15227

NATIONAL LIBRARY
OTTAWA

CANADA

BIBLIOTHÈQUE NATIONALE
OTTAWA

NAME OF AUTHOR... PAUL JEFFREY FLETCHER

TITLE OF THESIS... AN EXPERIMENTAL APPROACH TO SYNTACTIC PARAPHRASE

UNIVERSITY... ALBERTA

DEGREE FOR WHICH THESIS WAS PRESENTED... PH.D.

YEAR THIS DEGREE GRANTED... 1973

Permission is hereby granted to THE NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

(Signed)... P J Fletcher

PERMANENT ADDRESS:

6 CLAREMONT TERRACE
VICTORIA ROAD
CROSBY, LIVERPOOL 23
ENGLAND

DATED... April 9 ... 1973

NL-91 (10-68)

THE UNIVERSITY OF ALBERTA

AN EXPERIMENTAL APPROACH TO SYNTACTIC PARAPHRASE

by

© PAUL JEFFREY FLETCHER

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF LINGUISTICS

EDMONTON, ALBERTA

SPRING, 1973

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "An Experimental Approach to Syntactic Paraphrase", submitted by Paul Jeffrey Fletcher in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

.....
Supervisor

.....

.....

.....

.....

.....
External Examiner

Date March 26, 1973

ABSTRACT

The notion of syntactic paraphrase is examined within the work of several scholars, in an attempt to resolve apparently contradictory opinions concerning which structures are paraphrases and which are not. On the basis of distinctions arising from the overview, one of several linguistic descriptions of clefted sentences in English is selected as the preferred grammar. An experimental hypothesis based on this description is tested, and the results of the experimental test used to motivate modifications to the description.

ACKNOWLEDGEMENTS

Many people, peers and teachers, past and present, have contributed to the final emergence of this thesis. I am in their debt. Two members of my supervisory committee have had a particular influence: Dr. William J. Baker has guided me with patience through the minefields of experimental design and statistical analysis; and Dr. Gary D. Prideaux has constantly stimulated and guided my linguistic thinking. I am also grateful to Professor C.I.J.M. Stuart, Dr. Bruce Derwing, and Dr. Jeff. R. Sampson for differences of opinion, constructive criticism and suggested revisions.

My years of doctoral study at the University of Alberta were supported by a fellowship from the Canada Council, and by the Department of Linguistics, through teaching assistantships.

I am grateful to John Gray, for his indispensable help with the bibliography, and to the Principal and students of Los Banos High School, California, for their cooperation in the running of the experiment.

Finally, my thanks go to Helen and Lisa, who have contributed a good deal more than they know.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

Prolegomena

This study is an experimental enquiry into syntactic paraphrase. The end-product is a consideration and discussion of the results of an experiment, in which English speakers were required to make judgements, in relation to materials which have been described within the framework of a transformational-generative grammar as syntactic (or constructional, or systematic) paraphrases. However, since there is considerable controversy within linguistics as to the exact form of a grammar, together with disagreement among behavioural linguists, and psychologists concerned with language, about the relevance of a transformational grammar as a description of the speaker's "knowledge of his language", it is necessary to make explicit the theoretic and methodological framework within which the experiment was performed. In particular, the following require clarification to avoid a further contribution to the obscurity which appears endemic, at present, to the field of language study:

1. The relationship between linguistics and psychology, with reference to (i) the relevance of the grammar for the language-user; and (ii) the relevance of linguistic experimentation for the grammar.

2. The term paraphrase, both as a behavioural notion, and as a contemporary term within linguistics.

Once the psychological and linguistic background to the thesis has been delimited, some previous studies on syntactic paraphrase are considered and found wanting in certain respects. Following this, the structures which serve as the experimental materials, cleft and pseudo-cleft sentences, are given a linguistic description -- in fact, some competing syntactic descriptions are critically examined. The first, introductory, chapters of the study end with a summary of the assumptions underlying the experimental hypothesis, and with the hypothesis itself.

Linguistics and Psychology

The linguistic definition of syntactic paraphrase within the standard theory model[1] is simple and straightforward: two sentences are syntactic paraphrases if they differ from one another only in the application of one or more optional rules. It is clear, however, that there is not unanimous agreement among linguists as to what are paraphrases and what are not. For the sentence-types of concern here, cleft and pseudo-cleft sentences in English, several distinct descriptions have been proposed, which lead

---

[1]The 'standard theory model', referred to also as the STM, is that of Chomsky, 1965.

to distinct paraphrase sets. The experiment described here was intended to broaden the data-base available for the evaluation of a linguistic description of these sentences, by going beyond the intuitions of the individual linguist. A legitimate question at this point is how an experimental approach which necessarily involved the language-user could produce evidence which might be relevant for the evaluation of different formal descriptions.

The Grammar and the Language-User

Any attempt to associate the linguist's formulations with language behaviour suffers from the problem that the linguist does not feel constrained to subject his theories to empirical test. One reason for this may be that the normal procedures of hypothesis testing employed in the social sciences, in experimental psychology, for example, are simply not applicable to formal systems constructed to describe the combinatorial regularities exhibited in the language product: it is likely that, for many linguistic parameters (particularly processes such as the ordered rules involved in a derivation), psychological rules do not exist (cf. Watt, 1970; P. Harris, 1970; Derwing, in press). Equally, it is clear that linguistic parameters are not available for psychological variables which must be included in a theory of language behaviour (cf. Osgood, 1968, p. 499).

If, however, no consideration is given to the possibility that the components and processes of the grammar necessarily have some analogue in language-user behaviour, how is a linguistic description to be interpreted? The atavistic response to this question is that it is to be interpreted as a taxonomic grammar of an item-and-process type (cf. Hockett, 1954). One set of predictions which can be derived from such a description are those concerning its classification of surface structures. The grammar classifies sentences: first, by definition, the set of grammatical sentences of the language; in addition, various subsets are grouped together as paraphrases. A paraphrase set definition provided by the grammar can be looked on as making a testable behavioural claim, but only as far as the classification of surface structures is concerned.

The grammarian may provide a paraphrase set with a deep structure, which may be syntactic, or semantic, or a mixture of both. There will, however, be no direct evidence from native-speaker intuitions about the form or even the status of this deep structure: the experimental evidence will only be with respect to the output of the grammar. To return to the 'legitimate question' posed at the conclusion of the preceding section, the relevance of the experimental evidence in this study to formal systems is in relation to their classification of outputs. One point at which grammars touch reality is when native-speakers provide judgements of sentence-relatedness. It is in this light

that it maked sense to evaluate a linguistic description in terms of its paraphrase classifications, by measuring the predictions derivable from it against experimental evidence.

The Nature of the Evidence

What is the nature of this experimental evidence? In this study it consists of judgements by subjects of the suitability of each of a set of responses to a particular question. Presented with:

(1) Who did Nixon choose?

The subject was required to decide, for each of (2)-(4), for example, whether they constituted suitable responses or not:

(2) It was Agnew that Nixon chose.

(3) The one who chose Agnew was Nixon.

(4) It was Nixon who chose Agnew.

The experiment yielded a response distribution giving information about subjects' judgements of substitutability of sentence types, syntactically defined within the linguistic description, as answers to particular questions. This provided an operational definition of a paradigmatic paraphrase set, namely those sentences which were allowed as answers to the same question. An experimental hypothesis, based on a selected linguistic description, was evaluated in the light of subjects' responses.

In summary, then, it is apparent that once the *in toto* interpretation of a grammar as a theory of language behaviour, or as an invulnerable representation of the user's 'knowledge of his language' is not maintained, there is no direct and obvious link between linguistic and psychological constructs. There are, however, still predictions which can be made on the basis of linguistic descriptions, and can be tested, using the methods of experimental psychology. One such prediction, concerning paraphrase sets, is tested here, and language-users' intuitions, with regard to the paraphrase classification proposed within a linguistic description, are examined.

CHAPTER TWO

PARAPHRASE

Preliminaries

There is no question about the importance of the notion of paraphrase within linguistic theory, particularly since Katz and Postal introduced the requirement that transformations preserve meaning (Katz and Postal, 1964). They suggested paraphrase as a heuristic for grammatical descriptions (sentences intuited as paraphrases 'by virtue of non-synonymous expressions' could be related in the grammar and thus simplify it). What may be arguable is the behavioural utility of the notion.

The concept of paraphrase has as its basis an everyday usage, like many other notions which have been formalised within linguistics, or have been the subject for discussion by philosophers. For instance, Searle (1969, p. 11), in the introduction to his discussion of various aspects of the philosophy of language, points out that characteristic problems in the area arise from our ordinary experience of language. He makes the further and more important point that our inability to establish adequate criteria for these phenomena does not mean that they do not exist:

> I have no operational criteria for synonymy, ambiguity, nounhood, meaningfulness or sentencehood. Furthermore, any criterion for any one of these concepts has to be consistent with my (our) knowledge or must be abandoned as inadequate. The starting-point, then, for this study, is that one knows such facts about language independently of any ability to provide criteria of the preferred kinds for such knowledge. (loc. cit.)

While this position is extreme, it illustrates the point that linguistic notions such as paraphrase, while much constrained by comparison with everyday usage, are at least likely to have a basis in ordinary language behaviour.

The 'ordinary language' use of the term paraphrase is expounded in this dictionary definition, which contains some points of note:

> Paraphrase, V: to express the meaning of (a word, phrase, etc.) in other words; to render or translate with latitude. (OED)

1. It follows from this definition for the verb paraphrase that an adequate criterion for two utterances being paraphrases is taken as a (rough-and-ready) meaning-equivalence. Various interpretations of this criterion are the foundation for all linguistic discussion of paraphrase.
2. There is no mention in this definition of syntactic paraphrase, which refers within linguistic theory to a set of differing structural arrangements of identical lexical items, with preservation of the functional relationship among these items. Syntactic paraphrase is a formal

linguistic innovation.

3. The use of the term translate is a reminder of the comparison or connection that is often suggested by philosophers, between translating an utterance of language A into an utterance of language B, and paraphrasing an utterance of language A into another utterance of language A (e.g., Quine, 1960, Ch. 2, passim; Cohen, 1966, p. 79; Nolan, 1970, p.15). Such a comparison suggests a link between formal notions of paraphrase relationships between sentences, and a behavioural interpretation of such notions. Paraphrase, as a speaker ability, may be looked on as a specialised linguistic ability, akin to translation in a bilingual speaker, which is not central to normal language use, but which may be looked on as a useful adjunct to it. If one broadens the scope of 'normal language use' to include not simply communication in the narrow sense of provision of information but to take into account, for example, a speaker's use of humorous or ironical effects, or ambiguity which needs resolving, the ability to elucidate meaning by 'saying the same thing in other words' appears to be potentially a very useful skill[1]. In the more restricted area of syntactic paraphrase, true paraphrases may be looked on as alternative choices available to a speaker at a particular point in discourse.

---

[1]See Derwing (in press, section 5.3) for similar views on paraphrase as an ability

Meaning-equivalence

Central to any notion of paraphrase, obviously, is meaning-equivalence. However, the notorious inexactness of the term 'meaning' itself has given rise to differing ideas within linguistics as to what is, and what is not, a paraphrase set. Compare these roughly contemporary assertions by linguists interested in the question:

> Although parenthetical remarks in the appendices of traditional grammars acknowledged the existence of constructional paraphrase, it was rarely noted how pervasive, how characteristic of language, is the availability of alternative constructional types that keep meaning constant (Gleitman and Gleitman, 1970, p. 2).

> What I am saying is that the notion that language is full of paraphrases, in the sense of different surface structures which reflect the same semantic structure, is mistaken (Chafe, 1971, p. 11).

That linguists working within roughly the same area can entertain such contradictory notions indicates that something is wrong. By examining differences in their criterion of meaning-equivalence for paraphrase, and specifying the imprecision of the terms 'meaning' or 'semantics', it can be shown that the contradiction exemplified above, and also to be seen in the work of other linguists, is only apparent, and that although the two points of view are not reconcilable, they are at least comprehensible, within the distinctions suggested. Given

the distinctions made, an operational approach to paraphrase can be taken which avoids the problems inherent in the linguistic approaches to date, by avoiding complete reliance on the notoriously fallible evidence afforded by linguistic intuition (cf. Leech, 1970a, p. 346).

Semantics: distinctions

In this discussion, and indeed in all that follows, the sentence, and the relations holding among its constituents, is of central interest. While discourse phenomena (in the sense of extra-sentential linguistic context) are incorporated into the linguistic discussion, and play a role in the experimental part of the study, it is their effect on intra-sentential structure which is of concern here. Thus any statement of meaning-equivalence or non-equivalence is with reference to the sentence.

To illustrate the varying viewpoints on paraphrase which linguists have held, and to provide a convenient descriptive basis for the experimental materials, it is appropriate to distinguish the following meanings of the term semantics, and to relate these distinctions to their

syntactic reflexes in sentence structure[1]:

1. The semantics of content, which refers to the lexical items in the sentence and their particular functional relationship;
2. The semantics of illocution, which covers meaning differences which are a function of the context into which a sentence fits; the semantics of illocution can be subdivided into:
   (a) the semantics of mode, and
   (b) the semantics of discourse.

The semantics of mode refers to structural features of the sentence which indicate the attitude of the speaker toward the content-semantics; examples would be interrogation, negation and the use of modal auxiliaries. The semantics of discourse is that effect of linguistic context on sentence structure which has been described under the headings of <u>focus</u> and/or <u>topicalisation</u>; this generally involves the positioning of constituents in (linear) sentence structure, and the occurrence of certain prosodic features.

---

[1]A similar descriptive division, into semantics of content and semantics of type, is made in a study on grammatical properties of sentences, by Baker, Prideaux, and Derwing (in press). The semantics of content outlined here follows their definition. Other similar divisions are made by scholars of the Prague school, for instance Danes, 1964; 1968.

One intention of the classification of semantics being attempted here is to avoid reference to truth-value as a criterion for equivalence of sentences. Such a notion may be philosophically useful, but in view of the variety of linguistic structures which cannot be judged in terms of their truth-value, such as questions, conditionals, imperatives and structures containing modals, the criterion is restrictive, since it can only apply to statements.

Semantics of content

The semantics of content (Sc), refers to the basic information conveyed by the lexical items in the sentence, together with the structural arrangement in which they are found. Thus in the following set, (1) and (2) are Sc-equivalent, but (1) and (3), and (2) and (3) are not:

(1) The singer imitated the comedian.

(2) The comedian was imitated by the singer.

(3) The comedian imitated the singer.

To assert equivalences and non-equivalences of this kind is to make intuitive semantic judgements which are difficult to define in formal syntactic terms. Clearly word-order alone in English is not adequate for distinguishing functional relationships among lexical items (as (1) and (2) indicate). To approach a satisfactory definition, in fact, one has to select a basic word-order, and define the allowable configurations of auxiliary verbs, and the permutations of

the basic word-order which do not alter the functional relationship among the lexical items. To avoid this rather messy problem of a purely surface syntactic definition, Sc-equivalence is defined here with respect to sameness of lexical items, and functional equivalence of NPs in the sentence with respect to the verb; two sentences such as (1) and (2) are judged equivalent because singer and comedian fulfil the same role in the sentence in relation to imitate. (In both sentences, singer is agent, and comedian is object).

An Sc-equivalence is what holds among sentence-families of the type explicitly related by Z.Harris (e.g. 1957) and by Chomsky (1957). A Syntactic Structures grammar, for example, defined a kernel or basic sentence, and a set of transformations on the kernel, such as passive, negative or question, and combinations of these. The definition of the semantics of content results in such sentences being Sc-equivalent to (1)[1]:

(4) The singer didn't imitate the comedian.

(5) Did the singer imitate the comedian?

(6) Wasn't the comedian imitated by the singer?

