cabbage or not simply doesn't matter.

(59) COMPLEX NP COMPLEMENTATION

The idea that nobody will survive is appalling.
The command for all troops to move out was given Friday.
The question whether they'll strike remains unanswered.

(60) COPULAR COMPLEMENTATION

Your problem is that you are arrogant.
The command was for all troops to move out.
The main question is whether they will support us.

(61) ADJOINT COMPLEMENTATION

For his son to enjoy the army, he sould have to try very hard.
Whether or not his son enjoys the army, he will try very hard.
That his son would not have to join the army, he joined himself.

Secondly, verbs are subcategorized by complementizer, and also it is known that verbs must be subcategorized for WH.

(62) We {*believed / inquired} whether he was there.

(63) We {believed / *inquired} that he was there.

Further WH shows subcategorizational dependencies:

(64) Whether or not his mouth turns black will show whether or not he's been nipping at the silver nitrate.

(65) *Whether or not his mouth turns black will show that he's been nipping at the silver nitrate.

(66) *That his mouth is turning black will show whether or not he's been nipping at the silver nitrate.

Thirdly, besides behaving like complementizers, WH is also mutually exclusive with other types of complementizers.

(67) *I know that whether he came.

(68) *For whom to own a rifle doesn't affect me.

(69) *It doesn't matter to them whether that you march.

(70) *I asked what for John to do.

Bresnan argues that only if WH is recognized as a complementizer can these facts be related; otherwise it is necessary to add to the grammar a special prohibition against complementizers on 'Q'-clause.

By the above arguments, Bresnan proposes the phrase structure rule like (71) and the lexical or morphological rule in (72).

(71) $\overline{S} \longrightarrow$ COMP S

(72) COMP $\longrightarrow$ {that / for / WH}

Bresnan's rule in (72) states that COMP may be either lexicalized as that or for or re-written as WH[1]. The striking similarity of the

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1. The detailed analysis of COMP-node will be discussed in the second part of Chapter4.

above assumption to Baker's clause-initial Q-morpheme hypothesis leads Bresnan to conclude that Baker's hypothesis must be reformulated in terms of the node COMP.

(73) The Complementizer Substitution Universal:

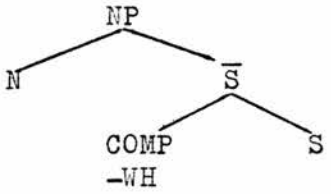
> Only languages with clause-initial COMP permit a COMP substitution transformation.

Bresnan adds that "the term COMP-substitution transformation may be understood informally to apply to any transformation moving a constituent over an essential variable into the position of the complementizer - for example, Relative-Clause Formation and Question Formation, or WH-Movement" (op.cit.: 318).

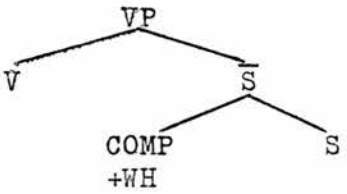
One advantage of this approach is, as Bresnan pointed out, to account for the universal behaviour of WH-movement in relative clauses as well as that of questions, while Baker left it an unsolved problem because of the limitation of his Q-hypothesis to the interrogative formations.

Bresnan's assumptions that WH is a type of complementizer and that relative clauses are derived from complementized clauses leads to another generalization on the relationship between movement rules in Question Formation and Relative Clause Formation and the position of COMP-node in deep structure. Observing the fact that only languages having relative clauses with leftward head yield Relative Clause Formation movement rule, she offers one more assumption, that relative clauses with leftward heads are derived from clauses with leftward complementizers. The specification of complement position provides the structural similarities among declaratives, interrogatives, and relatives as follows:

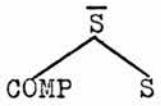
RELATIVE CLAUSE



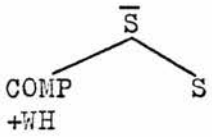
EMBEDDED QUESTION



DECLARATIVE



INTERROGATIVE



As indicated in the above diagrams, Bresnan further specifies the node [COMP, WH] which can be substituted by any fronted wh-word: i.e., the node [COMP,+WH], which is equated to Baker's Q, and the node [COMP,-WH] which will be substituted by any relative pronoun including relative complementizer that.

As being discussed, Bresnan's COMP-hypothesis manages to eliminate the special node like Q by the treatment of interrogatives as the counterpart of declaratives with the same deep structural node and also captures wider generalizations on the universal aspects of languages by defining the leftward directional movements of elements in terms of the position of leftward COMP-node in the phrase structure rule.

Both Baker's Q-morpheme hypothesis and Bresnan's COMP-hypothesis stem from K&P's analysis of deep structure Q-postulation for interrogatives. While K&P's Q was the element having both syntactic and semantic functions, Baker and Bresnan are concerned with the syntactic description of interrogatives, so their Q or COMP can be regarded as purely syntactic devices used for particular universal functions such as relative clause formation, question formation, and the like. They have rejected K&P's performative analysis because of its inadequacy

to describe indirect questions.

There is an approach to the interrogative formations in recent studies that originated from K&P's analysis of the meaning of questions: i.e., the governing performative predicate hypothesis mainly studied by Bach (1971), Ross (1970), and Langacker (1974). They agree with K&P's assumption that the performative meaning of a question should be associated with the deep structure, but they reject the Q-morpheme analysis since the performative Q analysis has the possible desadvantage of postulating non-parallel underlying structures for the parallel semantic relations between an interrogative clause and the specification of its illocutionary force in direct and indirect question pairs such as (76).

(76) (a) Who drank my hemlock?

(b) I ask you who drank my hemlock.

This observation leads them to the assumption that there is an implicit and explicit existence of a performative verb of the type ask which dominates all questions, direct and indirect. A further assumption being made by this is that this performative verb may function as a trigger for all question formation just like an abstract morpheme Q. According to this idea, Langacker (1974) proposes the underlying structure of interrogatives of the form shown schematically in (77), where XVY is a string with a performative verb and C is the questioned constituent:

(77) XVY [... C ...]

He argues that in embedded questions the main clause predicate can be identified with XVY and controls the question formation directly, and in direct questions XVY will be an abstract governing predicate. Langacker justifies his analysis as follows (op. cit.: 16):

> (77) has the potential advantage of showing more directly the parallelism between direct and indirect questions, since it treats the former as just a special case of the latter. In particular, deep (or semantic) structures such as these treat the semantic scope relation between direct question and its illocutionary force as exactly parallel to the scope relation between an embedded question and its controlling predicate.

Further he points out that the performative V bears the direct questions in (78) the same kind of semantic relation that the main clause predicates bear to the embedded questions in (79), and this similarity is directly expressed in deep structures of the form (77).

(78) (a) Who has been eating my porridge?

(b) Do you think he can blow my house down?

(c) How big are your teeth?

(79) (a) I wonder who has been eating my porridge.

(b) Jack asked Peter whether he thought he could blow my house down.

(c) Tell me how big your teeth are.

Besides the fact that the performative V can serve to account for the semantic function in interrogatives instead of K&P's performative Q, Langacker goes on to argue that the governing V can be indexed as an operator and serve to constrain WH-Movement.

The argument about the universal property of the governing predicate to constrain WH-Movement is given by Bach (1971). As we have noticed, Baker's universal hypothesis of Q-morpheme has been derived from the observation of the relationship between the types of word order among languages and the existence of WH-Movement. Instead of postulating a special universal element, Bach tries to show the universal tendency of WH-Movement is directly related to the deep structure position of the predicate. According to this hypothesis, Bach sets up the following Question-word Movement as a universal rule:

(80) $X, \begin{bmatrix} +\text{Verb} \\ +\text{Interrogative} \end{bmatrix}, Y, \left[_{S} Z, \left[_{NP} WH \begin{bmatrix} +\text{Pro} \\ -\text{Def} \end{bmatrix} W \right] R \right], P$

1 2 3 4 5 6 7 ⟶

1 2 3 5+4 ∅ 6 7

Bach suggests several motivations of the detailed formation of this rule in terms of the universal properties of wh-words movement.

First, he notes the indefiniteness of the question-words such as English who, what, where, why, and the like. He observes that question words occur in environments where indefinite noun phrases can occur but not where only definite phrases occur.

(81) (a) Who else was at the party?