---

[1]That there are some reservations to this claim was pointed out to me by G.D.Prideaux. WH-questions, for example, if they are considered part of a sentence-family, may not be Sc-equivalent with the kernels of which they are transforms. This issue is further discussed on page 34.

In defining Sc, the emphasis is on lexical content in a consistent functional relationship, and Sc-equivalence is maintained through changes in the semantics of mode exemplified in (4)-(6).

Senantics of illocution

In Austin's attempt to determine exactly what it is that we are doing when we say something, he finds it expedient to define a term "illocutionary act", which is:

> (the) performance of an act in saying something, as opposed to the performance of an act of saying something (ibid., p. 99).

His purpose is to make distinctions among various kinds of utterance as acts, as part of a linguistic context in which the utterance fits. His contention is that "illocutionary force" within that context, which can often be tied down to various intrasentential structural features, is an important feature of its overall semantics. He wants to distinguish it from meaning glossed as 'sense or reference', the meaning of the words of the sentence (i.e. Sc). This is all too often the focus of attention, to the exclusion of all else, with occasionally unfortunate philosophical consequences.

The aspect of his work that is specifically interesting here is his insistence, for the full interpretation of what an utterance means, of attending to (a) aspects of structure which signal the 'attitude' of the speaker toward the

content-semantics of the utterance (some examples would be imperatives, interrogatives, the use of certain modals), and (b) the 'occasion of use' of the utterance -- its linguistic context, which may have some effect on the arrangement of items in a sentence (the phenomena of focus and topicalisation would be examples). Points (a) and (b) will be dealt with separately below under the headings of the semantics of mode (Sm), and the semantics of discourse (Sd).

While the term <u>semantics of illocution</u> is used here to acknowledge Austin's insight into the relevance of mode and discourse semantics for the meaning of an utterance, it must be noted that his term is not being used in exactly the way he used it. His concern with utterances was philosophical, and led him into areas which are of no concern to this enterprise. More crucially, the term "illocutionary act" as he applied it can have no uniform linguistic definition, since it refers to a wide variety of disparate structures, which may be semantically alike, but are syntactically heterogeneous in unpredictable ways (cf. Austin, 1962, p. 98). Thus while it may be possible to locate syntactic reflexes of Sm in some permutations or expansion of the AUX node, or of Sd in permutations of NPs under certain conditions, such precision is not possible for all the utterances Austin wanted to view as illocutionary acts.

Semantics of mode

The inclusion in the AUX node of a negative particle, the inversion of the first auxiliary with the subject NP to signal interrogation (or alternatively the use of rising pitch-movement on the final stressed lexical item of the sentence), the expansion of the AUX node to include a modal, do not affect the Sc of the sentence, but manifestly affect its meaning. It might be argued that there is nothing new in this observation, and that linguists since Bloomfield have talked about Sm under the headings 'structural meaning' or 'grammatical meaning'. As Lyons (1968, p. 435) has pointed out, however, it is necessary to distinguish at least three different senses of 'structural meaning':

1. The meaning of grammatical (closed-set) items such as function words, or of grammatical categories such as adjective or verb.
2. The meaning of grammatical functions: either the traditional functions such as subject-of, or object-of, or the more recent formulations in terms of 'cases' or 'roles' which may define the function of a constituent in a sentence.
3. The meaning of sentence-types such as interrogative, negative, imperative, in relation to a declarative type.

It is the last distinction which comes closest to Sm, which, however, covers more than 3. does. First, it is necessary to emphasise, under the heading Sm, the expression in the utterance of the speaker's attitude toward what is being

said. This does not only involve denials of the Sc, or questions about the Sc, but emphatic assertion, statements of obligatoriness or possibility, or doubt, for example. Secondly, it is not altogether clear in discussions of structural meaning that the declarative sentence type has a 'meaning' just as does the interrogative, or negative. Sm includes the declarative as the 'unmarked' type. (Sc + Sm)-equivalence defines weak paraphrase (P1). Two sentences are P1-equivalent if they are equivalent with respect to content-semantics and semantics of mode. This a stronger requirement for sentence-relatedness than Sc-equivalence, and, as will be seen, is that used by linguists working within the standard theory to define syntactic paraphrases. This requirement does not allow semantic equivalence between (7) and (8)-(10), but defines (8)-(10) as equivalent:

(7) Joyce didn't dislike Gogarty.

(8) Was Gogarty disliked by Joyce?

(9) Did Joyce dislike Gogarty?

(10) Joyce disliked Gogarty?

Semantics of discourse

It was pointed out earlier (p. 11), that the meaning of the sentence, as opposed to larger units of discourse, is the main concern here. This is because linguistics has, for the most part, dealt with the sentence in its descriptions

of distributional regularities. However, while a single sentence may constitute the whole of a discourse in rare instances, for the most part sentences are embedded within discourses which are a linguistic interchange between two or more speakers. Preceding discourse has an inevitable effect on the form of a particular sentence. Linguistic analyses of discourse have until recently concentrated on such factors as anaphoric reference, as exemplified by the use of pronouns (Dik, 1968, p. 15; Halliday, 1964), tense and aspect (Fletcher, 1969), and finally, the distribution of information in the sentence, as marked by non-segmental features such as tonicity, and certain aspects of constituent structure (Halliday, 1967). Lately, transformational linguists have shown an interest in similar phenomena. As might be expected, transformational treatments of the influence of context on sentence syntactic structure, or sentence semantics, appear under several headings. Some of these will now be briefly examined, to illustrate in some more detail what is meant by the semantics of discourse.

Chafe (1970), in a description of English which is his own, but which can still be called transformational, devotes Chapter 15 to the discussion of a subject which he justifiably claims has been "neglected by the mainstream of linguistics". This subject is the distribution of information in the sentence. Chafe makes a distinction between <u>old</u> information, that which is already shared

between speaker and hearer when the sentence begins, and new information, which is related to the old by the speaker. There are two aspects of sentence structure which mark the information distribution, the linear arrangement of items in the sentence, and tonicity. Thus in the following sentence, empty, which is at the end of the sentence and is marked by pitch-movement (and greater amplitude), carries the new information:

(11) The box is empty.

The choice of box as subject here (if a subject-predicate division of the sentence is made), or topic (if a topic-comment distinction is preferred), is dictated by the information available to speaker and hearer from the preceding context. This is only an outline of what Chafe has to say, but it is apparent that he is making the important claim that certain aspects of linguistic context are predictably represented within the structure of a sentence.

This claim is also made by Chambers (1970), in the course of a detailed attempt to formally incorporate context influences within a sentence-generating grammar. The study concentrates on NPs in English, and separates within the description what Chambers sees as two basic phenomena, focus and topicalisation. Topicalisation involves (in transformational terms) the front-shifting of NP constituents, as in passivisation or clefting; focus is the

back-shifting of constituents to the intonation centre, as in pseudo-clefting and dative-movement.

Another attempt to come to grips with these problems is made by Chomsky (1971, p. 199). He considers the questions of focus and presupposition in relation to sentences like (12):

(12) It isn't John who writes poetry.

Here John (marked with the tonic) is the focus of the sentence, and the sentence expresses the presupposition that someone writes poetry. Such aspects of the sentence have to be included within the total linguistic description, he claims, as they are relevant to semantic interpretation. Chomsky opts in this paper to determine focus and presupposition from the surface structure; the focused item in the sentence is that which is at the intonation centre, and the "presupposition can be determined by replacing what is taken as focus by an appropriate variable" (ibid., p. 202). The merits or demerits of this analysis, or indeed of those mentioned earlier, are not at issue here. What is of note is that linguists have become increasingly aware that the structure of a sentence is not exhaustively described within the standard theory model, and that surface structure variants within a standard theory description are not semantically equivalent. It is realised, moreover, that such variants are determined to some extent by context, and that a semantic notion such as focus, which can be used to

distinguish surface variants, can have regular and predictable features of syntactic structure associated with it. The importance of the linguists' revised descriptions for any experimental study is clear: if the descriptions of focus and topicalisation are behaviourally relevant, their syntactic reflexes will affect judgements about sentence materials that subjects might make. Two sentences which are P1-equivalent might still be non-equivalent by virtue of contextual determination.

Thus a distinction is necessary in the semantics of illocution between Sm and Sd. Two or more sentences will be strong paraphrases (P2-equivalent) if they are (Sc + Sm + Sd)-equivalent. P2-equivalence is thus the strongest form of sentence-relatedness, and legislates descriptively for the possibility that in a behavioural situation where context is available, subjects may regard P1-equivalents as not mutually substitutable because focus and topicalisation requirements are not met. This account of Sd has virtually ignored the question of presuppositions, another recent preoccupation of linguists. Very generally, the presuppositions of a sentence can be characterised as the conditions which the universe has to meet in order for that sentence to be appropriate in use. Specifying such conditions is a daunting task, and most linguists have been careful to attempt description of only a subset of these conditions, namely "those that can be related to facts about the linguistic structure of sentences" (Fillmore, 1971, p.

277). Thus Kiparsky and Kiparsky, 1971, for example, endeavour to account for the syntactic dissimilarities of the complements of certain predicates in English, by differentiating the predicates according to their presuppositions.

It remains to be seen whether this excursus by linguists into wider semantic realms will be successful even within their own terms. Meanwhile, the restricted nature of the linguistic phenomena whose presuppositions have been examined (chiefly single lexical items), and the vagueness of the notion, preclude any operational approach in this area at present.

Semantics and synonymy

The descriptively convenient distinctions that have been attempted are relevant to the meaning of the sentence, and by extension, to sentence-families which are Sc-equivalent. What appears to be excluded is the possibility of two or more sentences being paraphrases by virtue of having synonymous lexical items. Such relationships are defined by some linguists in terms of the truth-value of the sentences involved. Thus Leech (1970b, p. 9) states that paraphrase may be defined in terms of implication: "assertions X and Y are paraphrases of one another if X implies Y and vice versa".

It is clear from the examples Leech gives that he does not envisage a paraphrase relation being restricted to sentences which have the same lexical items (op. cit., p. 16), but to include sentences with different lexical items. The problems with synonymy are well-documented in the philosophical literature; and since, if paraphrase relations can be maintained by substitution of lexical items, syntactic paraphrase would be a special case of a more general phenomenon, possible consideration of the more general phenomenon is merely acknowledged here. The problems raised by an extension of this study to lexical synonymy are open-ended, and not immediately relevant to its purpose.

To illustrate how open-ended the problem is, from the point of view of linguistic description, note that there is no restriction, in synonymy paraphrase, on (a) how many lexical items can be substituted in a given sentence and still retain the original truth-value; or (b) what structural rearrangements are allowed; or (c) what are the permissible interreactions of (a) and (b). Thus given (13), an example of Leech's factual synonymy, (14)-(16) are presumably candidates for paraphrase:

(13) Human beings are often irrational.

(14) Featherless bipeds are often irrational.

(15) Featherless bipeds are often illogical.

(16) Featherless bipeds often act in an irrational manner.

Here (14) has one lexical substitution and (15) two, while both preserve the constituent structure of (13), at the level of major constituents. However, (16) has lexical substitution plus a structurally quite different VP. The synonymy by truth-value criterion is thus at once too strong, in restricting consideration to statements, and too weak, in allowing (it seems) unrestricted substitution. This is a consequence of extending a criterion originally used with single lexical items to cover more complicated structures. Ultimately, any claim for the synonymy of sentences is going to rest on the synonymy of the individual items in the sentence, and such a procedure cannot take account of syntactic aspects of the sentence which are influenced by context, for example.

Linguistic Accounts of Paraphrase

The importance of paraphrase as a linguistic concept and, implicitly, as a behavioural one, is attested by the attempts made by linguists to include it within their formal systems. Z.Harris (1964), Hiz (1964), Katz and Fodor (1963), Katz and Postal (1964), Weinreich (1966) and various followers of Chomsky(1965), have allowed for the specification of paraphrases within their linguistic

descriptions[1]. Recent accounts of transformational theory have emphasised the claim that one of the skills which the native-speaker has, and which the grammar accounts for, is the ability to perceive paraphrase (e.g., Jacobs and Rosenbaum, 1968, p. 7). If different accounts of paraphrase are examined, however, it becomes obvious that there is a wide range of variability among linguists as to what structures are, and are not, equivalent in meaning.

Zellig Harris

If Harris is given his true place in the development of transformational theory, he is the bridge between the structural and generative eras which allows modern linguistics to be viewed as an historical continuum rather than as a classic example of the Kuhnian paradigm of scientific revolution. It was Harris (e.g., 1957) who introduced the term transformation into linguistic theory, claiming that transformational operations can specify, in general, the differences and similarities among sentences.

---

[1]In view of the aims of this study, it is intriguing to note Chomsky's pessimistic view of experimental approaches to notions such as paraphrase:

> There is no reason to expect that reliable operational criteria for the deeper and more important theoretical notions of linguistics (such as "grammaticalness" and "paraphrase") will ever be forthcoming. (1965, p. 19)

Harris's concern to extend his rigorous methodological procedures for structural levels below that of sentence (Harris, 1951), to the sentence level, caused him to search for formal ways of defining the difference between any two syntactic structures which contain elements of the same lexical word-classes, in the same cooccurrence relationship to one another. This definition is expressed by testing transformations of a particular kernel or basic sentence: the transformations can rearrange items in the basic sentence, or insert grammatical morphemes such as the negative marker, or insert empty morphemes such as the DO auxiliary, which is required for questions. So the following sentences are transformationally related (Harris, 1957, p. 202):

(17) The workers rejected the ultimatum.

(18) The ultimatum was rejected by the workers.

(19) By whom was the ultimatum rejected?

These examples can be looked at in conjunction with this statement:

> That many sentences which are transforms of each other have more or less the same meaning, except for different external grammatical status, ...is an immediate impression (op. cit., p. 209).

It is obvious from this that Harris is defining meaning-equivalence in terms of Sc^1, the semantics of

---

[1] See page 34 for some reservations to this statement.

content. While Harris's descriptive framework is of exceptional interest for linguistic theory, it is not of primary concern here. What is relevant is his conception of paraphrase relationships. Harris's theoretical orientation was inherited from Bloomfield, and in his methodological procedures he attempted to avoid the problems associated with bringing meaning into linguistic description. In consequence, he attempted as far as possible to avoid reference to the meaning of sentences which he wanted to relate transformationally, but to define the relationship in terms of the formal permutations, or additions of pro-forms or grammatical morphemes. What is problematical in this approach is that it is difficult to sufficiently constrain a discovery procedure resricted to surface structure constituents so that it will not relate sentences like (20) and (21):

(20) The singer imitated the comedian.

(21) The singer was imitated by the comedian.

It was presumably to avoid this problem that Harris suggested in later papers (1964, 1965) that the property of acceptability which sentences have be used as a criterion for determining a candidate paraphrastic set (which can be characterised, roughly, as those sentences which can be decomposed into a common kernel plus one or more specifiable transformations). He suggests the acceptability criterion because the use of direct meaning-judgements presents

special problems. It is too individual -- there is a sense in which every sentence differs from every other sentence, and there is therefore no point in attempting to relate them on the basis of meaning (Harris, 1964, p. 473).

Harris's acceptability criterion is deemed to work in this fashion: sentence set A below, all the sentences of which can be described by the same configuration of category labels (N1 V N2 P N3), can be compared in acceptability to sentence set B, which exemplifies the structure (N1 V N3 N2):

SET A

The man mailed a letter to the child.

The man mailed a letter to the moon.

The man mailed the moon to the sun.

The idea mailed the moon to the cheese.

SET B

The man mailed the child a letter.

The man mailed the moon a letter.

The man mailed the sun the moon.

The idea mailed the cheese the moon.

Harris claims that the acceptability differences among the sentences of set A are maintained among those of set B, despite the difference in structure. If, however, another structural change is defined, to produce set C, with the form (N1 V N3 P N2), his contention is that the

acceptability differences among the individual items of a set, maintained through the transformation of set A into set B, do not hold when A is transformed into C:

SET C

The man mailed the child to a letter.