(b) Someone else was at the party.

(c) *The man else was at the party.

(82) (a) *As big as what was it didn't scare me.

(b) *As big as a python was it didn't scare me.

(c) As big as the python was it didn't scare me.

Bach also seeks the evidence of indefiniteness of wh-words from the semantic function of questions (Bach, 1971: 158):

> For after all the function of a question is to obtain a specification of the value of x in an open sentence of the form P(x). But it is of the nature of definite noun phrases that they embody a presupposition that the identity of the referent is known to both speaker and hearer, a condition that would seem to rule out a question-word question.

He also supports his assumption by the fact that interrogative words and indefinite pronouns are often morphologically related, even identical in a wide variety of genetically unconnected languages: e.g., in Japanese, dare ka (ka = question particle) means "someone or other" while dare means "who".

The second assumption embodied in the formation (80) is that the WH-phrase may move indefinitely far from its original position, subject only to general limitations on movement rules; that is, the rule is unbounded. The following examples show the case:

(83) Who did you hear Mary say John expects Harry to do.

(84) *I wonder Sally thinks John expects Harry to do.

The third assumption is that the movement of the WH-phrase is toward a verb that governs questions, that is that the rule "attracts" toward a guestion-governing element. Further one consequence of this is that movements will be limited so that the WH-phrase will not go beyond the scope of the governing word.

According to Bach's third assumption, the sentences like (85) which are perfectly grammatical in English must be prevented:

(85) Where he was working was obvious.

Because the word where moved not toward the governing verb but to the clause initial position. To solve this problem, Bach proposes that there are only two possible deep structure types: Verb-final and Verb-initial. For example, the deep structure of English is VSO, even though its surface forms are always SVO. Although there are scholars, like McCawley (1970), who support this hypothesis, it is a controversial hypothesis (see Berman 1974, for a discussion of English as a VSO language).

So far, we have discussed two different approaches relevant to the structural description of questions; the operator analysis and the governing-predicate analysis. One thing on which they agree is that there must be a certain deep structure element in the formation of questions to provide a well-formed structural description and to

account for the universal properties of the movement rule. However, since both studies have advantages and disadvantages of description of questions, the explanatory adequacy of a grammar of interrogative formation remains a problem.

Chapter 4: WH-Movement.

In the previous chapter we have discussed various analyses of questions in relation to the development of the theoretical concerns of grammar. In the course of the discussion, we frequently mentioned wh-word questions informally and we observed several important assumptions having been made with respect to the syntactic aspects of wh-word movement. This chapter will be devoted to a discussion of the formation of transformational rules for wh-question in more detail and various conditions on its operation within the framework of Standard Theory and of Extended Standard Theory.

There have been a number of studies, under the Universal Grammar Hypothesis, trying to establish conditions and restrictions on the application of transformations. These studies have been carried out in order to abstract from the rules some general principles that govern their applications, since the permissible rules cannot express in detail how they function, and one cannot include within the rules themselves the restrictions placed on their application.

We already observed some arguments on this line of studies in the previous chapter. We discussed the necessity of a certain universal constituent such as COMP for the structural description of question formation and relative formation. An example is Bresnan's Complementizer Substitution Universal (1970: 317): i.e., "only languages with clause-initial COMP permit a COMP substitution transformation." This principle presupposes that COMP is a universal element that may appear in various sentence positions and asserts that an item

can be moved into COMP position only when COMP is initial. In particular, "wh-word" - the relativized constituents in relative clauses or questioned constituents in interrogatives - can be moved only to the left, such movement being permitted only when there is an initial COMP in the phrase to which the transformation is being applied. This approach is a matter of defining the structural description available for tansformations like relative formation and question formation. Therefore, the postulation of such an element in deep structure can be regarded as a condition on the form of grammar.

Now we shall consider the formation of the WH-Movement rule in more detail on the basis of the arguments in the previous chapter. In order to formulate the WH-Movement rule, we need another element besides the sentence-initial COMP (=Q), that is WH. We have observed that there are two different ways to introduce WH into the structural description of WH-Movement: one way is to postulate WH in the Det position of an NP in the base structure (cf. Katz and Postal's analysis) and the other alternative way is to insert WH into the questioned NPs by the transformational rule (cf. Baker's argument). We will not discuss the question how to introduce WH to the structural description of WH-Movement. But it is reasonable to assume that if WH is introduced by the transformational rule, this rule must precede WH-Movement, so at the stage of application of WH-Movement WH must be in the structural description of WH-Movement.

Another thing we have to note is the hypothesis of unboundedness of leftward movement. This hypothesis not only requires variables to state the SD of WH-Movement, but also causes a controversy with regard to the manner of the application of this rule. It is necessary to

introduce the variables to state the SD of WH-Movement to represent all the material that may intervene between a wh-word and the initial position of the tree. Since wh-words may be fronted from indefinitely far down in a structure, there is no way we could specify exactly all the material that could intervene between the wh-word and the initial position.

According to these observations, we can state roughly the structural description of the rule for WH-Movement as follows:

(1)

COMP	X	NP	Y	
1	2	3	4	⟶
1+3	2	∅	4	

where 3 dominates wh.

This rule produces sentences like those in (2), where it is clear that the questioned element can be moved from sentences which are indefinitely deeply embedded in a P-marker:

(2) (a) Who will Samuel marry?

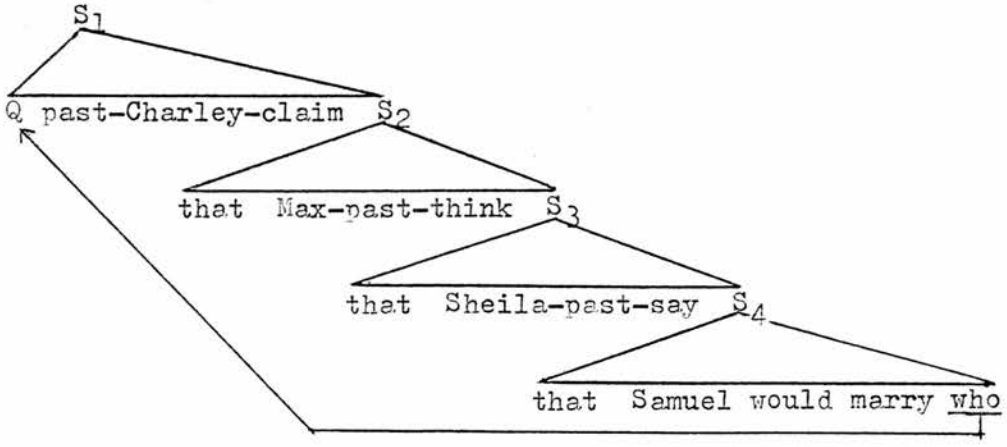
(b) Who did Sheila say that Samuel would marry?

(c) Who did Max think Sheila said Samuel would marry?

(d) Who did Charley claim that Max thought Sheila said Samuel would marry?

As an illustration, consider the operation of WH-Movement on sentence (2d) (which we greatly abbreviate here), shown in (3):

(3)



In the derivation of sentence (2d), the wh-word who will be fronted from a position that is three sentences "down" from the initial position of the highest sentence. Examples such as (2d) can easily be expanded further, and there is, in principle, no upper bound to the number of embedded sentences that may intervene between the original position of the wh-word and the sentence to which it is moved.

Now we will consider the manner of application of the WH-Movement rule to derive complex sentences such as (2d) in relation to the transformational cycle[1], that is the well-known principle which governs the application of transformational rules to the phrase structures. According to this principle, there are two logically possible ways in which WH-Movement might apply to complex structures. On the one hand, it might be a cyclic rule that applies on each cycle, fronting the wh-word to the initial position of each successive embedded sentence until the highest sentence is reached (i.e., successive cyclic application of the rule). On the other hand, WH-Movement might be a last-cyclic rule, which simply fronts the wh-word in one step on the highest cycle of the tree.

The latter treatment of WH-Movement which has been assumed by Baker (1970) and Bach (1974) lays a stress on the unboundedness of WH-Movement and the direct relationship between the sentence-initial question element and wh-word. So they argue that the wh-word has to be moved to the sentence-initial position by the single application of the rule. Further they point out that the successive cyclic application of WH-Movement can lead to ungrammatical sentences. An illus-

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1. See Chomsky (1965: 134-35) and Bach (1974).

tration is based on the observation that WH-Movement may optionally front a preposition in sentences such as the following:

(4) (a) Who(m) did you give the book to?