The man mailed the moon to a letter.

The man mailed the sun to the moon.

The idea mailed cheese to the moon.

Harris therefore holds that while the set A to set B transformation does define a paraphrase set, the set A to set C transformatien does not.

The end result of this 'acceptability' procedure is visualised as a body of transformations which will define a paraphrase set on a particular kernel. The acceptability test is obviously viewed by Harris as a necessary adjunct to formal discovery procedures when these break down (as in the case of the set A to set C transform, when an operation which is formally comparable to the set A to set B transform fails to produce structures which are grammatical in the language, for example the first sentence of set C). The problem is that Harris views the acceptability test as a mechanical procedure which is an alternative to direct meaning-judgements. This is quite clearly not the case, since any test of acceptability involving sentences must necessarily involve meaning-judgements. In addition, the test only succeeds if the original sentence set contains

items among which there are acceptability differences (i.e. anomalous and non-anomalous sentences, as in set A)[1] .

In summary, then, Harris's pioneering approach to a description of the structure of related sentences cannot avoid, in the end, an appeal to meaning to differentiate structures which could be related in a purely formal fashion. The basis for his candidate paraphrase sets, as the quotation below indicates, is their Sc-equivalence:

> But aside from such differences (as differences of emphasis or style PJF) transforms seem to hold invariant what might be described as the information content (Harris, 1957, p. 162).

Henry Hiz

Characterising a paraphrastic set as a set of sentences which speakers recognise as all 'saying the same thing', Hiz (1964) endeavours to formalise this relationship by relying on a distinction between lexical words, and grammatical words or 'constants'. Harris had tried unsuccessfully to provide formally-based methods for finding paraphrases. Hiz, however, begins with paraphrase sets which speakers have provided. If the grammarian compares a number of these

---

[1]Its success or failure can only be discussed if one admits, for the sake of argument, that the question of acceptability differences arises among the members of a sentence set. This is fairly hard to credit with anomalous sentences.

sets, he may discover that while there are non-constant items (lexical words), there are also constants (function words, affixes), which appear in the same combinations.

Hiz records that the repetitions or permutations of non-constant phrases coincide with the appearance of particular constants. The descriptions of these similarities constitute the rules of paraphrasing (op. cit., p. 10). The grammatical constants which accompany the non-constant lexical items yield, eventually, a "battery of paraphrastic transformations". One constraint placed by Hiz on his transformations (which have here no formal definition or exemplum) is that, unlike Harris's, they do not change the 'mood' of the sentence, so that an interrogative will not be obtained from a declarative. His paraphrase sets, then, are made up of sentences which are (Sc + Sm)-equivalent. However, one unfortunate result of the Hiz formulation is that it is too loose, as it stands, to exclude sentences which have the same lexical items and grammatical constants but, because of order changes, are Sc distinct (the very problem which Harris tried to avoid by his acceptability condition). For instance, Hiz claims that the changes introduced in paraphrasing are only those of word-order, and insertion or omission of the grammatical constants. If the words are John, easy, cut, and the constants is, to, -ly, -s, (22) and (23) can be Hiz-type paraphrases:

(22) John easily cuts.

(23) John cuts easily.

(23) is ambiguous, so for at least one reading of (23), (22) is not a paraphrase.

Harris and Hiz thus have similar difficulties in restricting their formal apparatus to defining just those paraphrase sets which are, in some sense, semantically-equivalent. The significant difference between their accounts, ignoring for the moment the descriptive problems, is in the range of sentences they admit as equivalent.

Chomsky's 'Syntactic Structures'

Chomsky, in Syntactic Structures (1957), continues in the tradition established by Harris with regard to the classification of sentence structures into equivalence sets. While he does not use criteria of meaning-equivalence, he claims, in a chapter devoted to the explanatory power of linguistic theory, that the fully explicit formational theory he proposes gives an intuitively correct classification for the following set of sentences, which are "understood in a similar manner" (op. cit., p. 90):

(24) John ate an apple.

(25) Did John eat an apple?

(26) What did John eat?

(27) Who ate an apple?

Sentence (24) is structurally described as a kernel sentence (i.e. a sentence to which only obligatory transformations have applied). The others in the set consist of the same kernel sentence plus one or more optional transformations.

The Syntactic Structures equivalence class is thus a syntactically constrained set which Chomsky assumes is meaning-related, to judge from his assertion that a speaker of English will comprehend (24)-(27) in a similar fashion. It is not clear, however, that (24)-(27) are Sc-equivalent; while (24) and (25) certainly are, it might be argued that (26) and (27) are not Sc-equivalent to (24) and (25), since they do not fulfil the requirement of sameness of lexical items. This is certainly true on the 'surface', but this view may be countered by pointing out that within the Syntactic Structures description, (24)-(27) are Sc-equivalent since they all have the same kernel sentence (op. cit., p. 91), and (26) and (27) are formed on this kernel by applying transformations Tq and Tw. The only drawback to this counter-argument is a footnote (p. 69), which suggests that applications of Tw are limited "to strings X-NP-Y where NP is he, him, or it". This is at variance with Chomsky's account of an equivalence class (p. 91ff), since it suggests that Tw cannot apply to a kernel sentence like (24), which does not contain a pronoun. The issue of whether or not (24)-(27) constitute an

Sc-equivalence set is therefore confused. What is apparent is that these sentences are no more than Sc-equivalent: the transformations on the kernel produce sentences that differ with respect to Sm.

Katz and Postal

Grammars written in the transformational-generative framework after Chomsky (1957) followed his sentence-set definition of kernel, plus optional transformations, to yield imperative, interrogative or negative structures. Katz and Postal (1964), with a more highly-developed syntactic model, introduced the methodological principle that transformations preserve meaning. This had the effect that sentence-families, now defined as sentences with the same deep structure, were P1-equivalence classes (Sc + Sm-equivalent). As Prideaux (1972, p. 15) has pointed out, the Katz-Postal paraphrase principle depends on synonymy, which was understood as "equivalence of cognitive meaning" (Katz and Postal, p. 112). This is a somewhat misleading phrase, since it appears to have behavioural implications. This is not so. All it signifies is "equivalent semantic interpretations as defined by Katz and Postal", since they claim earlier that "the semantic interpretation that a string of formatives has assigned to it provides a full analysis of its cognitive meaning" (op. cit., p. 12). Katz and Postal's "cognitive synonymy", then, is defined only within their linguistic model, without reference to any

evidence other than their own intuitions.

The meaning-preservation constraint (henceforth the MP constraint) was introduced formally to simplify the operation of the semantic component originally proposed by Katz and Fodor (1963). If no meaning-change takes place during the derivation of a sentence, then the semantic component can operate solely on the deep structure configuration. This innovation was supported by internal syntactic evidence, showing, for example, how the description of interrogatives could be simplified by adopting the MP constraint and using a Q-marker in the deep structure to trigger obligatory transformations.

In the Katz-Postal revision of Chomsky's 1957 theory, transformations have the function solely of interrelating phrase-markers; to reinterpret the Katz-Postal model in terms of this study, everything relevant to Sc is defined in the deep structure, as it was before in the kernel sentence, but now so also is the semantics of mode. Transformations can rearrange or delete constituents, but cannot add to either Sc or Sm. Thus the following sentences, despite having distinct surface structures, are P1-equivalent by virtue of having the same deep structure:

(28) It is apparent that Raquel Welch has charisma.

(29) That Raquel Welch has charisma is apparent.

The incorporation of the MP constraint into the grammar

reults in a claim, derived from the grammar, about relationships among sentences, which appears to have empirical consequences. An attempt was made by Katz and Postal to say what these consequences were, when they stated a heuristic principle for linguists to follow:

> Given a sentence for which a syntactic description is needed; look for simple paraphrases of the sentence which are not paraphrases by virtue of synonymous expressions; on finding them, construct grammatical rules that relate the original sentence and its paraphrases in such a way that each of these sentences has the same sequence of underlying P-markers (1964, p. 157).

This principle has given rise to considerable confusion, if one is to judge from the conflicting descriptions of paraphrase sets exemplified for only one set of structures in Chapter Three. The main reason for the confusion is the licence extended by such a principle to the linguist's unaided intuition, to determine what the limits of the term 'paraphrase' are, a task which is not made easier by the polysemy of the term. The heterogeneity of structures described as paraphrases suggests that the linguist's intuition is only a rough guide, and that more reliable behavioural evidence needs to be found, in order that the classifications achieved within the linguistic system bear a closer relation to the intuitions of native-speakers.

Chomsky's 'Aspects of the Theory of Syntax'

The MP constraint gained immediate acceptance among linguists working within a transformational-generative framework, and was endorsed by Chomsky in Aspects of the Theory of Syntax (1965, p. 132). The idea of paraphrase sets as consisting of what have been called here (Sc + Sm)-equivalent sentences thus became enshrined in modern linguistic theory, and a good deal of effort by linguists was devoted to discovering and formulating paraphrase relations. It may therefore be useful to consider, at this point, the formal characteristics of P1-equivalent sets within the standard theory, particularly with regard to surface structure commonalities among such sets. In other words, what surface similarities among sentences would linguists look for, in order that such sentences would be candidates for inclusion in a standard theory paraphrase set?

In deep structure terms, paraphrases within the standard theory can be described as follows:

(a) they contain the same lexical items and the same grammatical markers;

(b) the lexical items are in the same functional relationship to one another, as defined by the application of the categorial rules of the base to create complex symbols.

Unfortunately, deep structures and their components are not

readily amenable to empirical testing. In general, it is the output of grammars -- surface structures, roughly -- which native-speakers have intuitions about. Consequently, some of the commonly proposed paraphrase sets will be examined in an attempt to factor out of them some common features in terms of descriptive similarities. What form do the rearrangements of items and constituents take? The sets are listed below[1]:

A. RELATIVE CLAUSE/PRENOMINAL ADJECTIVE

(30) Spiro acknowledged the girl who was tall.

(31) Spiro acknowledged the tall girl.

B. PARTICLE MOVEMENT

(32) John looked the girl up.

(33) John looked up the girl.

C. PASSIVISATION/DATIVE MOVEMENT

(34) Joyce sent a letter to Nora.

(35) Joyce sent Nora a letter.

(36) Nora was sent a letter by Joyce.

(37) A letter was sent to Nora by Joyce.

D. EXTRAPOSITION

(38) That Montreal will win the Stanley Cup seems likely.

(39) It seems likely that Montreal will win the Stanley Cup.

---

[1]Sample references for the sets are: A: Smith, 1964; B: Jacobs and Rosenbaum, 1968, p. 105; C: ibid., p. 146ff; D: ibid., p. 171ff. For references for E, see Chapter Three.

E. CLEFTING

(40) It was George that left United in the lurch.

(41) It was United that George left in the lurch.

(42) It was George that United was left in the lurch by.

(43) It was United that was left in the lurch by George.

In terms of the result of surface descriptive processes, these sets fall into two main classes: set A, which involves the rearrangement and deletion of major categories; and sets B-E, which involve only the rearrangement of constituents. In category terms, the rearrangements are by no means homogeneous. Set B involves the permutation of a sub-category of V; set C involves the permutation of NPs, with some structural addition; and set D depends on the EXTRAPOSITION transformation. In order to satisfy the structural description of the set D transformation, an NP which is also an S must be present in the phrase-marker. In the CLEFTING set, several possibilities arise for discussing the permutations -- these will be detailed in Chapter Three. Proleptically, however, it can be pointed out that the the description of the clefted structures which is preferred on linguistic grounds involves an EXTRAPOSITION transformation, similar to that used for set B.

The transformations described above have one thing in

common: they are all optional rules[1]. However, the heterogeneity of their structural descriptions suggests that under this term may be subsumed a number of distinct operations. It would be advantageous, from a descriptive point of view, if experimentally determined evidence about paraphrase sets could be handled within the formal apparatus of the grammar. For instance, one might speculate, on the basis of the descriptive distinctions in the previous paragraph, that permutation of NPs resulted in sentences which were P1-equivalent (as ACTIVE-PASSIVE); while sentences which involved EXTRAPOSITION of an NP-S constituent were P2-equivalent. Such speculation can only be answered experimentally. This problem of the relationship between the descriptive apparatus and experimental evidence is returned to in Chapters Five and Six.

Beyond Aspects

Aspects of the Theory of Syntax was a watershed in the development of syntactic theory. It marked the culmination of a decade's intensive effort by formalising in detail a deep structure which was syntactic -- it remained in a close

---

[1]An exception to this generalisation is PASSIVE, which has been formulated as an obligatory rule triggered by an optional element in the base (e.g., Katz and Postal, 1964, p. 73).

relationship to surface structure -- yet claimed to provide all the necessary information for semantic interpretation. It characterised relatedness among sentences (the relatedness being Sc + Sm-equivalence) in the manner described in the previous section. Following Lakoff's (1970) revision of the theory, motivated in part by a desire to "allow certain sentences to be derived from underlying structures that more closely reflected their semantic representations" (1970, p. ix), such constraints on sentence relatedness as held within the STM were relaxed, and the appearance of abstract predicates such as INCHOATIVE allowed (44) and (45) to be derived from the same deep structure:

(44) The official reddened with anger.

(45) The official became red with anger.

The further elaboration of Lakoff's revisions (e.g., Lakoff, 1971; McCawley, 1968) has implications for the study of paraphrase in general. Most notably, the Katz and Postal condition that sentences are paraphrases 'not by virtue of synonymous expressions' can be safely abandoned. If there are such things as synonymous lexical items, then the lexicalisation of a set of (primitive) semantic elements, as in a generative semantics base structure, presumably involves optional choices, resulting, for example, in (46) and (47) being paraphrases:

(46) The concubine disturbed Elmer.

(47) The concubine bothered Elmer.

In addition, if predicate-raising is an optional transformation, then (48) and (49), which involve more than tne substitution of one lexical item for another, are also paraphrases[1]:

(48) Oswald killed Kennedy.

(49) Oswald caused Kennedy to die.

The relaxation, within formal models, of the constraints of the Aspects theory, leads into uncharted territory which this study will not pursue. While not necessarily adhering to the standard theory _in toto_ as a descriptive framework, this study does deal with paraphrase within the lexical and syntactic constraints of the standard theory.

Besides Aspects: Wallace Chafe

Chafe, in several articles (e.g., 1967; 1971), and in his book (1970) has attempted, by outlining a formal system which is different to the standard theory, to redress what he sees as an imbalance in contemporary linguistics. He claims that current theorists, while paying lip-service to the notion that grammars relate meaning and sound, have concentrated mainly on phonetic data and ignored that from semantics. His formal system will not be reviewed in detail, but some observations are pertinent. The generative power of his grammar resides in _semantic structures_, which

---

[1]The examples given are at least P1-equivalent.

are tree-like configurations of verbs, and nouns in various designated relationships to the verb, such as patient, agent, and goal (these semantic roles are thus similar to Fillmore's cases (Fillmore, 1968)). Processes of symbolisation and linearisation convert semantic structures into syntactically well-formed strings. Chafe's view on paraphrases, quoted on page 10, concerns these strings, and is supported by arguments concerning the lack of utility of the truth-value criterion for establishing synonymous sentences, and the insensitivity of linguists to meaning-differences such as those between active and passive sentences. Hence while he is prepared to admit that (50) and (51) reflect "random, post-semantic" choices available to the speaker, he claims that (52) and (53) are different in meaning:

(50) Steve put his clothes on.

(51) Steve put on his clothes.

(52) Oculists eye blondes.

(53) Blondes are eyed by oculists.

Chafe's difference of opinion with other linguists can be explained within the framework for semantics outlined earlier. It is apparent that he will only admit P2-equivalents as synonymous, that is, sentences which are (Sc + Sm + Sd)-equivalent. Gleitman and Gleitman, however, are prepared to admit (54) and (55) as examples of 'constructional paraphrases" (1970, p. 3):

(54) The heiress was pinched by the gate.