(b) To whom did you give the book?

The preposition to may either be left behind, as in (4a), or it may be optionally fronted, as in (4b). The same fact holds true when WH-Movement applies to a complex structure, as in the following example:

(5) (a) Who(m) did you believe that Mary gave the book to?

(b) To whom did you believe that Mary gave the book?

If WH-Movement applies in a successive cyclic fashion, there is the possibility of leaving an optionally frontable preposition to on the way of cycle where it may not appear in surface structure.

(6) *Who did you believe to that Mary gave the book?

There is nothing to prevent the rule from operating in this way. But if this rule is applied in a last-cyclic fashion, there is no way that WH-Movement can leave a preposition behind in any medial position in the sentence.

In spite of this criticism[1], Chomsky (1973) argues that WH-Movement must be a cyclic rule. His main point of arguments is that WH-Movement is applied not only to direct questions but also embedded questions and relative formations. If it were a last-cyclic rule, then its application to a structure such as (7) should not be possible.

(7) I wonder who Mary loves.

This is because the rule would not be able to apply until the highest

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1. Chomsky proposes two alternative ways to rule out the ungrammatical sentences by the successive-cyclic movement; either it is prevented by the A-over-A principle or it can be ruled out by the rule of interpretation.

cycle had been reached; but then, in order to front the wh-word in the proper way (i.e., only to the beginning of the complement), WH-Movement would have to apply only within the embedded sentence. That is, WH-Movement would have to "go back" to a cycle that has already been passed, operating only on that previous cycle and ignoring the current one. But this sort of rule application must be avoided by the cyclic principle.

By these arguments, Chomsky proposes the general condition to sharpen the notion "transformational cycle" (1973: 243):

> (8) No rule can apply to a domain dominated by a cyclic node A in such a way as to affect solely a proper subdomain of A dominated by a node B which is also a cyclic node.

He interprets it as "rules cannot in effect return to earlier stages of the cycle after the derivation has moved to larger, more inclusive domain" and refers to (8) as the Strict Cycle Condition. As we will discuss below, the Strict Cycle Condition and the following assumption that WH-Movement must be a cyclic rule become very important in Chomsky's analysis of WH-Movement.

So far we have discussed the formulation of WH-Movement briefly and the manner of application of this rule in relation to the cycle. The rest of this chapter will be about the conditions on the applicability of WH-Movement. We shall discuss three studies on this matter. Firstly, Ross (1967) sets up a group of constraints on the variables in the structural description for the reordering transformations. These conditions are formulated in such a way as to restrict severely the operation of the rules of grammars while not affecting their form. We will observe these constraints in terms of how they correctly constrain WH-Movement. Secondly, Emonds(1976)

proposes the conditions on the applicability of WH-fronting rule in accordance with his general constraint on grammatical transformations, the structure-preserving constraint so-called. He is concerned with restricting the deep structure category COMP that is substituted by the fronted wh-word or other complementizers. Thirdly, Chomsky (1973, 1975, 1976) proposes various conditions in the framework of the trace theory. In the treatment of WH-Movement, Chomsky characterizes this rule as follows: (1) it leaves a trace, (2) WH-phrase is moved to the COMP position, and (3) WH-Movement shows a successive cyclic operation. Then, he shows how his conditions can explain the operation of WH-Movement.

The studies of all these conditions and constraints have aimed at seeking some general principles imposed on the grammar of a language or languages, their analyses are not limited to the study of WH-Movement. Therefore, our discussion on this matter will be in a very limited way, since we are concerned with the operation of WH-Movement. We will follow the steps to introduce their conditions with references and to illustrate and to discuss the relevant examples of WH-Movement.

1. Constraints on Variables.

When we observe the operation of the rule in (1) above more closely, we could easily find that this rule may generate infinitely many non-sentences, such as those in (9):

(9) (a) *What did Bill buy potatoes and?

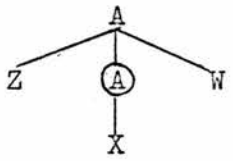
(b) *What did that Bill wore surprise everyone?

Therefore, we have to consider the problem of how to prevent the ungrammatical sentences which may be derived by the operation of the rule (1). The first attempt to limit the expressive power of transformational rules appeared in Chomsky (1962, 1964), namely the A-over-A principle. This principle was made in order to restrict an ambiguous representation in the structural descriptions for transformations. Chomsky formulates the A-over-A principle as follows (1962: 931):

(10) If the phrase X of category A is embedded within a larger phrase ZXW which is also of category A, then no rule applying to the category A applies to X (but only to ZXW).

In terms of tree diagram (11), the principle asserts that all transformations which refer to A must apply to the topmost instance of A in (11), not the dominated A, which is circled.

(11)



Chomsky's A-over-A principle can be made use of to exclude a number of ungrammatical sentences. The cases relevant to WH-Movement which seem to support to the A-over-A principle are grouped together by Ross (1967).

A. Elements of relative clauses may not be questioned or relativized. Thus, the sentence I chased $_{NP}$[the boy who threw $_{NP}$[a snowball] at our teacher] can never be embedded as a relative clause in an NP whose head noun is snowball: sentence (12) is ungrammatical.

(12) *Here is the snowball which I chased the boy who threw at our teacher.

It is easy to see how the A-over-A principle would exclude this: in the source sentence the NP a snowball is embedded within a

larger NP the boy who threw a snowball at our teacher, and the principle dictates that only dominating, not dominated, nodes can be affected by the operation of a rule.

This restriction also applies to elements of reduced relative clauses.

(13) (a) She reported all the girls wearing bikinis to the police.

(b) *Which bikinis did she report all the girls wearing to the police?

B. Elements of sentences in apposition to such sentential nouns as *fact*, *idea*, *doubt*, *question*, etc., cannot be questioned or relativized.

(14) (a) Tom mentioned the fact that she had worn a bikini.

(b) *Where's the bikini which Tom mentioned the fact that she had worn?

C. In a relative clause structure, $[_{NP}\ NP_1\ S]$, it is not possible to question or relativize the dominated NP_1. An example of the kind of sentence that must be excluded is the following:

(15) He expected $[[$someone$]_{NP}$ who I was acquainted with$]_{NP}$ to show up.

It is not possible to question (15) by moving *someone* to the front of the sentence and leaving the relative clause *who I was acquainted with* behind. Thus (16) is ungrammatical:

(16) *Who did he expect who I was acquainted with to show up?

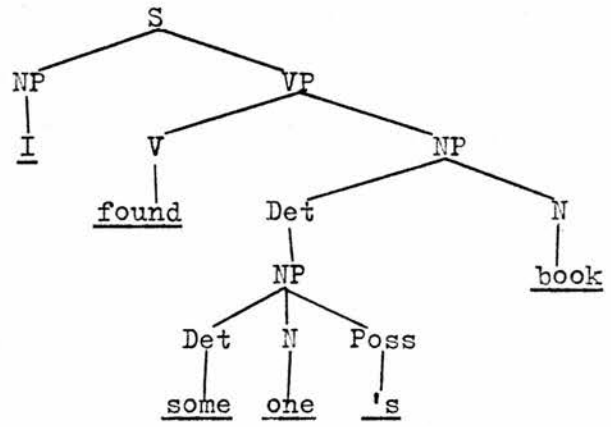
In (15), if the NP *someone* is to be questioned, the whole NP which dominates it, *someone who I was acquainted with*, must be moved forward with it, yielding (17), or by later extrapositon (18).

(17) Who who I was acquainted with did he expect to show up?

(18) Who did he expect to show up who I was acquainted with?

D. A NP which is exhaustively dominated by a Determiner can not be questioned or relativized out of the NP which immediately dominates that Determiner. Thus, from (19) it is impossible to form (20):

(19)



(20) *Whose did you find book?

Only (21) is possible:

(21) Whose book did you find?

E. An NP which is a conjunct in a coordinate NP structure can not be questioned or relativized. Thus, in (22a), neither of the conjoined NP's may be questioned - (22b) and (22c) are both impossible.