(55) The gate pinched the heiress.

Such sentences are only P1-equivalent, and this is the source of the apparent contradiction revealed by the juxtaposition of views on page 10. In the less restricted view of linguists following the Katz-Postal heuristic, "cognitive equivalence", which can be interpreted as (Sc + Sm)-equivalence, is a sufficient condition for syntactic paraphrase. In contrast, Chafe takes a more restricted view, and considers the permitted order of constituents, as well as the interaction of constituent order and tonicity, to be as relevant to the meaning of a sentence as its basic lexical items. It is this latter view which is accepted in this study, for the important reason that linguistic descriptions which have this 'extra-sentential' orientation can best reflect the psychological evidence available to us concerning speakers' judgements of sentence-relatedness. This is because any evidence we collect which involves native-speakers' reactions to sentence materials will inevitably be affected by their everyday language experience. Such experience involves a considerable interaction with their fellows, as well as language activity on their own part which is not restricted to the production of sentences in isolation -- the chief objects of the linguist's attention. If a linguistic context which is a common one in normal language experience can be built into the experimental situation, the judgements subjects make, it

could be argued, will be more 'natural' than if the context had been excluded.

Experimental Approaches to Paraphrase

In some psycholinguistic investigations, the ability to paraphrase has been taken for granted, to the extent that subjects' paraphrasing is used as a measure on which experimental conclusions are based. Fillenbaum, 1970, for instance, in an attempt to avoid what he sees as the problem of the intrusion of memory and retrieval processes into tasks which purport to deal with linguistic processing, asks subjects directly for paraphrases of affirmative and negative yes/no questions. On the basis of their responses, he is able to claim significant differences between the two types of question -- differences which had not been apparent in an earlier study (Clifton and Odom, 1966), which had involved storage and retrieval of sentences by subjects. Other studies have used similar methods to approach, for example, the problem of multiple self-embedding (Blumenthal, 1966), and the verb complexity hypothesis (Fodor et. al., 1968).

The use of paraphrase as a measure in these studies indicates that the experimenters regard it as a relatively uniform index of comprehension. Yet the question of what is and what is not a paraphrase, or the related question of the types of sentences that subjects produce as paraphrases of a

particular structure, have not, in general, been addressed. There are, however, two recent studies which bear on these questions. The first, Gleitman and Gleitman (1970), investigates the relations between compound nouns and certain sentence-types in English; the second, (Honeck, 1971), looks at the relationship among (a) syntactic paraphrases, (b) lexical paraphrases, and (c) syntactic + lexical paraphrases. It should be stated at the outset that the reviews here of both these studies are in essence unfavourable. It is felt, however, that since both represent detailed attempts to bring experimental evidence to bear on the notion of paraphrase, they are themselves worth detailed criticism.

Gleitman and Gleitman: paraphrase as an ability

Elaborating on a study by Livant (1964), Gleitman and Gleitman (1970) devised an experimental situation in which subjects were required to give a "phrase that means about the same thing" (p. 232) as a compound noun which was syntactically derived by two applications of the compounding rules (p. 106). The compound nouns were lexically restricted in this fashion: there were 144 compounds, and all of them contained, in some syntactic relation, the words bird and house ; the other term in the compound was chosen from a list of only twelve other lexical items, which were either verbs, adjectives, or nouns. Some sample compounds are the (a) items below; the (b) items are paraphrases of

them. Stress, which is crucial to interpretation, is marked on the compounds; the superscripts can be interpreted as follows: ^{1} is primary (strong) stress, ^{2} is secondary (intermediate) stress, and ^{3} is tertiary (weak) stress:

(56a) bird^1 house^3 boot^2

(56b) a boot to wear in a house for birds.

(57a) dry^1 bird^3 house^2

(57b) a house for birds which are dry.

(58a) bird^2 house^1 boot^3

(58b) a boot that a bird wears in the house.

(59a) dry^2 bird^1 house^3

(59b) a house for birds that is dry.

The experiment was run on three distinct groups of subjects: (a) graduate students and postdoctorates; (b) undergraduates and college graduates; (c) high school graduates[1]. The Gleitmans designed their experiment to answer two basic questions:

1. Can people "devise phrases that are related to compound nouns" (p. 105), where the relationship between stimulus and response is that described by the Gleitman and Gleitman rules for compounding?
2. Are there significant differences among groups (a), (b) and (c) in their performance of the task?

In answer to the second question, they report "massive differences in the ability of the three population groups to

---

[1]The three groups each contained 7 subjects.

provide syntactically determined paraphrases of the compound noun stimuli" (p. 128). (This finding has recently been replicated, for (a) and (c) groups, by Seer, Gleitman and Gleitman, 1972). The groups differed, not only in the absolute number of errors made, but in the kind of errors they committed. (An error in paraphrasing was a submission by a subject of a sentence not equivalent in meaning to a given compound, as judged independently (and highly reliably) by three scorers).

As far as the first question is concerned, Gleitman and Gleitman report that "in about half the instances, our subjects did provide syntactically determined responses, responses that conformed in form and content to the description we have proposed" (p. 119). One might want to conclude, from this carefully designed study, that the relationship between the grammar and the linguistic capacities of the individual can be looked on, for compound nouns at least, as direct. For example, the authors are able to cite experimental evidence for the following transformational rule; (the rule cited is (iv) on p. 81. Its format has been changed to clarify the structural description (SD) and structural change (SC)):

					P				
SD:	(T1)	N1	-#1	WH	PROVB	(T2)	N2	-#2	
SC:	1	2	3		4	5	6	7	→
	1	6+2	3		0	0		7	

Not represented in this format is the stress assignment, which appears in the Gleitmans' structural change as $N2^{1}$ $N1^{2}$. The rule formalises, supposedly, the relationship between structures such as (60a) and (60b):

(60a) the man who brings the mail

(60b) the mail-man

The SD of rule (iv) is a formal representation of (60a). The operations specified in the SC of rule (iv), involving the front-shifting of item 6 (mail), and the deletion of items 4 and 5 (who brings the mail), bring about a formal representation of (60b).

There are, however, some problems with this book. The extent to which it falls short of the mark may be realised if it is pointed out that the authors express in their preface the hope that "the empirical step we have taken...underlines the central role of paraphrasing in understanding the relations between speaker and linguistic system", without either providing a satisfactory fragment of a linguistic system for their experimental materials, or giving a reasonable behavioural interpretation of these relations between speaker and system.

The linguistic system, as presented, is basically Chomsky's standard theory, and it is intimated that the experiments reported are concerned with systematic paraphrases of the standard theory type (P1-equivalents).

This is obvious from the early discussion (p. 2ff), and from footnote 1, p. 15:

> It should be noted throughout, however, that we restrict our discussion to 'constructional paraphrase' and ambiguity.

It was noted earlier (p. 2), that such paraphrases have a straightforward characterisation. It is distressing to find, therefore, on examination of the Gleitmans' formal account of the rules of the grammar which deal with compounding, some back-pedalling as far as the linguistic system is concerned (pp. 72-73):

> Our purposes will be limited: some grammatical features will be described informally, hopefully in a way that is accessible to readers not acquainted with the intricacies of formal linguistics. Special descriptive problems with compounds also make it inconvenient to describe them in orthodox transformational forms. The "rules" we will provide roughly characterise certain relations between compounds and relative clauses, but they are not "rules of grammar", in a strict sense.

Gleitman and Gleitman are candid about one of the specific problems involved with their formalism, which is that of the grammatical category PROVERB, which appears in the SD of rule (iv) above as PROVB. As they point out (p. 91ff), if a linguist chooses, as they do, to relate compounds to relative clauses derivationally, then one problem he has is that some of the material deleted in the compounding transformation is irrecoverable. Thus any one of (61)-(63) would be allowable, intuitively, as the source for (64),

although they contain different verbs:

(61) The man who brings the mail.

(62) The man who delivers the mail.

(63) The man who takes the mail around.

(64) The mailman.

Thus it is impossible, given a standard theory framework and the desire to relate compounds to relative clauses derivationally, to provide an explicit formalism. One might concede, then, at this point, that it is not possible for some of the Gleitmans' rules to be rules of grammar "in a strict sense". However, if they want to avoid certain descriptive problems, such as that of PROVERB, by formulating a quasi-rule, they cannot then claim that their rule is iterative -- that, since the base rule specifying the constituency of NP is recursive, the compounding rule can come to be applied again to its own outputs. Such a claim requires, of course, a strict formalism, since any lack of specification in the output of a rule will mean that that output will not meet the conditions for iteration. As an example, it can be noted that rule (iv) does not allow for N2 to be sister-adjoined to N1 in its structural description. That is, if, in a particular structure, N2 happens to be sister-adjoined to N1, rule (iv) will not apply. Now the effect of the structural change of rule (iv) is to sister-adjoin N2 to N1; hence, in the form given by the Gleitmans, rule (iv) cannot be an iterative compounding

rule. If the authors wish to avoid descriptive problems with a quasi-rule, then they cannot expect it to function in a specific, formally well-defined operation.

Even if a solution is found to this difficulty, there is a further problem, which is more serious, since it raises the posssibility that the recursivity which the Gleitmans claim is built in to their experimental materials, has no formal basis. One of the items used as an example of compounds formed by the iterative application of rule (iv) is (65):

(65) a lady bug-house.

The compound bug-house is formed by application of rule (iv) to (66):

(66) a house for bugs.

Gleitman and Gleitman claim (p. 82) that if bug-house is an output of rule (iv), "that output is a noun, so it may appear in the left hand of a rule meeting the condition for (iv)", and so produce (65). The major difficulty with this analysis of (65) is that it is not at all clear what is its underlying structure, before any application of the compounding rules. In the first place, Gleitman and Gleitman do not provide formational rules for a string such as (67), which is said to underly (65):

(67) a house for bugs for ladies.

It is difficult to imagine what structure would be assigned to this string, within the standard theory model, without embedding one of the postmodifying prepositional phrases as a relative clause. There are then two possible underlying structures, (68) and (69):

(68) (a house(wh is for ladies) for bugs)

(69) (a house (wh is for bugs) for ladies)

By the conventions of the transformational cycle, and the application of the compounding rules, these structures are transformed into (70) and (71) respectively:

(70) a bug lady-house.

(71) a lady bug-house.

Of these, (71), of course, is the desired output, and so (69) is one possible underlying source. These examples indicate that it is possible to find an underlying source for (65), but that it is not (66), the source suggested by Gleitman and Gleitman. If (69), or something like it, is the base structure for (65), the question of recursion does not arise, since the generation of (69) only requires one application of the NP rewrite rule. There is, however, iteration of the transformational rule (iv) on this structure, since two applications of it are required on (69) to generate (65).

It is interesting to note, in this connection, that the data generally do not provide substantial support for a

linguistic description of compounds involving either iteration or recursion. Of the 144 responses by a subject from group (a), listed in Appendix 1, only 40 can be construed as reflecting the application of two rules. The response mode which is most common reflects only one application of a compounding rule, as in (72), which is a response to the stimulus kill bird-house :

(72) the name of a bird-house in which birds are killed.

Clearly the subject has not unravelled this compound in full, but only so far as was necessary to make a semantic interpretation of it; this meant that bird-house remained as a single unit in her response, and was not further analysed.

The problems reviewed so far are pertinent to the question of the relations envisaged in this book between speaker and linguistic system. As seen towards the beginning of the book, this relationship is not indirect:

> If people can provide paraphrases in a principled way, something very like a transformational account of language must be postulated to account for this skill (p. 26).

What, then, of the operational definition of paraphrase provided by Gleitman and Gleitman? It turned out that nearly fifty per cent of the responses to compound nouns were relative clauses, which fitted, roughly, the structural description of rule (iv), or of a small set of similar rules. In other words, given an item whose structure was

that of the output of rule (iv), subjects gave an item whose structure was the input. To interpret this result as a vindication of the grammar as far as paraphrase is concerned only makes sense if the input to, and output from, rule (iv) are regarded as regular surface alternations. There are two reasons why this is not the case. First, by virtue of the PROVERB in the case of the nominal compounds, structures of the form of the input to rule (iv) can only be part of the derivational process of structures of the form of the output; second, even prescinding from rigid adherence to the form of the grammar, it is unlikely that compounds and the relative clauses associated with them fulfil the conditions for P2-equivalence in this study -- that they are mutually substitutable in all environments. Consider the unlikely event of a hockey commentator substituting (74) for (73):

(73) The goal-scorer for Boston was Esposito.

(74) The one who scores goals for Boston was Esposito.

The substitution would have to hold if the Gleitman rule (v), (p. 83), played a central part in the relation between the speaker and the linguistic system.

The amount of space spent on the Gleitmans' study is not an attempt at purely destructive criticism, but an endeavour to show up the difficulties involved in doing research in this area. To introduce the concept of constructional paraphrase, which has a strict linguistic definition, and then to ignore that definition in the

delimitation of experimental materials, is one problem; to discover an experimental effect, and then to try to relate this to the already undermined linguistic system, is another. Finally, to draw conclusions about the central role of paraphrasing in this relationship is unwarranted.

One of the basic problems with the whole study is the choice of compounding as an area of investigation. This is an area of English syntax which exhibits restricted productivity -- a notoriously difficult problem for transformational grammars to deal with, as Matthews (1971) has pointed out for a different syntactic area. He cites the descriptive problems posed by the class of nouns which can be semantically grouped as "communications": some of these nouns can be used as verbs, so that we can have he cabled that... , or he radioed that... , but he lettered that... , or he messaged that... , are not acceptable. The question is, where and how, descriptively, to draw the line. Compounds afford complex descriptive problems if a decision is made, as by Gleitman and Gleitman, to produce them derivationally. Take, for instance, their rule (v), which is to handle compounds with verbal components, like inn-keeper :

SD:	Indef	-#	WH	Vt	-Tns	NP	
SC:	1	2	3	4	5	6	→
	4+1	2	o	o	o	(of+6)	

For example, the structural description of the rule is met by a structure roughly like (75):

(75) Someone who keeps inns.

The structural change of the rule transforms (75) into keeper of inns.

This output then serves as the input to rule (iv), to produce the required output, inn-keeper. The rule reflects, with its -Tns specification, the Gleitman view that compounds for the most part have associated with them a semantic feature of permanence, or habituation -- the milkman is the man who brings the milk, daily, but you are unlikely to call the boy who clears the drive once or twice during the winter the drive-clearer. There is an element of truth in this view, but unfortunately it is not the only constraint on compounding, nor is it always applicable. To illustrate the latter point, consider an example already used:

(73) The goal-scorer for Boston was Esposito.

As was pointed out, it would be counter-intuitive to claim that the compound in this sentence is derived from a relative clause with a tenseless, generic verb, as in (74). There must be some other source for goal-scorer in (73). For (76), however, something like (77) would not be an unreasonable underlying form, since there is an element of habituation associated with the scoring:

(76) Esposito is the league's leading goal-scorer.

(77) Esposito is the league's leading one who scores goals.

Two different underlying forms are required for the same surface form, therefore. The problem here, of course, is the -Tns specification, which is the syntactic reflex of what the authors feel to be a semantic constraint on compounding. To remove this constraint is to allow drive-clearer and other, more bizarre compounds to be defined within the grammar in the same way as inn-keeper and other common forms. A more reasonable conclusion might be to avoid treating compounding as a transformational process.

While the difficulties raised in this review affect the conclusions which Gleitman and Gleitman draw concerning the relationship between speaker and linguistic system, there is no question that they have provided interesting and provocative data, which still require an explanation. In particular, their finding of differential abilities between their three subject groups should have implications for other investigators[1].