(22) (a) He will put the chair between $[_{NP}[_{NP}$ some table $_{NP}]$ and $[_{NP}$ some sofa $_{NP}]_{NP}]$

(b) *What sofa will he put the chair between some table and?

(c) *What table will be pit the chair between and some sofa?

Although the above ungrammatical sentences and other similar cases can be excluded by the A-over-A principle, this principle is too strong, as Chomsky (1964) and Ross (1967) pointed out, since it does rule out perfectly grammatical sentences as follow:

(23) (a) Who would you approve of my seeing?

(23) (b) What are you uncertain about giving to John?

(c) What would you be surprised by his reading?

In each case of these sentences, the question word who or what which is itself an NP, has been moved out of another NP ($_{NP}$[my seeing something], $_{NP}$[giving something to John], $_{NP}$[his reading something]).

Observing the above specific cases of the A-over-A principle and its inadequacies, Ross argues that several more specific constraints than the A-over-A principle must be constructed in order to avoid the defects of the A-over-A principle and at the same time to account for the above cases. Ross (1967) examines reordering transformations which move a constituent over variables such as Question rule and Relative Clause Formation rule, and sets up a group of constraints to limit the power of variables: i.e., the Complex NP Constraint, the Coordinate Structure Constraint, the Left Branch Condition, and the Sentential Subject Constraint.

We begin with a discussion of the Complex NP Constraint.

(24) The Complex NP Constraint:

> No element contained in a sentence dominated by a noun phrase with a lexical head noun may be moved out of that noun phrase by a transformation (Ross, 1967: 70):

Ross sets up this constraint not only to exclude the ungrammatical sentences in case (A) and (B) which were ruled out by A-over-A principle, but also to exploit the structural similarity between (25a) and (26a) in order to explain the similarity of the ungrammaticality of sentences like (25b) and (26b) on the same basis.

(25) (a) John saw the girl that was living with Mary.

(b) *Who did John see the girl that was living with.

(26) (a) John believes the claim that the man is living with Bill.

(b) *Who does John believe the claim that the man is living with?

The ungrammaticality of the above sentences had been observed by Lees (1960, and see Chapter 3) and Klima (1964). Especially Klima noticed that the NP that man would be questioned in (27b), but not (27a) (cf. (28)), Klima proposed a constraint stated in (29):

(27) (a) I read a statement which was about that man.

(b) I read a statement about that man.

(28) (a) *The man who I read a statement which was about is sick.

(b) The man who I read a statement about is sick.

(29) Elements dominated by a sentence which is dominated by a noun phrase cannot be questioned or relativized.

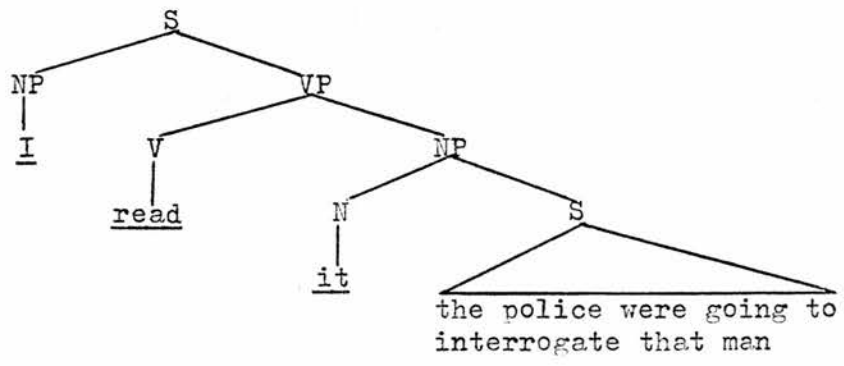
However, Ross notes the inadequacy of the above constraint by observing the following sentence.

(30) (a) I read $[_{NP}[_{S}$ that the police were going to interrogate that man $_{S}]_{NP}]$

(b) the man who I read that the police were going to interrogate

Ross gives (31) as the deep structure of (30a):

(31)



This sentence shows that <u>that man</u>, a constituent dominated by a S which is dominated by a NP can be relativized, this case shows that Klima's constraint in (29) is too strong.

Another argument against Klima's constraint is that, in general, elements of reduced relative clauses and elements of full relative clauses behave exactly the same with respect to reordering transformtions.

(32) (a) Phineas knows a girl who is jealous of Maxim.

(b) *Who does Phineas know a girl who is jealous of?

(c) *Who does Phineas know a girl jealous of?

In order to explain the fact that elements in reduced relative clauses as well as in full relative clauses cannot be extracted out of that clause, Ross sets up the condition as follows:

(33) No element of a constituent of an NP which modifies the head noun may be questioned or relativized.

The Complex NP Constraint in (24) is actually the modified form of this constraint. The main reason to modify condition (33) is to account for the difference of sentences in (34).

(34) (a) I believe the claim that Otto was wearing this hat.

(b) I believe that Otto was wearing this hat.

(35) (a) *The hat which I believed the claim that Otto was wearing is red.

(b) The hat which I believed that Otto was wearing is red.

The sentences of (34), which only differ in that the NP object of <u>believe</u> has a lexical head noun in the first, but not in the second, differ as to relativizability, as the corresponding sentences of (35) show. Moreover, there are sentences which have <u>it</u> pronoun in their

surface form, but still allow realtivization from that-clause.

(36) (a) This is a hat which I'm going to see to it that my wife buys.

(b) This is a hat which I'm going to see that my wife buys.

To account for this difference, Ross assumes the existence of a feature, [± Lex], in the head noun of the complex NP to distinguish between lexical items like claim in (34a) or girl in (32a) on the one hand, and the abstract pronoun it of (36a) on the other. Since it is possible to move elements out of sentences in construction with the third of these, it seems to be necessary for the theory of grammar to keep them distinct.

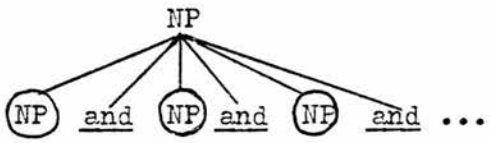
However, this constraint cannot give an explanation of the grammaticality of (28b), since it was assumed, as we observed above, that the reduced relative clauses are subject to this constraint as well as the full-formed relative clause. Klima took sentences like (27b) as derived from a full-formed relative clause, but Ross suspects that (27b) is nearer to being basic than (24a) is, and that in any case, (27b) is not derived from (27a) by means of the rule of Relative Clause Reduction. Recent studies on this matter define the structural analysis of the sentences like (27b) as the string of NP P NP which is directly derived by the base rule, so there is no way for this construction to be subject to the Complex NP Constraint.

The second constraint Ross proposes is the Coordinate Structure Constraint. He formulates this constraint as follows:

(37) In a coordinate structure, no conjunct may be moved, nor may any element contained in a conjunct be moved out of that conjunct.(op. cit.: 89).

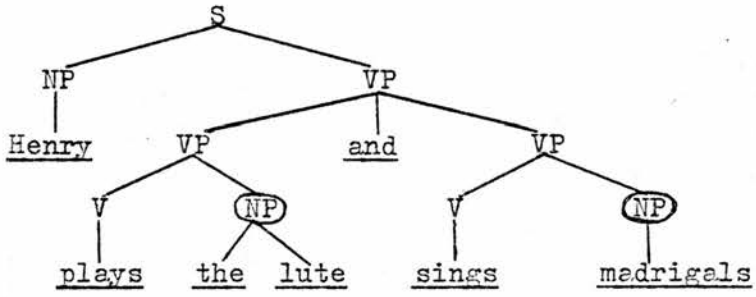
This constraint is to account for the case (E) in the A-over-A principle,, but also expands its coverage to sentential conjunctions. Ross points out the impossibility of questioning the circled NP nodes in diagram (38) can be successfully accounted for by invoking the A-over-A principle:

(38)

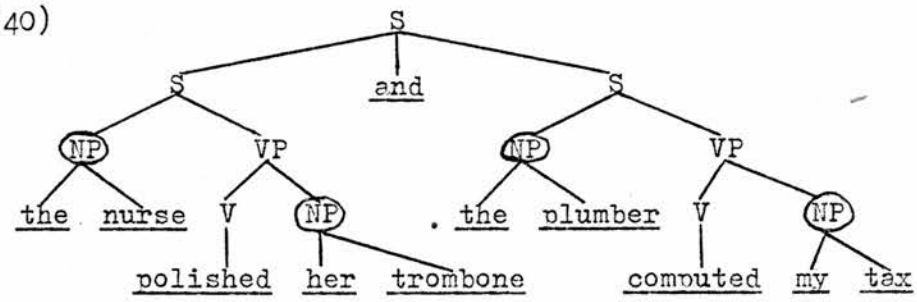


However, the A-over-A principle does not prevent the circled NP nodes in diagrams (39) or (40) from being questioned or relativized.

(39)



(40)



But all of the circled nodes must somehow be restricted from being moved, as the ungrammatical sentences of (41) show.

(41) (a) *The lute which Henry plays and sings madrigals is warped.

(b) *The madrigals which Henry plays the lute and sings sound lousy.

(41) (c) *The nurse who polished her trombone and the plumber computed my tax was a blonde.

(d) *Which trombone did the nurse polish and the plumber computed my tax?

(e) *The plumber who the nurse polish her trombone and computed my tax was a hefty fellow.

(f) *Whose tax did the nurse polish her trombone and the plumber compute?

The latter part of the Coordinate Structure Constraint can correctly exclude the ungrammatical sentences in (41). But this constraint cannot explain the following examples:

(42) (a) When did you get back and what did you bring me?

(b) *Sally is sick and what did you bring me?

(43) *Which boy and the girl embraced?

Ross suggests that non-sentences of (42b) and (43) must be excluded not by a transformational constraint but rather by a deep structural one.

The third constraint we will consider is the Left Branch Condition. Ross proposes this condition to block the ungrammatical sentences like (16) and (20), which are ruled out by the A-over-A principle in the case (C) and (D). The Left Branch Condition is as follows (op. cit.:114):

(44) No NP which is the leftmost constituent of a larger NP can be reordered out of this NP by a transformational rule.

This constraint can block the derivation of ungrammatical sentences like (45c) and (45d):

(45) (a) We elected the boy's guardian's employer president.

(b) The boy whose guardian's employer we elected president ratted on us.

(45) (c) *The boy whose guardian's we elected employer president ratted on us.

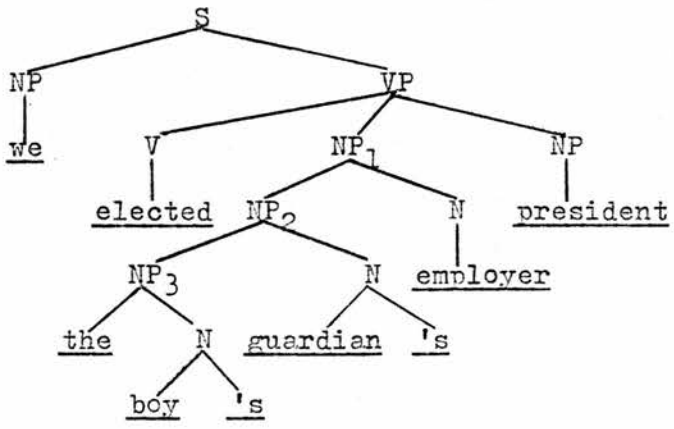
(d) *The boy whose we elected guardian's employer president ratted on us.

Apart from the Left Branch Condition, we have to discuss how the whole constituents can be reordered from their original position in the case of (42b). For the derivation of this kind, Ross proposes a special convention called the Pied Piping Convention to account for the fact that "any transformation which is stated as operating on some NP singled out in some such way may instead operate on any higher NP." This Pied Piping Convention is stated as follows (op. cit.: 114):

(46) Any transformation which is stated in such a way as to effect the reordering of some specified node NP, where this node is preceded and followed by variables in the structural index of the rule, may apply to this NP or to any non-coordinate NP which dominates it, as long as there are no occurrences of any coordinate node, nor of the node S, on the branch connecting the higher node and the specified node.

Now we will see the derivation of (45b) from the underlying structure of (47) which is given as follows:

(47)



When NP_3 is specified by the rules of Relative Formation or Questions, then the rule may apply to NP_3, NP_2, or NP_1 by the Pied Piping Conven-

tion. But in this case, the Left Branch Condition requires the obligatory application of the Pied Piping Convention. Since the movements of NP_3 or NP_2 out of their branches are blocked by the Left Branch Condition, only the largest NP which the Pied Piping Convention allows to be moved, NP_1, can be moved to the front of the sentence, and the resulting sentence is (45b).

One more fact which is provided by Ross to support the Left Branch Condition and the Pied Piping Convention is that when adverbs of degree which occur in pre-adjectival or pre-adverbial position are questioned, the questioned constituent, how, cannot be moved to the front of the sentence alone, as in (48a) and (49a), but only if the adjective or adverb is moved with it, as in (48b) and (49b).

(48) (a) *How is Peter sane?[1]

(b) How sane is Peter?

(49) (a) *How have you picked up TNT carelessly?

(b) How carelessly have you picked up TNT?

He also notes that if the degree adverb that in (50) is questioned, the Pied Piping Convention must be applied to move not only tall, but also a man to the front of the sentence.

(50) Sheila married that tall a man.

(51) (a) How tall a man did Sheila marry?

(b) *How tall did Sheila marry a man?

(c) *How did Sheila marry tall a man?

The last one among Ross's constraints is the Sentential Subject

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1. This sentence is marked because it is unrelated to (48b) - the how in (48a) does not replace to what extent, but rather something like in what respect or in what way.

Constraint, which is to account for the ungrammatical sentences like (53b). Compare (52a) with its two passives, (52b) and (52c).

(52) (a) The reporters expected that the principal would fire some teacher.

(b) That the principal would fire some teacher was expected by the reporters.

(c) It was expected by the reporters that the principal would fire some teacher.

Noun phrases in the that-clauses of (52a) and (52c) can be relativized, but not those in the that-clause of (52b), as (53) shows:

(53) (a) The teacher who the reporters expected that the principal would fire is a crusty old battle-ax.

(b) *The teacher who that the principal would fire was expected by the reporters is a crusty old battle-ax.

(c) The teacher who it was expected by the reporters that the principal would fire is a crusty old battle-ax.

According to the observations, he sets up the Sentential Subject Constraint (op. cit.: 134):

(54) No element dominated by an S may be moved out of that S if that node S is dominated by an NP which itself is immediately dominated by S.

So far, we have discussed four constraints relevant to the wh-word movement rule. Ross suggests that the Complex NP Constraint and the Coordinate Structure Constraint be regarded as general universal conditions and that the other two, the Left Branch Condition and the Sentential Subject Condition, are language particular constraints. In the task of setting up generalized constraints on the operation of transformations, Ross has made detailed observations on the wh-word Movement which has been a base to seek further generalized conditions on a WH-Movement in a more advanced theory of grammar.

2. WH-Fronting as a Structure-Preserving Transformation.

Emonds (1976) sets up three types of transformations to restrict the possible classes of transformations in a grammar: i.e., Root Transformation, Structure-preserving Transformation, and Local Transformation. He defines them as follows (op. cit.: 3-4):

(55) Root Transformation: A transformation (or a transformational operation, in the case of a transformation performing several operations) that moves, copies, inserts a node C into a position in which C is immediately dominated by a root S in derived structure is a "root transformation" (or a root trnasformational operation).

(56) Structure-Preserving Transformation: A transformation (or a transformational operation, in the case of a transformation performing several operations) that introduces or substitutes a constituent C into a position in a phrase marker held by a node C is called "structure-preserving".

(57) Local Transformation: A transformation or a transformational operation that affects only an input sequence of a single nonphrase node C and of one adjacent constituent C' that is specified without a variable, such that to C and C', is called a "local transformation" (or a local transformational operation).

Emonds assumes that every transformational operation must be of these types, and he calls it "the structure-preserving hypothesis". Further he defines nonlocal transformational operations as major transformational operations. He insists that this hypothesis may impose strong limits on the expressive power of transformations and predict the kind of derived constituent structure which transformations may produce.