---

[1] This review has concentrated on the authors' free response study. They performed another experiment, after a lapse of time, using responses originally produced by subjects, in a forced-choice situation. Subjects were given two paraphrases of a compound, told one was right and one was wrong, and told to select the "best answer". Results, in terms of differential ability between groups, were similar to the first experiment. This further experiment was ignored because it does not materially affect the criticisms of the first experiment.

Honeck: a taxonomy of paraphrases

Honeck (1971), a short study which does not require the detailed treatment accorded to Gleitman and Gleitman, consisted of two experiments using sentence materials defined as paraphrases. The second experiment, which was a recall task, can be ignored, bearing in mind the problems of confounding storage and retrieval problems with syntactic processing (Fillenbaum, 1970). The first experiment involved similarity ratings, by subjects, of sentences related to a "base" sentence in these ways:

1. Transformationally (T); if the base sentence was (78), then (79) is claimed to be a T paraphrase:

(78) The fight evoked the emotions that perplexed the boy that wept.

(79) The emotions that were evoked by the fight perplexed the boy that wept.
(i.e., (78) and (79) are no more than P1-equivalents, in present terms).

2. Lexically (L); substitution of synonymous lexical items for the content words in (78) results in (80):

(80) The struggle elicited the feelings that puzzled the lad that cried.

3. Formalexically (F); as well as the lexical

substitutions of (80), transformational operations are carried out, producing, for example, (81):

(81) The feelings that were elicited by the struggle puzzled the lad that cried.

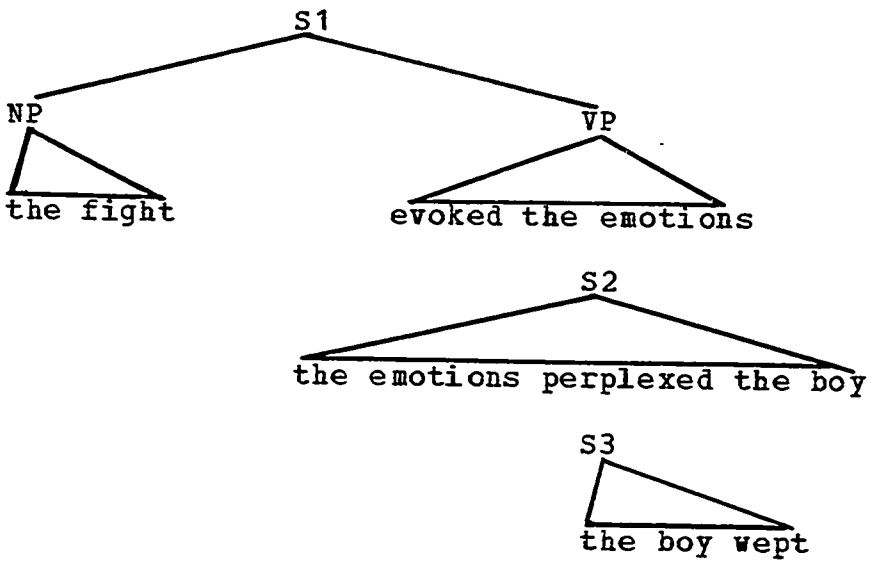
Honeck presented ten sets of eight sentences -- one base, three T-related sentences (though he does not specify the form of the transformations), three F-related, and one L-related. He asked subjects to rate them on a seven-point scale for similarity of meaning. Results reported were T < L < F, i.e. that the transformationally related sentences were judged more similar to the base than either the lexically related or the formalexically related sentences. This result would be interesting, since it appears to favour syntactic paraphrases over the others, were it not for the obvious flaws in Honeck's study.

First, the sentences which are claimed to be transformationally related to the base are not all so related. One of Honeck's T-relations, for instance, produces (82) from the base (78):

(82) The emotions that were evoked by the fight perplexed the boy that wept.

Now the phrase-marker for (78) is, schematically, (83):

(83)



the nearest structure to (82) which can be producee from this phrase-marker is (84):

(84) the emotions by which the boy that wept was perplexed were evoked by the fight.

So-called T-related structures like (82), or even (83), are not in fact transformationally derivable from (84), for the simple reason that they do not maintain the subordination relations of the base sentence; both (82) and (83) alter the matrix proposition of (78). They do not maintain Sc intact. This basic error in the experimental materials persists with the formalexically related sentences.

Secondly, there is a problem with the statistical analysis. An analysis of variance (Sentence sets x Paraphrase type) was performed on the data constituted by taking as subjects' raw scores for the T and F paraphrase type, the mean of the three instances of each type, for each

base sentence. A significant effect of paraphrase type ($p < .001$) is reported. The experimenter then performed t-tests on all possible means, and reports them all to be significantly different, "thus confirming the earlier prediction". The earlier prediction was that T paraphrases should receive higher ratings (i.e., closer to 1), and L and F should receive lower ratings. Quite apart from the dubiety of the author's a posteriori comparison among means, the all-significant-differences report suggests a finding he does not want, namely that there is the same difference between T1 and T2 as there is between T3 and F1, for instance. If all means are compared and are found to differ, there is no basis for classifying subsets of these means together into a T-class, and an F-class or whatever. Finally, there is some indication in the discussion that the author is not entirely in control of the linguistic constructs he is trying to manipulate (not a wholly unreasonable position for a psychologist, considering the obscurity of some of the constructs). In an attempt to explain why L and F paraphrases have different mean ratings, (the mean rating for the L condition is 2.59, and for F, 3.10), he produces the following memorable illustration of his confusion (p. 372):

> In short, it is argued that differences in performance between the two conditions reflect the differences between competence and performance (structure), that it was the greater processing required in order to subsequently compute this structure that induced Ss to perform differently in the F condition.

In short, this study is unable to shed any light on the phenomenon of syntactic paraphrase.

CHAPTER THREE

CLEFTED SENTENCES IN ENGLISH

The structures used as experimental materials, cleft, pseudo-cleft and reverse pseudo-cleft sentences, are referred to here generically as clefted structures. The terms refer to a common belief among linguists that these structures, while clearly consisting of two clauses, are related to simple active declarative sentences which contain the same lexical items in the same functional relationship. The clefted sentences are seen as placing a constituent from the related simple sentence, often but not always an NP, into a position of grammatical and intonational prominence. No definitive linguistic description, or even a complete survey and critique of previous descriptions is attempted here. However, the major structural features of clefted sentences are outlined, along with various grammatical descriptions proposed for them. One of these descriptions, that of Akmajian(1970), eventually serves as the basis for the experimental hypothesis.

Structural Features

Cleft sentences

The term cleft refers to a structural type which is not syntactically unique, at first appearance. Both (1) and (2) below consist of a matrix sentence followed by a relative clause as schematised in (3):

(1) It is the girl who is helping George.

(2) It is the girl who is helping George.

(3) (IT + BE + NP (S))

In fact, only context in the written language could bring out the meaning difference between the two sentences. If the sentences are spoken, there are prosodic differences between them, with the tonic on the nuclear syllable of the NP in the matrix sentence indicating that (1) is the cleft[1] (see Lees, 1963 and Huddleston, 1971 for similar observations). The semantic difference between (1) and (2) can be illustrated by considering questions to which they would be suitable answers:

---

[1]The underlining of a lexical item indicates the placement of the tonic. The term 'tonic' (after Halliday, 1967 and Crystal, 1970) is preferable to the more familiar term 'primary stress', since the physical dimension of tonicity is primarily pitch movement, though duration and intensity do play a role.

(4) Who/Which one is helping George?

(5) Which girl is that?

In response to (4), which is a request for identification, (1) specifies girl, in contrast to some other one in the extralinguistic context. Sentence (2), on the other hand, adds information about a girl already specified in (5)[1]. As Huddleston (1971,p. 246) points out, the it in (1) is non-anaphoric -- it does not have an antecedent in the preceding discourse; it in (2), however, is anaphoric -- it refers to the girl of (5).

The semantic difference between these two structurally similar types can perhaps be better brought out by a pair such as (6) and (7):

(6) It is the blonde who I am marrying.

(7) It is the girl who I am marrying.

Clearly, even in this enlightened age, (7) is unlikely to be used to resolve any problem of identification on the part of the questioner, whereas (1) is used by the speaker to emphasise the blonde as opposed to a bird of a different colour.

---

[1] These two different placements of the tonic can be viewed, then, as two ways of relating this syntactic string to the context, and thus bringing about the semantic difference between them (cf. Gunter, 1972, p. 199).

Although tonic placement is the only way to distinguish a pair such as (1) and (2), if spoken, there are other differences between cleft and non-cleft structures of the form of (3). Certain restrictions on what may appear in the matrix NP of one structure do not hold for the other (cf. Quirk et al., 1972, Ch. 15; Schacter, 1972; and Huddleston, 1972, p. 245ff). So, for instance, clefts can have proper nouns in the NP position of (3), as antecedent to the embedded sentence, as in (8), whereas structurally similar non-clefts, such as (9), cannot:

(8) It is George who is helping the girl.

(9) *It is George who is helping the girl.

Secondly, the non-clefts can have certain indefinite pronouns as antecedents to the relative, but not the clefts, as is apparent in (10), (the putative cleft), and (11):

(10) *It is someone who is helping the girl.

(11) It is someone who is helping the girl.

These differences would seem to reflect semantic facts about the function of cleft sentences in highlighting a constituent, by marking it syntactically and prosodically. There seems little likeliehood that a situation would arise where this would be appropriate for an indefinite pronoun, while it clearly is appropriate for a proper noun.

More generally, there is apparently a much wider range of constituents which can be relativised in the clefts than

in the non-clefts. In particular, prepositional phrases of various kinds can appear in the antecedent position, for example:

(12) It was for reasons known only to himself that he left.

(13) It was at four o'clock that the plane landed.

(14) It was in Chinatown that they found him.

While these facts would have to be incorporated in a full description of clefts, they are merely acknowledged here, and no attempt is made to deal with them exhaustively. Interest is restricted to those cleft structures which have NPs as antecedents to the relative clause.

Pseudo-cleft Sentences

Another construction type, distinct on the surface from the cleft, but with a similar two-clause structure, is that referred to by transformationalists as the pseudo-cleft, exemplified in (15) and (16):

(15) What we want is Watney's Red Barrel

(16) The one who is helping the girl is George.

This structure reverses the order of the cleft, having the relative clause, with or without preceding proform, followed by the matrix BE + NP. As in clefts, the constituent which appears in the matrix sentence NP position has tonic

placement on its nuclear syllable, but here, this follows the regular pattern for English declarative sentences. Despite the structural differences between clefts and pseudo-clefts, they appear similar in function. For instance, (18) could as easily serve as a response to (17) as (1) can:

(17) Who/Which one is helping George?

(18) The one who is helping George is the girl.

Halliday (1967, p. 223), claims that this type of construction is "...a highly favoured clause type in Modern English, not least in informal conversation".

One major difference between cleft and pseudo-cleft is that the latter can have either a participle + NP or a VP complement following BE in the matrix sentence, as in (19) and (20), respectively:

(19) What he was doing was riding his bike.

(20) What he wanted was to ride his bike.

Contrast the unacceptable (21) and (22), the analogous cleft structures:

(21) *It was riding his bike that he was doing.

(22) *It was to ride his bike that he wanted.

Again, responsibility for these more complex structures is disclaimed here, and only those pseudo-clefts with an NP in the matrix sentence will be of concern.

Reverse Pseudo-cleft Sentences

These structures are quite simply achieved by switching the positions of the sub-strings of the pseudo-cleft sentence, which occur on either side of the copula, BE. Thus from (19) is derived (23), and from (24), (25):

(23) The girl is the one who is helping George.

(24) What the truck hit was the bus.

(25) The bus was what the truck hit.

While there is a difference in linear order of constituents between pseudo-cleft and reverse pseudo-cleft, the tonic remains on the same constituent in both. Reverse pseudo-clefts have not generally been recognised in transformational descriptions, possibly because the copula switch transformation necessary to derive them from pseudo-clefts is not wholly productive for other structures containing the copula. One cannot, for instance, switch the two substrings of (26) around without producing the unacceptable (27):

(26) John is tall.

(27) *Tall is John[1].

Linguists working outside a generative framework, however, explicitly relate pseudo-cleft and reverse pseudo-cleft (Quirk et al., 1972, Ch. 15; Halliday, 1967, p. 233), and there is experimental evidence reported in Hornby, 1972, which suggests that their intuitions are correct. Hornby had presented subjects with pictures representing an activity, which was simultaneously described to them orally, with a cleft or pseudo-cleft sentence. Sixty seconds after the last picture-sentence pair was presented, the pictures alone were presented, and the subject was asked to recall the sentence that had described the picture when it was originally presented. Although no reverse pseudo-clefts were present in the original stimuli, such structures made up a proportion of the 'recalled' responses, indicating an intimate relation, for some speakers, between these structures and pseudo-clefts.

---

[1]There are, of course, some equative structures which appear to be relatable, for example (a) and (b):
(a) John is the leader
(b) The leader is John
There may, however, be semantic differences between these types-- vid. Halliday, 1967.

Analyses

General Problems

There are three separate problems associated with past analyses of clefts and pseudo-clefts:

1. The underlying simple sentence hypothesis (USS), exemplified by Kac (1969) and Smaby (1971).
2. The P1-equivalence assumption, apparent in Lees (1963), as well as Kac and Smaby.
3. The separate analysis hypothesis, to be seen in Peters and Bach (1968, reported in UESP, 1969) as well as Kac and Lees.

USS hypothesis. If, within the standard theory, or indeed any grammatical theory which attempts to relate different sentence structures, it is assumed that clefted sentences are derived from simple sentences, the problem of 'structure-building' immediately arises. This term refers to the addition of nodes and /or branches to the phrase-marker resulting from a transformation, which were not in the phrase-marker meeting the structural description of that transformation. Structure-building is not in itself indefensible, (cf. Chambers, 1970, p.208), but its unrestricted use has been frowned on by linguists. If the USS hypothesis is to be reflected in the description, structure-building is necessary, but it needs to be constrained, as the examples below indicate. There is

evidence that the auxiliary verbs in the two clauses of a cleft can be to some extent independent, as the appearance of a modal auxiliary in the matrix sentence of (28) shows (this fact is first pointed out in Lees, 1963):

(28) It may be the girl who is helping George.

It is difficult to see how this sentence, with the added modal auxiliary, could be derived from the simple sentence, (29):

(29) The girl is helping George.

To preserve the USS hypothesis, then, a proponent might want to maintain that (28) derives not from (29), but from (30), in an attempt to explain the appearance of the modal:

(30) The girl may be helping George.

Unfortunately, the nearest cleft paraphrase of (30) would seem to be (31):

(31) It is the girl who may be helping George.

These examples indicate that, while there is an Sc-equivalence between simple sentences and clefts, it is the verbal auxiliary in the relative clause (the embedded S) of a cleft, which reflects the auxiliary in the Sc-equivalent simple sentence, and the matrix sentence verb is to some degree independent, though it must of course be

an auxiliary[1]. These facts also hold for pseudo-clefts, as (32) and (33), the analogues of (28) and (31), illustrate:

(32) the one who is helping George may be the girl.

(33) The one who may be helping George is the girl.

If the USS hypothesis is to be retained, the description must allow structure-building, but it must constrain it in such a way that the relationship between the simple sentence auxiliaries and those of the embedded S in clefted sentences are accounted for.

P1-equivalence. Given the hypothesis that simple sentences underly clefts, there is an obvious temptation, within a transformational description, to assume that the four clefts derivable from a single simple sentence are systematically related, as for instance (34)-(37), with (29) as the source sentence:

(34) It is George who the girl is helping.

(35) It is George who is being helped by the girl.

(36) It is the girl who is helping George.

(37) It is the girl who George is being helped by.

---

[1]There must be tense agreement between the matrix verb and the auxiliary verb of the relative clause; (a), which does not maintain this, is unacceptable:

(a) *It was the girl who may be helping George.