We observed an example of root transformations of English in Chapter 2, namely Subject-Auxiliary Inversion. This transformation can be analyzed as movements of nodes into positions where such nodes are immediately dominated by a root S. The mechanics of this trans-

formation are well known: if the subject of the highest S is preceded by a questioned (WH) or negated (NEG) constituent, the order of the subject and the following auxiliary, which includes a TENSE affix and a possible form of not, is reversed. According to this observation, he forms the rule as follows (op. cit.: 22):

(58) Subject - Auxiliary Inversion:

COMP NP AUX X ⟶ 1 - 3 - 2 - 4

where 1 dominates WH or NEG.

The Subject-Auxiliary Inversion can occur when the node COMP is sentence-initial "complementizer" and dominates WH or NEG, so it can be neither a structure-preserving (since it does not occur in an embedded sentence) nor a local transformation (since it depends on conditions external to the two interchanged nodes).

Emonds assumes that the structure-preserving transformations are all substitution rules which move constituents over a string specified by a variable in the structural description of the rule and substitute constituents for categories generated in the base. He illustrates some generally accepted transformational operations that seem to have the structure-preserving property in English: e.g., the postposing of the subject noun phrase into a verb-phrase-final prepositional phrase of the passive construction.

In the case of local transformations he gives two examples from the rules of English: "the optional interchange of an object NP and a post-verbal particle and the obligatory reordering of a head adjective and the modifying intensifier (degree word) enough (too big, so big, but big enough)" (op. cit.: 4).

Now we turn to discuss the WH-fronting rule in this framework.

Emonds includes WH-fronting in the category of structure-preserving transformation, since this rule moves constituents over variables (i.e., it is a major transformational rule) as we saw in the previous section and also it operates in embedded sentences (i.e., it is not a root transformational rule). In the course of analyzing other structure-preserving transformations like Passive, Emonds gives a definition of a structure-preserving rule that is somewhat more abbreviated than the general definition above (op. cit.: 68):

(59) Structure-preserving Transformation: A transformational operation T that substitutes a node B and all the material dominated by it for some node C that is a constituent of the same category is structure-preserving.

According to the structure-preserving transformation defined so far, Emonds tries to formulate WH-fronting by the observation of the following examples:

(60) (a) Whose father was the President?

(b) In which town does he reside?

(c) How did he achieve this?

(d) How big does this appear on a screen?

These examples show WH-fronting may move an NP, a PP, or an AP to the sentence-initial position. But he perceives various difficulties in formulating WH-fronting as a structure-preserving transformation under the presented definitions, since, for WH-fronting to be a structure-preserving rule, we need such phrase nodes as an NP, a PP, or an AP in the sentence-initial (presubject) position by the above definition. But according to his independently motivated constraints on the base rule formations[1], no rewriting rule can generate such phrase nodes in

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1. Emonds gives several constraints on base rules seperately. See Emonds (1976: 12-20).

the presubject position.

To solve these difficulties, he modifies the notion of WH-fronting on the one hand, and weakens and expands his original definition of structure-preserving transformation. The former attempt is shown by his assumption that WH-fronting is to be viewed not "solely as a transformational operation on phrase nodes" but as "an operation on the syntactic element WH". For the latter attempt, Emonds proposes a condition extending the notion of structure-preserving operations to those syntactic element like WH (op. cit.: 112):

> (61) The Sentence Boundary Condition: If A_j is a rightmost or leftmost constitent of an S, a transformational operation that substitutes B for A_j, is structure-preserving if B dominates A_i, provided that there is no S such that $B = X [_S Y A_i Z _S] W$.

If we rewrite symbols as A_j = [COMP, WH], B = NP, or PP, or AP, and A_i = WH, and interpret the last condition as that the node B cannot dominate an S which contains a COMP and WH, we can easily conceive how this condition allows WH-fronting to be a structure-preserving rule.

In accordance with the preliminary modifications, he formulates WH-fronting rule as follows:

$$(62)\quad \text{COMP} \quad X \quad \left[\begin{Bmatrix} \text{NP} \\ \text{AP} \\ \text{PP} \end{Bmatrix} \quad (\text{P}) + \text{WH} + \text{Y} \right] - \text{Z} \longrightarrow 3 - 2 - \emptyset - 4$$

Emonds suggests that this rule can be applied to the formations of both questions and relative clauses in that this rule operates on WH. But the source of WH is different; in the case of questions, it is generated by the base rule as a specifier of an NP or an AP, on the other hand, in the relative formation WH is introduced by the inser-

insertion rule into the specifier of the NP in the relative that is coreferential with the NP modified by the relative clause.

But this WH can be subject to the WH-fronting rule if and only if the leftmost grammatical formative category COMP can have WH in the base. Emonds argues that COMP has to be mentioned in the structural description of the WH-fronting rule, but not WH, since the structure-preserving constraint requires a certain property of COMP for WH-fronting, and also COMP which is independently generated by the base rule can predict exactly what kind of constituent can replace it. According to Bresnan (1970), three types of sentential complementizers can be derived from the underlying COMP: i.e., that, for and WH (this WH is realized by the fronted wh-words or whether by the combination with either). Emonds reconstructs this analysis of COMP as having the three feature complexes[1] [COMP], [COMP,WH], and [COMP,FOR] . Accepting this general analysis of complementizers, Emonds notes that the possibility of empty nodes and the possibility of a COMP lacking either +WH or +FOR give five different base configurations[2] (op. cit.: 189):

(63) COMP

(64) (a) COMP, WH, whether (b) COMP, WH, Δ

(65) (a) COMP, FOR, for (b) COMP, FOR, Δ

---

1. The analysis of COMP as the feature complex has been proposed by Chomsky (1970). He regards COMP as a feature bundle which is featurally specified for complementizers, since it subcategorizes verbs.

2. The configurations in (64), which can be replaced by the wh-phrase of questions and relative clauses, have been described as [COMP, +WH] for (64a) and [COMP,-WH] for (64b) in Bresnan's analysis (see Chapter 3) and also in Chomsky (1973).

Emonds assumes that the configuration in (63) underlies that clause complements and relative clauses exhibiting that, and the configuration (65a) is the underlying structure of for-complementizer. According to the definition of the structure-preserving movement, only the two configurations in (64) can expect to be substituted by the WH-fronting. As we observed, in the case of questions, WH is postulated in deep structure, so it can only be moved to another node which has WH in the base, i.e., the configuration in (64a). Emonds explains the function of this configuration as follows: "Clauses that are direct or indirect questions are derived from underlying structures with whether complementizer. An NP or an AP with a WH in the specifier position can replace this (recoverable) $[_{WH}$ whether] when WH fronting applies in such constructions" (op. cit.: 190).

The configuration in (64b) can also be substituted by the WH-fronting. But unlike (64a), this empty node cannot occur in the question formation, since according to Emonds "empty nodes play no part in subcategorization" and it is well-known fact that the interrogative complementizer does subcategorize verbs, adjectives, and nouns. Then the only way to remove this node is by WH-fronting in the Relative Formation. As we saw above, WH in relative clauses is inserted by transformational rule so it does not require a deep structure WH in the COMP. Therefore the COMP configuration in (64b) can occur in the structural description of the relative clauses that exhibit WH-words.

The configuration in (65b) is, as Emonds noticed, somewhat problematic, since there is no rule in English to derive well-formed sentences with this configuration, that is that "no transformation

moves or inserts an element with the distinguishing feature of the complementizer for into the COMP position."

Seeking any possible derivation of movement rule with for-complementizer, Emonds observes the existence of infinitival relatives, which always appear as prepositional phrases in their surface forms in the place of for-complementizer.

(66) (a) I found an usher from whom to buy tickets.

(b) Some tools with which to fix the table will soon arrive.

(c) You have fifteen months in which to pay.

Then he assumes that WH fronting replaces a for-complementizer with a prepositional phrase. But it is clear that this replacement cannot be a structure-preserving movement, since WH fronting cannot move WH into [COMP,FOR] by the definition of a structure-preserving movement. In order to treat this movement as a structure-preserving movement, Emonds follows several steps; firstly, he limits a substitutable category for [COMP,FOR] by WH-fronting to a PP, and secondly, in this case WH-fronting does not operate on WH but on a PP; thirdly, a for-complementizer has a structure [COMP,PP] at some point of derivation prior to WH-fronting, then WH fronting will be a structure-preserving movement of the PP node in for clause.

So far we have discussed the formation of WH-fronting and the configurations of deep elements in the SD of WH-fronting in accordance with the structure-preserving constraint. Although the structure-preserving constraint correctly specifies some necessary conditions on the application of WH-fronting, this constraint seems not to be strict enough to account for the derivation of well-formed sentences

by WH-fronting. For instance, this rule also uses variables, so they need to be restricted in the sense of Ross's constraints discussed in the previous section such as CNPC, Left Branch Condition. Therefore, if we do not support stringent restrictions on the types of base structure allowed, Emond's theory may make a very weak claim.

3. Analysis of WH-Movement within the Trace Theory Framework.

In this section, we will discuss the characteristics of WH-Movement and conditions on its operation outlined by Chomsky (1973, 1975, 1977) within the trace theory framework. As we mentioned, the concept of trace has been introduced recently in the Extended Standard Theory. This new theory incorporates a distinction not available in the standard theory. What was called a movement rule was actually a conjunction of two elementary transformations: a copying elementary (substitution or adjunction) and a deletion of the source of the copy from its original site. Thus the effect of a deletion was always the same: deletion of the terminal element and automatic reduction of all labeled brackets strictly enclosing the deleted element. In a new theory a "movement" rule is a rule that copies and deletes, but there is no subsequent reduction and the "empty" nodes remain. Since the nodes (or labeled brackets) are indexed the new phrase marker resulting from the rule bears a record of what element has been moved: that is the "trace".

In order to capture the correct notion of "trace", we shall consider a rule of NP-postposing, one component of the Passive rule, as applied to the structure (67):

(67) $[_S[_{NP_i}$ John] $[_{VP}$ be+en kill $[_{NP_j}$ Bill] by $[_{NP_k}$ e]]]

The rule of NP-postposing moves NP_i, replacing the terminal identity element e, in NP_k. The moved NP, John, retains its index, so that in place of NP_k, we have NP_i of (67). Then NP-preposing occurs to fill the subject position. The resulting structures are as follows:

(68) $[_S[_{NP_i}$ e] $[_{VP}$ be+en kill $[_{NP_j}$ Bill] by $[_{NP_i}$ John]]]

(69) $[_S[_{NP_j}$ Bill] $[_{VP}$ be+en kill $[_{NP_j}$ e] by $[_{NP_i}$ John]]]

Here the structure $[_{NP_i}$ e] of (68) and $[_{NP_j}$ e] of (69) can be defined as the "trace" of NP_i ($=[_{NP_i}$John]) and NP_j ($=[_{NP_j}$Bill]) respectively and they are represented as t(i) and t(j). According to this, we can define the trace as an indexed NP with null terminal.

Now we will discuss the function of the trace in the rule of WH-Movement. According to the conceptions just outlined, wh-Movement leaves a nonterminal trace, just as all movement rules do.

(70) (a) who_i did John see t_i

(b) [whose book]$_i$ did Mary read t_i

Chomsky (1975, 1976) assumes that wh-words should be regarded as quantifiers of some sort, so the trace of wh-words may be turned into variables by rules of interpretation to form the logical form of questions and relative clauses. He postulates the following steps to derive logical forms from the sentences in (70):

(71) (a) find the place from which who moved

(b) mark this position by x

(c) interpret who as "for which person x," controlling the free variable x

Thus, at the level of LF, the sentences in (70) will be represented

as (72):

(72) (a) for which x, x a person, John saw x.

(b) for which x, x a person, Mary read x's book

As for (a)-(c) in (71), if we consider the surface structure to be as represented in (70), in accordance with the trace theory, then steps (a) and (b) of (71) have already been accomplished, in effect. Thus, to interpret these surface structures it suffices to carry out step (c) of (71), namely to replace who by its "meaning", for which person x. Thus these cases show how the trace makes it possible for surface structure to be directly mapped into LF merely by the replacement of "quantifier words" by their meanings.

Chomsky (1976) argues that the trace should not be identified as the variable within the scope of the wh-quantifier, since the trace is a non-terminal symbol, while the variable introduced in the position of the trace by the rules giving the meaning of such quantifiers as every and who is the terminal symbol of LF. If we compare the sentences in (70) to those in (72), in the case of (a) in (70) and (72), the trace can be virtually identified with the variable, but in the case of (b), the distinction becomes obvious. In the latter case, trace marks the position from which the wh-phrase was moved, but the rule expanding the quantifier wh posits a terminal symbol x in the position of the NP source of who. From these observations, Chomsky introduces the rule of interpretation for wh-phrases as follows (1976: 84):

(73) Given an $\overline{S}$ of the form:

$[_{COMP}$—[wh-$\overline{N}$]— +WH] $[_S$... t ...]

where t is the trace of [wh-$\overline{N}$], rewrite it as:

$[_{COMP}$ for which x, x an $\overline{N}$], $[_S$...[--x--] ...]

So far, we have noted the definition of "trace" and its function in relating surface structure to LF directly in the case of WH-Movement. Now we will see another function of trace. As we have discussed in the previous sections, WH-Movement can be stated simply as "move wh-phrase over variables to the suitable sentence-initial COMP." But this rule operates incorrectly in many cases leading to massive "overgeneration," given that it operates free of context. Chomsky proposes that ungrammatical sentences overgenerated by the rule can be ruled out by rather general constraints on rules of "construal" (that is, rules of semantic interpretation that determine LF), provided that all movement transformations leave behind a trace. Such a trace must be anaphorically bound by the moved constituent. Chomsky sets up independently motivated constraints on anaphora sensitive to the positions of the anaphoric element and its antecedents in derived structure, e.g., the wh-word and its trace. It is another function of trace that an improperly bound trace can block a derivation of sentence.

We will concern ourselves now with Chomsky's analysis of WH-Movement and general conditions on its operation. Chomsky (1973) gives the WH-Movement transformation as follows:

(74) (a) wh-Placement on NP, PP, AP, or either

(b) wh-Movement: in the structure

$[_S[_{COMP}\ X_1, X_2, X_3, \pm WH], X_5, wh, X_7]$

the sixth term fills the position of X_2 and is replaced by trace

In the above rules, Chomsky assumes that wh is a feature that can be placed on a node and the node marked by wh is moved into the proper position in COMP by the structure-preserving condition. As we dis-

cussed above, Chomsky takes WH-Movement as a cyclic rule and derives an unbounded movement of wh-phrase from a successive-cyclic application. For this Chomsky gives another language specific rule:

(75) Move wh-phrase from COMP to higher COMP over a bridge

This rule as well as the rule in (74b) is subject to all of the conditions on movement rules. Now we will inverstigate how the conditions properly constrain WH-Movement with the relevant examples. The general conditions proposed by Chomsky (1973, 1976) are such as the Specified Subject Condition, the Subjacency Condition, and the Tensed-S Condition.

We begin with a discussion of the Specified Subject Condition. The SSC is stated as follows (1973: 244):

(76) No rule can involve X, Y in the structure:

$$\ldots X \ldots [_{\alpha} \ldots Z \ldots -WYV- \ldots] \ldots$$

where Z is the specifed subject of WYV in α.

The symbol α represents NP or S; a specified subject is a subject NP that contains lexical items or a pronoun that is not controlled by the minimal major category containing X. In Chomsky's framework, NP and S are cyclic categories that differ in that sentences contain a complementizer, while noun phrases do not.

Extending the notion of subject to the possessive NP in the following examples, Chomsky (1973) uses this condition to account for the ungrammaticality of (77a) as opposed to (77b):

(77) (a) *Who did you see John's pictures of?

(b) Who did you see pictures of?

The underlying structures of these examples are assumed to be roughly as follows:

(78) (a) COMP you saw [$_{NP}$ John's pictures of WHO]

(b) COMP you saw [$_{NP}$ pictures of WHO]

If α = NP, X = COMP, Z = John's, and Y = WHO, it is easy to see how the specified subject condition will block (77a) but allow in (77b), in that (77b) lacks a Z, i.e., a Specified Subject.

Chomsky distinguishes examples like (77a) from ones like (79a) by a special clause allowing extraction over a specified subject by movement into a COMP node in the same cycle and further movement from that node to other COMP nodes. This node of escape also operates to override other constraints as we will see below:

(79) (a) Who did we believe that Bill hit?