In terms of the semantic distinctions made in the previous chapter, this constitutes at best a P1-equivalent set, since the sentences are not all functionally equivalent -- for instance, (34) and (35) differ from (36) and (37) in that they answer different questions. If the syntactic reflex of focus in clefts is the positioning of an NP under tonic in the matrix sentence, then (34)-(35) are Sd-distinct from (36)-(37). On the basis of arguments in the previous chapter, it is assumed that (34)-(35), and (36)-(37) will constitute two distinct P2-equivalent sets; by the same logic, the pseudo-clefts and reverse pseudo-clefts can be listed in a P1-equivalent set as (38)-(45), and sub-divided into two P2-equivalent sets, (38)-(41) and (42)-(45):

(38) The one who the girl is helping is George.

(39) The one who is being helped by the girl is George.

(40) George is the one who the girl is helping.

(41) George is the one who is being helped by the girl.

(42) The one who is helping George is the girl.

(43) The one who George is being helped by is the girl.

(44) The girl is the one who is helping George.

(45) The girl is the one who George is being helped by.

Separate analyses. As was pointed out earlier, some linguists have tended to analyse clefts and pseudo-clefts separately. Akmajian (1970) rightly notes, however, that these structures (he is referring to P2-equivalents only)

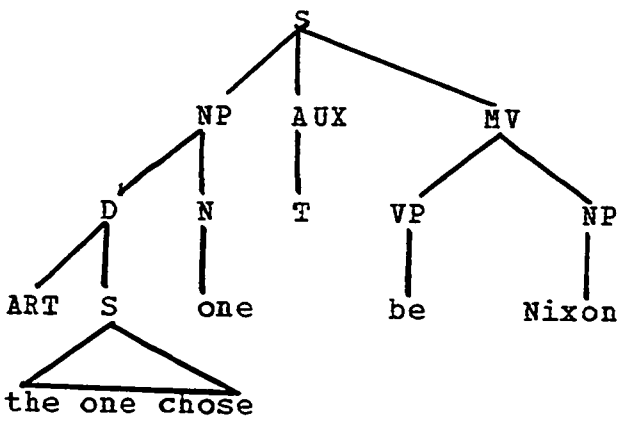
> are synonymous, share the same presuppositions, answer the same questions, and in general .....can be used interchangeably.

This point of view (and eventually the Akmajian analysis) is accepted here, and the remainder of this chapter is concerned with Akmajian's and two other analyses which associate cleft and pseudo-cleft.

Descriptions Linking Cleft And Pseudo-cleft

An early attempt to capture the intuitions (a) that clefts and pseudo-clefts are paraphrastically related, and (b) that this relationship is limited to P2-equivalents, was made by Moore (1967). His approach involves a deep structure for which the phrase-marker is (46):

(46)



Agnew

This deep structure, while facilitating the derivation of pseudo-clefts, formally requires (as noted by UESP, p. 819), a THAT-BE insertion transformation to derive cleft sentences, as the following sequence, recapitulating the

transformational operations on (46), shows:

(47) REL the one who chose Agnew was Nixon

EXTRAPOSITION

was Nixon the one who chose Agnew

IT-REPL

it was Nixon the one who chose Agnew

THAT-BE

it was Nixon that was the one that chose Agnew

THAT-BE-N DEL

It was Nixon that chose Agnew

It is apparent from (47), that not only are there ungrammatical strings in the sequence, but also that the THAT-BE transformation is only a device for linking clefts with pseudo-clefts, and has no independent motivation. This is consequently a description not to be preferred if others are available which do not require this device.

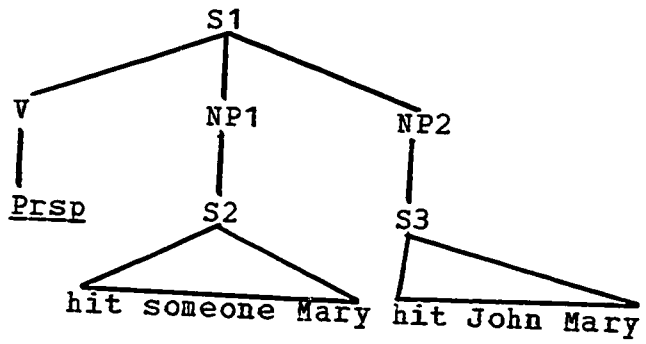
The second analysis, by Muraki (1970), has the same weak generative capacity as Moore's grammar, but differs in assigning a deep structure which contains as a constituent presupposition (Prsp). This a primitive predicate, defined as follows.

> The logical system which underlies the semantic structure of sentences includes Prsp as a primitive predicate. It is a two-place predicate which relates two sentences. It is an asymmetric, transitive,irreflexive relation (Muraki,1970,p.390).

Muraki goes on to reveal the workings of this predicate in

the derivation of cleft and pseudo-cleft sentences. By a complex sequence of transformations, a structure such as (48) allows the derivation of (49):

(48)



(49) The one who hit Mary was John.

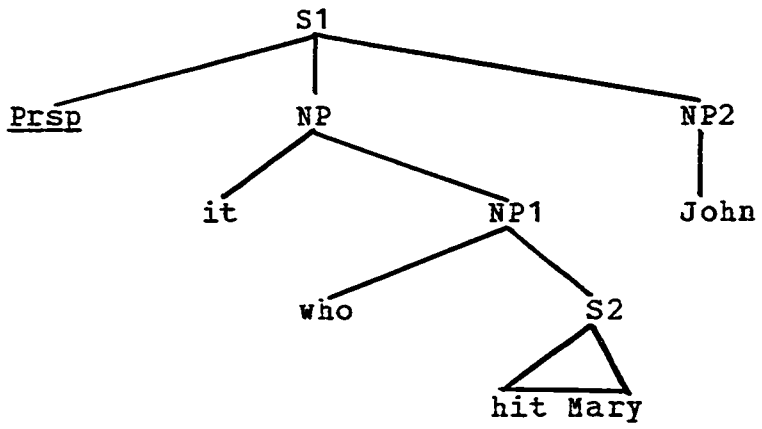
What Prsp means is explained by Muraki as follows. The semantic structure for (49) is given as (50):

(50) (Prsp (someone hit Mary) (John hit Mary))

The semantic structure (50) indicates that "someone hit Mary" is presupposed for "John hit Mary". In other words, the fact that someone hit Mary is a condition for the appropriateness of (49). As well as defining a semantic appropriateness condition, however, Prsp has a specific grammatical role to play. The particular form of the presupposition given by Muraki serves to achieve the correct stress assignment and constituent ordering at the surface. Thus instead of having the syntactic relations among hit, Mary, John, defined by constituent structure, these items are unordered in the deep structure (e.g. S3 in (48)). A linearisation of these items is achieved by another sentence

(S2 in (48)), which is identical to S3, except for a dummy argument, given as a proform. This proform indicates what will eventually be the identified or focused item in surface structure. On the basis of the Prsp, rather implausibly cast as a verb, and the constituent structure of S2, pseudo-cleft and cleft sentences are derived from (48); (51) shows the phrase-marker following the cleft transformation:

(51)

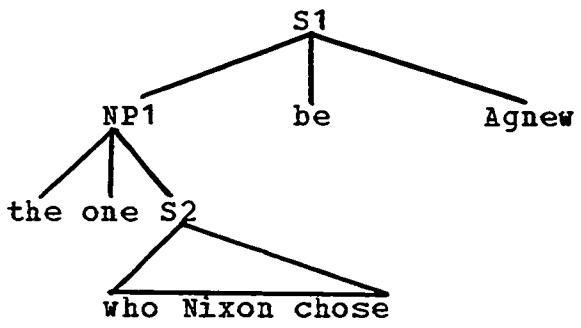


All that remains of S3 in (51) is NP2, and the remainder of the sentence is provided by S2. The importance of the predicate Prsp to this analysis is obvious, since all subsequent structures depend on its relating S2 to S3. It is not clear from Muraki's article what kind of formation rules would include Prsp in the underlying structure as a verb, nor why it is assumed to be unique, since other presuppositions of the eventual cleft structure can be imagined. If Prsp , or at least the relationship holding between S2 and S3, mediated by Prsp, is not unique, then Muraki's structures will generate ungrammatical sentences.

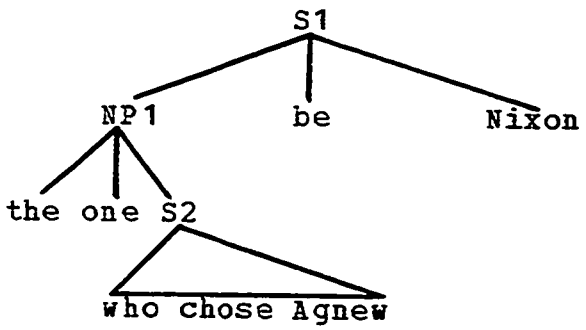
Once again there is a grammatical fragment which generates the desired output, but against which some fairly strong linguistic arguments could be constructed. For instance, there is no motivation for treating Prsp as a verb; nor is there any reason, apart from its usefulness in generating the required output, why this particular presupposition is used. There are other presuppositions associated with this sentence, for example, Mary is present. Muraki gives no indication of the selection procedure for Prsp.

The final description of this area, the one accepted here as the basis for the experimental hypothesis, is that by Akmajian (1970). Akmajian notes the similarities of cleft and pseudo-cleft structures, and uses the latter as a (pre-surface) structure for the former. In his analysis (52) and (53) are distinct structures which underly (54) and (55) respectively:

(52)



(53)

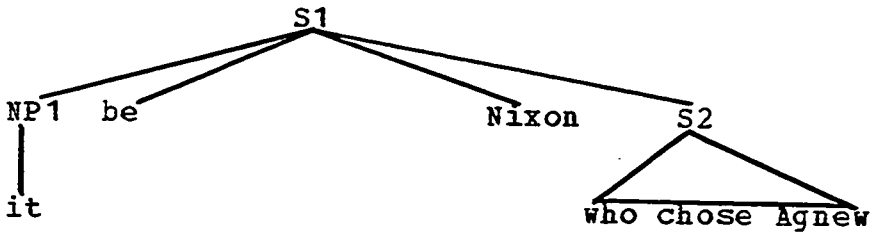


(54) The one who Nixon chose was Agnew.

(55) The one who chose Agnew was Nixon.

Clefts are achieved by EXTRAPOSITION and IT-REPLACEMENT, acting on structures like (53) to produce (56), for instance[1]:

(56)



---

[1]Actually, Akmajian assumes that sentences such as (a) and (b) are acceptable:

(a) Who Nixon chose was Agnew.

(b) Who chose Agnew was Nixon.

This appears to be doubtful; the assumption does,however, facilitate IT-REPLACEMENT, by leaving an empty node, and makes structures like (a) and (b), with human head nouns, comparable to those with non-human heads, like (c):

(c) What he saw was an antelope.

The syntactic arguments for Akmajian's analysis centre on the patterns of verbal agreement in clefts. He notes that while the verb in the embedded S of clefts agrees in number with the 'identified' noun in the matrix sentence, it does not agree in person. If pre-surface structures like (52) and (53) are posited, then the verbal agreement pattern in clefts follows from the pre-existing co-occurrence rules in English syntax. The importance of the verbal agreement patterns, perhaps not so obvious in (54) and (55), is more apparent in (57) as compared with the unacceptable (58):

(57) It is me who is responsible.

(58) *It is me who am responsible.

Because it achieves P2-equivalent classifications of clefted sentences, because it relates clefts and pseudo-clefts via independently motivated transformational rules, and because it accounts for verbal agreement patterns, the Akmajian analysis of clefted sentences is accepted as the preferred linguistic description. The major drawback with it is that it does not deal with reverse pseudo-clefts. It is clear, however, that if these are to be generated by the description, it will have to be by an optional transformation, operating on (52), for example, to switch the positions of NP1 and NP2 around the copula BE. A transformation such as this appears to be necessary in the grammar for a similar operation on different structures (vid. Lakoff, 1970, p. 126). The addition of such a

transformation to the Akmajian description is assumed from now on.

From Description to Experiment

The introduction and background to this study has attempted to demonstrate the equivocality of the term paraphrase, and to provide an adequate descriptive framework for an operational definition of paraphrases, in a selected area of English syntax. This framework is felt to be adequate in that it looks out beyond the confines of the sentence, as it is assumed the speaker does. In addition, the primacy of semantics in both the speaker and the descriptive framework is acknowledged, while at the same time, it is recognised that experimental approaches in this area are generally constrained to syntactic reflexes of semantic facts.

In general, it is claimed that the behavioural test proposed for paraphrases -- mutual substitutability of answers to a question -- will differentiate among P1-equivalent sentence sets. It is argued that the reason for this is that, in the experiment, as in normal linguistic discourse, the distribution of information in the sentence is affected by preceding context, and that the syntactically-definable perturbations of constituent order, with their concomitant intonational features, have semantic relevance for subjects.

More specifically, the experimental hypothesis concerning clefted sentences is based on certain assumptions about the semantic distinctions made earlier, the structure of the experimental materials, and subjects' responses to this structure. The assumptions can be stated as follows:

(a) that the semantic distinctions outlined earlier have syntactic reflexes, to which native speakers advert. In particular, Sd has syntactic reflexes involving the position of an NP in the surface structure of the clefted sentence, and placement of the tonic. Such Sd reflexes are referred to, for convenience, as focus devices;

(b) that the production or recognition of a particular focus device, by a native-speaker, can be influenced by the preceding linguistic environment;

(c) that <u>clefting</u> is a device available to English speakers for focusing a single NP, and that there are three distinct but equivalent ways of utilising <u>clefting</u>;

(d) that a WH-question constitutes a preceding linguistic environment which can request specification of a single NP. It can have, as an adequate answer, a sentence which focuses the NP specifying or identifying the unspecified NP of the question;

(e) that it is nct a requirement on a P2-equivalent sentence-set that its members should exhibit voice equivalence in their embedded sentences. That is, it was thought that the voice of the embedded S should not affect

subjects' choices, since syntactic reflexes of Sd are only likely to be realised in superordinate sentences.

On assumptions (a)-(e), the experimental hypothesis was formulated as follows:

> H1: subjects will select, as suitable answers to a WH-question, a P2-equivalent subset of a P1-equivalent set of clefted structures.

That is, in terms of Akmajian's description, it was assumed that subjects would regard as equivalent answers to a question all and only the following: clefted sentences which have the specifying (identifying, focused) NP in the matrix sentence with tonic placement.

The syntactic cohesion between question and answer in English thus provided a convenient framework for testing the assumptions of this study concerning P2-equivalence, using clefted sentences as examples. The remainder of this study is concerned with the experiment performed using these structures as materials.

CHAPTER FOUR

METHOD

Materials

Subjects (Ss) were presented with 32 distinct sets of questions and answers. The answer set, made up of 12 clefted sentences of different structures, can be looked at as formed on a simple, active, declarative, transitive sentence such as 1[1]:

(1) Nixon chose Agnew.

Where Nixon is subject (S) and Agnew, object (O). The set of all possible clefts, pseudo-clefts and reverse pseudo-clefts formed on this basic informational structure is listed in (2)-(13):

(2)	The one who Nixon chose was Agnew.	PC/A/O
(3)	It was Agnew who Nixon chose.	C/A/O
(4)	The one who was chosen by Nixon was Agnew.	PC/P/O
(5)	It was Agnew who was chosen by Nixon.	C/P/O
(6)	The one who chose Agnew was Nixon.	PC/A/S
(7)	It was Nixon who chose Agnew.	C/A/S
(8)	The one who Agnew was chosen by was Nixon.	PC/P/S
(9)	It was Nixon who Agnew was chosen by.	C/P/S

[1]Appendix A lists all such 'underlying' sentences used for the experimental materials.