(b) [COMP$_1$ we believe [$_S$ COMP$_2$ Bill hit WHO]]

The wh-word in (79b) can move over the specified subject Bill into the COMP$_2$ node and from there to COMP$_1$ by the above rule in (75), while no such movement can take place in (78a) since the NP has no COMP.

The SSC, together with the COMP-to-COMP analysis, predicts that movement rules that do not involve movement into a COMP node and controlled deletion rules can never operate over a specified subject.

The notion of Subjacency is defined as follows (op. cit.: 247):

(80) If X is superior* to Y in a phrase marker P, then Y is subjacent to X if there is at most one cyclic category C $\neq$ Y such that C contains Y and C does not contain X.

(* A category A is 'superior' to the category B in the phrase marker if every major category[1] dominating A dominates B but not conversely)

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1. The term "major category" indicates N, V, A and the categories that dominated them as defined in Chomsky (1965).

If Y is subjacent to X, then Y is either in the same cyclic structure, NP or S, or Y is only one cyclic structure "down" from X. In structure (81a) WHO is subjacent to both COMP nodes, while in structure (81b) it is subjacent only to the second, since it is separated from the first by two cyclic nodes:

(81) (a) COMP he believes $[_S$ COMP John saw WHO]

(b) COMP he believes $_{NP}$ the claim $[_S$ COMP John saw WHO]

Having defined Subjacency, Chomsky places the following condition on the applicability of transformations (1973: 246):

(82) No rule can involve X, Y in the structure

... X ... [... Z ... -WYZ ...] ...

where the rule applies ambiguously to Z and Y and Z is superior to Y.

The Subjacency Condition accounts for many of the facts that led to the formulation of Ross's Complex NP Constraint. The condition will block movement of the wh-word to the initial COMP in structure (81b) but will allow movement in (81a):

(83) (a) Who did he believe that John saw?

(b) *Who did he believe the claim that John saw?

Extraction from relative clauses such as the one shown in the following structure is likewise prohibited, accounting for the ungrammaticality of (84b):

(84) (a) COMP we saw $[_{NP}$ the man $[_S$ COMP who knew WHO]

(b) *who did you see the man who knew

In addition, according to Chomsky, the Subjacency Condition will block sentences to which the Complex NP Constraint does not apply:

(85) (a) *Who did you write articles about pictures of?

(b) *Who do you receive requests for articles about?

But it will allow examples like these:

(86) (a) What do you write articles about?

(b) What do you generally receive requests for?

Chomsky assumes that the underlying structures for the examples in (85) are something like this:

(87) (a) COMP you write $[_{NP}$ articles about $[_{NP}$ pictures of WHO]]

(b) COMP you receive $[_{NP}$ requests for $[_{NP}$ articles about WHAT]]

In each case, the wh-word is two cyclic categories removed from the initial COMP, and WH-Movement cannot apply because of the Subjacency Condition. On the other hand, the structures of examples (86a) and (86b) allow movement:

(88) (a) COMP you write $[_{NP}$ articles about WHO]

(b) COMP you generally receive $[_{NP}$ requests for WHAT]

Examples like (89) seem to show that WH-Movement is not always constrained by the Subjacency:

(89) Who did Bill believe that John told Ralph to kill?

This example has the following structure:

(90) COMP Bill believes $[_{S}$ COMP John told Ralph $[_{S}$ COMP PRO to kill WHO]]

To derive (89), the wh-word must move from its original position over two cyclic nodes. Chomsky accounts for this by successively moving the wh-word first into the COMP of the most deeply embedded S and then from COMP to COMP on each cycle, thus in accordance with the Subjacency Condition. By this, Chomsky assumes that the Subjacency Condition is a property of cyclic rules, i.e., part of the definition of the cycle.

WH-Movement appears to violate another of Chomsky's general conditions on movement rules, the Tensed-S Condition, as well as all other conditions by COMP-to-COMP movement. Chomsky states the Tensed-S Condition as follows (op. cit.:257):

(91) No rule can involve X, Y, (X superior to Y) in the structure:

$$\ldots X \ldots [_{\alpha} \ldots Z \ldots -WYV \ldots] \ldots$$

where Y is not in COMP and α is a tensed S.

Chomsky's initial motivation for (91) comes from examples like these:

(92) (a) Everyone believes the dog to be hungry.

(b) The dog is believed to be hungry by everyone.

(93) (a) Everyone believes the dog is hungry.

(b) *The dog is believed is hungry by everyone.

Many linguists like Postal and Bach have often assumed that there is a difference in structure between pairs of sentences like (92a) and (93a) in that a rule of raising into object position has applied. But Chomsky denies this claim. For him, the differences of the two is the difference between a tensed clause and one with an infinitive. So (92) and (93) are cited to show that the Tensed-S Condition blocks the applicability of Passive.

But WH-Movement violates the Tensed-S Condition as follows:

(94) (a) COMP you told me [$_S$ COMP what Bill saw]

(b) What did you tell me that Bill saw?

As we observed, the apparent violation which we noted of conditions such as the SSC, and the Subjacency, the Tensed-S condition accounted for by Chomsky in terms of an analysis in which WH-Movement occurs in "successive-cyclic" application and allows COMP to COMP movement.

Chomsky assumes that this uniform explanation about the violation of various conditions ensures the principle of strict cyclicity and COMP movement of WH-Movement.

By all these analyses, Chomsky defines the rule of WH-Movement as having the following general characteristics (1976: 136):

(95) (a) it leaves a gap

(b) where there is a bridge, there is an apparent violation of subjacency, PIC[1], and SSC

(c) it observes CNPC

(d) it observes wh-island constraints

The assumptions in (95) are that WH-Movement moves a phrase (implying (a)), observes SSC, PIC, and Subjacency (implying (c) and (d)), and is permitted from COMP-to-COMP under "bridge" conditions (implying (b)).

Chomsky sets up these general characteristics of WH-Movement in order to show that the variety of transformation types is only apparent, and that all movement transformations (except NP-Movement) and deletion transformations are in fact special cases of the very general rule of WH-Movement. But the discussion of this assumption is far beyond our present topic, so we regard Chomsky's analysis of WH-Movmenet as a part of study of Question Formation and Relative Clause Formation.

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1. PIC is the Propositional Island Condition which is a "parametrized" version of the tensed sentence condition above.

Chapter 5: Conclusion.

This thesis has been concerned mainly with the extent to which the topic of questions in English has provided insights into and a testing ground for hypotheses about the nature of a T.G. grammar. In conclusion, we might consider to what extent these developments have approached the matter of an adequate description of English.

From the discussion in chapter 2 we know that Free Relatives and Indirect Questions have to be recognise as separate and distinct syntactic categories. However, we do not have as yet any clear proposals as to how the differences, and of equal importance the similarities between the two structures can be captured. Clearly this is an area which needs to be considered in depth, particularly with respect to current work on the nature of COMP etc.

As might be expected thr work of K&P greatly deepened the semantic side of the study of questions, until 1964 largely limited to their syntactic nature. Yet it would be an exaggeration to claim that linguists are much closer to a full analysis of the semantics of questions and their relation to syntactic structures.

From the Aspects model we have two major directions in the study of questions, firstly the matter of Universal grammar and problems with a universal statement of question formation in languages and secondly the matter of constraining the grammar, although Bresnan's work on COMP appears to re-unite universality and constraints. The constraints have been strucyured in two ways, firstly Emonds has looked at the

typology of rules and has shown how his notion of structure-preservation can be united with Bresnan's work on COMP to constrain the nature of question formation, at least in English. Ross' work was concerned with the actual variables which may appear in movement transformation and this work has now been reformulated and extended by Chomsky in Trace Theory. The claim made by proponents of the Revised Extended Theory would appear to be, then, that Emonds plus Trace Theory provides as basis for the adequate description of questions at least in English. This may be true to an extent for English syntax but we cannot evaluate the claim fully here. One would at least need to look more carefully at the grammaticality and ungrammaticality claim of Chomsky in such a work. However, the whole area of semantics is left vague within this model and one needs also to consider whether any Universality can be claimed for Trace Theory in the lighr of languages which form questions without movement.

In conclusion one might say that we have a research program for the analysis of questions: in developing the theory, linguists have overlooked a full, adequate description of the main area used in the testing of their hypotheses.

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