(10) Agnew was the one who Nixon chose. RP/A/O

(11) Agnew was the one who was chosen by Nixon. RP/P/O

(12) Nixon was the one who chose Agnew. RP/A/S

(13) Nixon was the one who Agnew was chosen by. RP/P/S

The coding to the right of each sentence, which is used throughout, identifies the structure of the sentence uniquely in terms of (a) the type of clefted structure, (b) the voice of the embedded sentence, and (c) the NP from the presumed underlying sentence which is focused:

(a) C refers to a cleft sentence, PC to a pseudo-cleft, and RP to a reverse pseudo-cleft;

(b) A indicates that the embedded sentence is active, P that it is passive;

(c) S and O refer to the subject and object of the presumed underlying sentence. The occurrence of one of these in the code for a sentence indicates that it is that S or O NP from the underlying sentence which is focused in the clefted structure.

Each underlying sentence such as (1) also has four question-types associated with it:

(14) Who did Nixon choose? Q/A/O

(15) Who was chosen by Nixon? Q/P/O

(16) Who chose Agnew? Q/A/S

(17) Who was Agnew chosen by? Q/P/S

The questions with which Ss were presented thus varied in voice, and with respect to the NP for which specification was requested. Sentence (15), for example, is asking for specification of the object NP of sentence (1); sentence (16) is asking that the subject NP of (1) be specified. Voice was varied to provide a potential response determinant which would be an alternative to focus. Accordingly, half the questions were active and half passive; similarly, half the answer set to each question had active embedded sentences, and half had passive.

The four question-types appear in the study with two types of interrogative pronoun equally represented: who, termed (+human), and what, termed (-human). The underlying sentences for the who question and answer sets contain only (+human) NPs; the what questions and answers contain all (-human) NPs, half of which are animate and half inanimate, since English uses the same interrogative pronoun for both types. What questions are exemplified by (18)-(21):

(18) What did the truck hit? Q/A/O

(19) What was hit by the truck? Q/P/O

(20) What hit the bus? Q/A/S

(21) What was the bus hit by? Q/P/S

Sentences (18)-(21) suggest an underlying sentence, (22):

(22) The truck hit the bus.

Any transformational description, of course, would derive what questions in almost exactly the same way as who questions. The only difference would be in feature marking in the base, and certain consequent differences in application of transformational rules. Similarly, the answers (23)-(34) for what questions would differ from answers for who questions only in base feature markings, despite the surface difference, that (-human) PC and RP structures omit any phrase such as the one before the relative pronoun:

(23)	What the truck hit was the bus.	PC/A/O
(24)	It was the bus that the truck hit.	C/A/O
(25)	The bus was what the truck hit.	RP/A/O
(26)	What was hit by the truck was the bus.	PC/P/O
(27)	It was the bus that was hit by the truck.	C/P/O
(28)	The bus was what was hit by the truck.	RP/P/O
(29)	What hit the bus was the truck.	PC/A/S
(30)	It was the truck that hit the bus.	C/A/S
(31)	The truck was what hit the bus.	RP/A/S
(32)	What the bus was hit by was the truck.	PC/P/S
(33)	It was the truck that the bus was hit by.	C/P/O
(34)	The truck was what the bus was hit by.	RP/P/S

The experimental hypothesis does not predict any difference between Ss' paraphrase sets in response to who questions and those in response to what questions, despite the surface

structural differences between their answer sets.

A further constraint on experimental materials was that all underlying sentences (Appendix A), contained NPs with heads that were (+definite), either by virtue of the definite article, or the fact that they contained proper nouns. This uniformity was to safeguard against an effect reported by Wales (1970). He found an interaction between definiteness and focus in an experimental task, such that Ss tended not to regard (-definite) NPs as focused, whatever their linear position in sentence structure.

Subjects and Procedure

Ss were 77 high school juniors and seniors attending summer session at Los Banos High School, California. Each S was presented with a booklet containing 32 sets of questions and answers, in a classroom session controlled by the experimenter. The first page of the booklet consisted of a set of instructions, the text of which appears in Appendix B. The instructions were designed to clarify matters for Ss as follows:

(a) they were asked to respond to a particular question by marking with a plus sign whichever sentences from the answer set were considered 'suitable'. The instructions point out that all the answers are suitable in a sense, since all of them convey information which could be said to answer the question. Certain answers might, however, seem more natural

to them, in the sense that they would be more likely to use them if they were answering the question;
(b) Ss were asked to pay particular attention to reading every sentence in its entirety, to avoid missing any subtle differences which might exist between sentences. This, and a request for them to read the question again before considering each sentence, was an attempt to forestall strategies which might develop, such as cueing on the first or last item in the sentence, while ignoring the rest of the structure.

Ss' progress through the booklet was self-paced (though there was an upper time-limit of one hour for completion of all items in the booklet), and there was no reinforcement of their responses. They were required to mark with a plus sign those answers they regarded as suitable, and with a minus those they did not.

The figure of 32 questions, with accompanying answers, was arrived at as follows: 4 instances of each of 4 question-types, x 2 (since there was equal representation for (+human) and (-human) questions). It was felt that this number would not create undue stress for Ss. The questions are formed on the basic sentences listed in Appendix A. It will be noted that there are 32 sentences there, and not 8, as might be expected if each sentence was to serve as a basis for instances of each of the 4 question-types. This latter course, however, would have generated only 8 sets of

answers, each occurring 4 times, which might have made the sentences too familiar for Ss. The presentation of question-types was randomised, with the restriction that no two of the same type occurred in sequence. Each set of answers was also independently randomised.

Scoring

The sentence codings listed earlier indicate that responses can be considered as preserving or not preserving two aspects of questions, focus and voice. Sentences (35)-(37) illustrate this point:

(35)	Who did Nixon choose?	Q/A/O
(36)	It was Agnew who Nixon chose.	C/A/O
(37)	It was Agnew who was chosen by Nixon.	C/P/O

The question, (35), asks for specification of (focuses) an object; in both (36) and (37), this specification is given (focus is preserved). In (36) voice in the embedded sentence matches that in the question, whereas in (37) it does not. The sameness and difference of the focus and voice features of the response, with respect to the question, were used as a basis for scoring.

Each response was scored separately for focus and voice. A response which preserved the feature of interest from the question scored +1 ; one which did not scored -1. So (36) would score +1 for focus, and +1 for voice, in

response to (35); (37), on the other hand, would have the same focus score, but a -1 voice score. In this fashion, Ss' responses generated two distinct sets of same/different scores, one for focus and one for voice.

This method of scoring allowed Ss' responses to the two structural features of interest to be examined separately. It also had a further advantage: what the hypothesis outlined at the end of Chapter Three suggested, was that Ss would preserve focus rather than voice in their responses, if given the choice. In terms of same/different scores reflecting focus and voice preservation, predictions of Ss' mean scores can be made on the basis of this hypothesis, and deviations from these predictions can be more readily interpreted than if an analysis of incidence scores were attempted. Such predictions are taken up in detail in the next chapter.

CHAPTER FIVE

RESULTS

Only three Ss did not complete the experimental task in the time allowed, and these were excluded from the analysis, leaving 74 complete sets. In a tabulation of aggregate scores in all possible categories of stimulus and response, (see Appendix C), certain features of response patterns stand out. First, there is an obvious preference for maintaining stimulus-question focus in the response. This focus-preserving relationship is maintained for all question-types, through all response-types; however, off-focus responses do occur (the percentage of off-focus responses is 20.16%). Second, by contrast, the difference between the number of active responses and the number of passive responses is much smaller than the focus/off-focus difference, though the totals show some preference by Ss for active over passive. Third, there is a discrepancy between the total number of responses in the PC category, and totals in other sentence-type categories. These features of the data are returned to throughout the analysis, together with aspects of response patterns which are obscured by a tabulation like Appendix C, but which emerge from more detailed statistical analyses.

Scoring Predictions

The method of scoring was detailed in the last chapter. Before suggesting possible interpretations of same/different (S/D) scores, as a guide to the data analysis it is necessary to clarify the source of scores such as zero, or +16 to which reference will be made. For each response sentence-type (PC, C or RP) under each stimulus question-type (A/O, A/S, P/O or P/S), Ss had the opportunity to make 32 responses, of which 16 maintained the focus of the question, and 16 the voice. Thus the highest score in any sentence-type category for focus preservation would be +16, and for voice preservation, +16, similarly. These scores are not independent, however. For a +16 score on an A/O stimulus-question a subject would have to select, for example, all 8 PC/A/O responses, and all 8 PC/P/O responses. This preference by the subject for the structural feature of focus as a basis for substitutability necessarily results in a zero voice preservation score, as the focus responses are equally distributed in A and P categories. If focus preservation (FP) and voice preservation (VP) are regarded as possible subject strategies, Question-Type x Sentence-Type mean scores predicted by all possible combinations of these strategies can be represented as in Table 1. The raticnale for the +FP, -VP prediction for focus scores has already been explained. The predicted score of +8 in the +FP, +VP category is arrived at in the

same way: if Ss wish to preserve both focus and voice, in

TABLE 1

PREDICTED S/D SCORES FOR SUBJECT STRATEGIES

	FOCUS SCORES			VOICE SCORES	
	+FP	-FP		+FP	-FP
+VP	+8	0	+VP	+8	+16
-VP	+16	0	-VP	0	0

reply to an A/O question for example, only 8 responses under each sentence-type category are available which are both active, and object-focused. If a particular S's strategy is to retain voice at the expense of focus, then his focus S/D score will be zero, since (again using the A/O question as an example), the A/O and A/S responses will cancel out, thus giving the predicted -FP, +VP score. The final strategy type, -FP, -VP has a zero score predicted for it also, but there are two ways of arriving at this:

(a) A subject can consider all sentences equivalent, and in response to an A/O question select all possible responses, focused and non-focused, active and passive, with the result that he has a zero focus score;

(b) A subject can select very few sentences, with exactly the same outcome.

A focus score of zero, then, can reflect two distinct attitudes towards clefted sentences.

The voice S/D score predictions are similarly derived. By combining the two tables the FP, VP strategy scores for both focus and voice can be predicted (Table 2).

TABLE 2

PREDICTED S/D SCORES FOR SUBJECT STRATEGIES

	FOCUS AND VOICE	
	+FP	-FP
+VP	+8,+8	0,16
-VP	+16,0	0,0

The Akmajian hypothesis concerning clefted sentences predicts that the most most favoured strategy will be +FP, -VP, which has a predicted score in Table 2 of +16 for focus, and zero for voice. The reverse of this, -FP, +VP, would generate a voice score of +16 and a focus score of zero. If Ss wanted to preserve focus only if voice were also preserved, the outcome would be +8,+8. And finally, if neither focus nor voice preservation were to be a concern of Ss, they would score zero on both focus and voice, by choosing all possible responses, no responses, or by making response selections randomly with regard to both features.

Analyses

A four factor analysis of variance was applied to focus S/D scores and voice S/D scores separately. The four factors were:

Ss (74 levels)

Question-Focus (2 levels)

Question-Voice (2 levels)

Response Sentence-Type (3 levels)

with the S/D score of interest as the dependent variable. Analyses for both focus and voice are first dealt with separately, and then co-occurrences of responses are examined. However, more attention is given to focus scores, as generally low mean voice scores suggest that Ss did not follow a ±VP strategy. Therefore the ±VP prediction for focus scores, and the ±VP prediction for voice scores, can in reality be ruled out from the start. This point is implicit throughout the discussion of focus preservation scores.

TABLE 3

ANALYSIS OF VARIANCE

FOCUS S/D SCORES

Source	SUMSs	df	MSq	F
Ss	26989.07	73	369.71	104.56***
Question-Voice (QV)	20.83	1	20.83	4.44*
Question-Focus (QF)	9.95	1	9.95	1.58
Sentence-Type (ST)	1784.50	2	892.25	16.64***
Ss x QV	342.69	73	4.69	
Ss x QF	460.53	73	6.30	
QF x ST	11.46	2	5.73	1.31
QV x ST	9.63	2	4.81	1.04
Ss x ST	7830.83	146	53.64	
QV x QF	34.09	1	34.09	7.88**
Ss x QV x QF	315.98	73	4.33	
Ss x QF x ST	639.59	146	4.38	
QV x QF x ST	18.18	2	9.09	2.57
Ss x QV x ST	678.30	146	4.56	
Ss x QV x QF x ST	516.25	146	3.54	

Focus S/D Scores Analysis

The analysis of variance for focus S/D scores is given in Table 3. It locates the main effects Ss and ST as significant sources of variation ($p < .001$), as well as the interaction QV x QF ($p < .01$). Although there is no error

term available for directly assessing the Ss x ST interaction (as the Ss x QV x QF x ST term cannot be assumed to be zero), the variance component is quite large. To assess individual variation on ST, therefore, a hierarchical grouping technique (Veldman, 1967, p. 307) was applied to Ss in order to determine profile similarity. Once the grouping was completed, members of different groups were compared on their ST scores. In addition, analyses of variance (using the same four factors as for the main analysis) were run on each of the groups isolated by the Veldman technique, to determine (a) if the Ss x treatment interaction persisted, and (b) if the QV x QF interaction was a feature of one or all the groups.

A vector of scores on 12 variables was generated for each S, the variables being S/D scores on each of the three response sentence types for each of the four stimulus question types. The grouping technique achieves a step-wise reduction of the number of groups, using "total within-groups variation as the function to be minimally increased at each step". It was used in an attempt to find some natural clustering among Ss. The cut-off point for the number of groups was determined by graphing the error index, (Veldman, 1967, p.311), and noting the point preceding the maximum inter-step interval.

Table 4 shows the grouping arrived at, with the number of Ss in each group, and group mean focus S/D scores, within

each response sentence type category. The means show marked inter-group differences on ST.

There were only two Ss who did not fall into any of the three main categories. The distinguishing feature of their performance was the consistent selection of off-focus PC sentences as suitable responses, while selecting focused responses of the C and RP types much as the HF group did. Further research would be needed to determine whether such Ss are a consistent minority, or simply an oddity of this particular sample.

TABLE 4

HIERARCHICAL GROUPING -- FOCUS S/D SCORES

			MEAN FOCUS S/D SCORE		
GROUP	N		PC	C	RP
HF	34	MEAN	14.02	14.58	14.30
		S.E.	0.28	0.17	0.24
LPC	19	MEAN	3.42	10.88	11.31
		S.E.	1.00	0.60	0.60
LF	19	MEAN	1.22	1.02	1.98
		S.E.	0.54	0.47	0.43

The main feature of Table 4 is the obvious inter-group variation with respect to focus-preservation across sentence-types. While 34 Ss have consistently high scores (16 being the maximum), on all three types of clefted sentence, 38 do not. Inter-subject variation on this scale

raises problems for the experimental hypothesis, and consequently for the linguistic description on which it is based, since the description does not allow for this kind of variation. The groups are analysed in detail below, but in advance of this it is clear that if the grammar is to give an adequate account of clefted sentences, it will have to reflect, in its derivational relationships and paraphrase classifications, both majority and minority viewpoints, as far as is possible.

It should be noted at this point that interpretations based on strategies other than the various combinations of FP and VP have been ruled out here. It might be argued, however, that the apparent uniformity imposed by these labels is misleading, and that the LF group, in particular, do not use a syntactically-based approach to the experimental task. The claim could be made that the difference between the strategies adopted by the HF and LF groups (the LPC group is assumed here to be using essentially the same strategy as the HF), would be more adequately described by using general labels such as <u>complex</u> and <u>simple</u>, where these two terms are seen as opposite ends of a continuum of analytic abilities. The LF group, under such an interpretation, would be using a syntactically much less sophisticated strategy than the HF group, resulting in a lack of differentiation among the structures, and the selection of a large number of responses. The HF group, on the other hand, with their more developed appreciation of

syntactic structure, would make much finer distinctions among the set of possible answers to questions, and select very few sentences.

If such strategies were operating, then there would be direct predictions from them in terms of frequency of choice of response sentence-types: the LF group would have high incidence scores, and the HF group low incidence scores. This is not the case. The number of selections made by each group is roughly equivalent, but it is the distribution of responses in relation to the form of the question which differentiates the groups. It appears, therefore, that interpretations in terms of the FP and VP strategies are justified for both LF and HF groups.

High focus group (HF). These Ss, comprising the largest single group, achieved consistently high focus preservation scores on all sentence-types, as the means in Table 4 indicate. One S in this group had a score of 16, the maximum possible, on each sentence-type. The scores realised by this group suggest that they were following the (+FP, -VP) strategy, thus supporting the experimental hypothesis. The HF group, then, provides empirical support for a linguistic description which accounts for P2-equivalent sentences by differentiating them from similar P1-equivalent structures; which associates structures differing only in the voice of their embedded sentence; and which transformationally relates C, PC and RP structures.

The Akmajian analysis, therefore, which meets these three requirements, seems to be observationally adequate as far as these Ss are concerned.

By classifying together only focus-preserving structures, the HF group provides support for the claim that syntactic reflexes of Sd, the semantics of discourse, are relevant for the satisfactory description of the internal structure of sentences. In particular, support is provided for the view that the occurrence of an NP in the matrix sentence of a clefted structure, under the tonic, constitutes one of these syntactic reflexes.

By indicating that the voice of the verb in the embedded sentence of a clefted structure was irrelevant for the purposes of this task, the HF Ss substantiated the assumption that only features of the superordinate S are relevant to Sd. This is reflected in the description, which has active and passive variants of equal status within the P2-equivalent sets. While passivisation may in fact be a focusing device in superordinate or simple sentences, in subordinate structures it does not function as such. So even though maintenance of voice was a possible strategy for Ss to pursue, it was regarded by this group as irrelevant to the task of selecting suitable answers to questions.

The fact that the HF group has uniform +FP, -VP responses in each of the sentence-type categories also provides support for the Akmajian descriptiion. This

description, by transformationally relating C and RP structures to C structures by optional rules, claims that the three of them are in free variation. There are structural differences between C, and PC or RP, with the appearance in C of an it pronoun against the relative pronouns of PC and RP. There are differences between PC, and C or RP, in the position of the focused NP, which occurs towards the end of the structure, after the embedded S, in the former, but towards the front, and preceding the embedded S, in the latter. Nevertheless the HF data provides justification for associating them within the description.

Low pseudo-cleft group (LPC). While the experimental hypothesis appears to have been predictive of the performance of the largest single group, there are still more than half the Ss to be accounted for. Of these, 19 appear in this group, and an examination of the mean scores reveals that they perform in a similar fashion to the HF group on two of the sentence-types, C and RP. This focus preservation preference, while not as strong as in the HF group, is still marked, and allows the conclusion that for C and RP structures these Ss were using the +FP, -VP strategy. Where they differ from the HF group is in having low and minus scores on PC responses. The 19 mean scores in this group cover a range from -8 to +8, with the majority clustering in the middle portion of the range (i.e., around

zero). As far as PC structures are concerned, then, the group exhibits the +FP, -VP strategy. It was pointed out above, however, that there is more than one way of arriving at a focus S/D score of zero, and at least two are represented in this data.

If a total incidence score of 32 for PC sentences (25% of the maximum possible total of 128) is taken as a low/not-low boundary, then the LPC group divides into two subgroups. The first, consisting of 10 Ss, has total incidence scores of 32 or less, and achieves its low focus S/D score by making relatively few PC choices, and spreading those that are made through all PC categories (that is, without any noticeable attempt to preserve focus or voice). The range of total incidence scores for this group is from 2 to 32, with a mean of 18.5. The second sub-group, of 9 Ss, had medium to high incidence scores. It seems possible from these figures that the +FP, -VP strategy is a coverall for distinct types of performance.

Any explanation of the performance of the LPC group must depend on structural features of the responses, and therefore presents the immediate question as to why only this group performed in this way. Unfortunately, there is no satisfactory answer currently available, since there are no other measures obtained on Ss, which could be used as covariates with the linguistic measures. The explanations suggested here will therefore be put forward tentatively, in

the expectation that the results can be replicated and the phenomenon further explored in other experiments.

One obvious structural difference between the PC structures and the other two is the position of the focused item in sentence structure. In PC structures the focused item follows the embedded S, and occurs at the end of the sentence. In C and RP structures the situation is reversed, with the focused item at or near the beginning of the structure. If these differences in the linear position of the focused item are looked at as two separate focus devices, back-focus (for PC structures), and front-focus (for C and RP structures)[1], the differences between HF and LPC groups can be discussed in these terms.

The differentiation of focus into two distinct syntactic realisations suggests a reason why the LPC group do not treat PC structures in the same way as the HF group do. If, contrary to the HF group, who regard both front- and back-focused structures as 'suitable answers', the LPC group only accept front-focus, this would be a basis for the

---

1. The terms back-focus and front-focus are used in place of the already available focus and topicalisation, used by Chambers (1970), because the latter have a specific formal interpretation within Chambers' analysis, and because there are complexities of his analysis of clefted sentences, which it is unnecessary to go into here.

difference in performance. However, as we have seen, there appear to be two distinct sub-groups here, one with low incidence scores, and the other with medium/high. The structural difference between PC and C/RP structures may have the result for the low sub-group that they tend not to see PC structures as related to C and RP structures, while the second group may tend to relate P1-equivalent PCs with P2-equivalent C and RP sentences.

For the low sub-group, focus preservation can only be maintained by front-focused structures; back-focused structures are not acceptable as responses. This may be either because they do not recognise what has been termed back-focus as a focus device as such, or because they find some difficulty with PC sentences generally, because of some structural feature which they find difficult to process. For instance, a sentence such as (1) may cause difficulty because of the amount of structure the subject has to hold in abeyance, as it were, before the relative pronoun with which the sentence began is specified:

(1) What the bus hit was the truck.

This, and other suggestions, are, of course, merely conjecture at present, but they do offer interesting lines of future research, which might give more information about English speakers' reactions to PC structures.

The medium/high group do not recognise back-focus as a

device for syntactically defining suitable answers to questions either, but contrary to the low group, they have a tendency to allow any PC as an answer. This indicates no problems in processing PCs, but suggests that they regard P1-equivalent PCs as of the same status as P2-equivalent Cs and RPs. The performance of the LPC group generally, raises obvious problems for the Akmajian description which, although apparently vindicated by the HF group, requires some modification to incorporate these results as well. The LPC group does not provide support for a description which transformationally relates back-focused structures and front-focused structures. It is particularly unfortunate, given these results, that the Akmajian description assigns a priority to the PC structure in the derivation of C and RP sentences.

Low focus group (LF). Group 3, also consisting of 19 Ss, has focus preservation scores clustering around zero for all sentence types. This is the score predicted by either the -FP, -VP or the -FP, +VP strategies. Mean incidence scores for Ss in this group, on sentence-types, ranged from 13.33 to 127.67, with a mean of 74.21. Using the same low/not-low boundary point (32 responses within a sentence-type) as for the LPC group, only one S in the LF group had low scores across all categories, with a mean sentence-type incidence score of 13.33. The rest selected more than 25% of possible responses, without any attention to preservation of focus.

(Though this does not exclude attention to voice, it will be obvious in the voice scores analysis that such a strategy was not in use either). The sub-grouping apparent in the LPC group for PC responses does not arise with this group. In this case, the low focus S/D score does not conceal distinct stategies.

This group does not attempt to preserve focus, as it has been defined in this study, across question and answer. While the total number of sentences selectd by members of the group varied, the general tendency was to look on P1-equivaent structures as suitable answers. As far as these Ss are concerned, the descriptions of clefted sentences suggested or given by Lees (1963), or Kac (1969) are adequate. The Akmajian hypothesis does not hold with LF Ss, since they do not discriminate among a set of clefted sentences according to syntactically signalled focus. Any descriptive formulation, which aims at an exhaustive account of speakers' partitioning of clefted structures into paraphrase sets, must take account of the significant proportion of this sample, which, for reasons outside the scope of this study, regards P1-equivalents as paraphrases.

QV x QF interaction. It was mentioned at the beginning of this section that the QV x QF interaction was significant ($p < .01$). To determine the extent of the interaction, and possibly others, an analysis of variance (using the same four factors as the major analysis) was run on the focus S/D

scores of each of the groups separated by the hierarchical groups analysis. For the LF group, there were no significant effects or interactions, confirming the suspicion that this was an unstructured group, with respect to the variables manipulated in this study. In the LPC analysis, there was, not surprisingly, a significant main effect of ST ($p < .001$); the QV x QF interaction remains, but it is barely significant ($p < .05$). It is in the HF group that the interaction shows up most strongly.

The HF group analysis shows two significant features -- QV x QF ($p < .05$), and QV x QF x ST ($p < .01$). It is the latter which is examined, since the former is included in it. In a graph of the third-order interaction, (Appendix D), the aberrant feature can be seen to be PC responses to active, object-focused questions (Q/A/O). All other mean scores in the interaction are low on pseudo-clefts, except for the Q/A/O stimulus-condition, where they are high. There is no obvious explanation for this, though the high PC scoring clearly has something to do with the form of the stimulus question, which (2) illustrates:

(2) Who did Nixon choose?

One difference between this structure and the Q/A/S stimulus, of which (3) is an example, is that it has two markings for interrogation, the WH form and auxiliary inversion; sentence (3) only has WH marking:

(3) Who chose Agnew?

While this interaction raises one more question about PC structures, this time about their cooccurrence with different question types, it does not have any major bearing on the interpretation of the performance of the HF group.

Voice S/D Scores Analysis

In general, the voice preservation scores showed a narrower range, -8 to +8, than focus preservation scores, and the majority of them were close to zero. It seems obvious from this that there were no Ss who used the -FP, +VP strategy, the inverse of the experimental hypothesis, to govern their response selection. For the most part, as already observed ,voice preservation responses are subordinated to focus preservation.The analysis of voice scores is thus not as comprehensive as that for focus, but it does deal with the main trends and whatever exceptions there are. The focus and voice analyses taken together provide a comprehensive account of significant variation in Ss' performance, and an account is also provided of co-occurrences between groups isolated in the focus analysis and those isolated in the voice analysis.

TABLE 5

ANALYSIS OF VARIANCE

VOICE S/D SCORES

Source	SUMSq	df	MSq	F
Ss	517.65	73	7.09	2.48***
Question-Voice(QV)	906.09	1	906.09	45.20***
Question-Focus(QF)	0.41	1	0.41	0.10
Sentence-Type(ST)	44.14	2	22.07	6.88**
Ss x QV	1463.46	73	20.05	
Ss x QF	291.84	73	3.10	
QV x QF	21.76	1	21.76	3.40
Ss x ST	468.35	146	3.21	
QV x ST	28.08	2	14.04	3.635
QF x ST	19.90	2	9.95	2.63
Ss x QV x QF	467.43	73	6.40	
Ss x QV x ST	563.94	146	3.86	
Ss x QF x ST	551.59	146	3.78	
QV x QF x ST	13.36	2	6.68	2.34
Ss x QV x QF x ST	416.91	146	2.96	

The complete analysis of variance appears in Table 5. Once more, there is no available error mean square for testing interactions involving the Ss factor. As Table 5 shows, the main effect of Ss is again highly significant ($p < .001$), as is the voice of the stimulus question. Once more, a hierarchical groups analysis was applied to Ss, on

12 variables consisting this time of voice S/D scores, to determine profile similarity. The grouping achieved, using the error index preceding the maximum inter-step interval, is given in Table 6. The mean scores listed there are voice S/D scores on responses, for each of the four question-types. This was because it was felt that any significant differences between groups of Ss were likely to be reflected in these scores, since the voice of the question, if anything, would have been the determining factor. In addition, the Ss x QV interaction involves a large variance component.

TABLE 6

HIERARCHICAL GROUPING -- VOICE S/D SCORES

			MEAN VOICE S/D SCORE			
GROUP	N		A/O	A/S	P/O	P/S
LV	41	MEAN	0.56	0.65	0.92	-0.38
		S.E.	0.10	0.14	0.14	0.10
ARAQ	13	MEAN	2.43	4.07	-0.28	-0.49
		S.E.	0.31	0.46	0.33	0.34
AR	13	MEAN	1.10	1.74	-1.23	-1.89
		S.E.	0.38	0.45	0.46	0.24

There were three other groups, covering the remaining 7 Ss, which were excluded from consideration because of the small numbers involved. It would require further research to establish whether the Ss in these groups are oddities of this sample, or representative of a consistent minority.

Low voice scores group (LV). By far the largest group isolated has mean scores at or close to zero for responses to each question-type. This indicates that whether the question was active or passive, these Ss did not attempt to preserve voice in their responses. Overall, the size of this group points to the relative lack of importance of voice as a response determinant. Table 1 shows that either +FP, -VP or -FP, -VP are predictor strategies for a zero voice S/D score; this ambiguity can be resolved if the LV group and the focus score groups are compared for common membership. It turns out that, of 41 LV Ss, 33 also appear in either the HF or LPC groups, which are, with one important exception, focus-preserving. The LV low voice scores, then, are for the most part a result of focus preservation, that is, a +FP, -VP strategy. Scores for this strategy in Table 2 are (16,0), and these predictions are borne out for those 33 Ss who appear in HF/LPC and LV groups, with the exception of LPC performance on PC structures.

Other voice groups. The remaining major voice groups all have positive mean voice S/D scores on active question-types, and negative mean scores on passive question-types. While none of these scores are high enough to indicate selection of a +VP strategy, they reflect a slight tendency among these Ss to prefer active over passive responses. This tendency is somewhat more marked in the

ARAQ (active response to active question) group, particularly in response to A/S questions. The S/D scores in Table 6 reflect the overall discrepancy noted from Appendix C, where total active responses, over all Ss, exceeded total passive responses. This is a not unexpected result, since, in English generally, actives are more common structures than passives (cf. Svartvik, 1966, p.152). In general, then the remaining voice groups do not have high voice preservation scores. The ARAQ scores are not high if it is remembered that the maximum score for a +VP, -FP strategy is +16 under each stimulus type. If the S is maintaining active voice only, maximum scores are +16 for active questions and -16 for passive questions; if however the S is adopting a +VP, +FP strategy while maintaining only active voice, maximum scores would be +8 for active questions and -8 for passive questions. The highest mean S/D score is only 4.07, for A/S stimuli in the ARAQ group, and none of the means in the AR (active response) group even approach this.

The full list of co-occurrences for focus and voice groups is given in Table 7. The major feature of Table 7 has already been remarked on -- the number of Ss who are in both the HF and LV groups -- by far the largest number in any cooccurrence category, and clearly representative of the +FP, -VP strategy overall. For those Ss in the LPC group who also appear in the LV group, the +FP, -VP strategy was

also predominant, with the important exception of PC structures. This exception, and the apparently random behaviour of the LF group with regard to the preservation of focus, are the problems presented by this data for the experimental hypothesis.

TABLE 7

COOCCURRENCES OF FOCUS AND VOICE GROUPS

	LV	ARAQ	AR
HF	28	3	1
LPC	5	9	4
LF	5	1	7

From Experiment to Description

If the results obtained here are generally valid, and if one wishes to retain a grammatical description of clefted sentences, then obviously some modifications have to be made to the Akmajian description. Perhaps the easiest way to suggest what modifications are necessary, is to compare and contrast the Akmajian description (Da), and the description which will incorporate the experimental results (De), in terms of what they are thought to be descriptions of.

Da is a proposed grammar fragment, within essentially the standard theory model; it could, however, equally well be a 'shallow' or 'pre-surface' portion of a semantically-based grammar, since, whatever the form of the

deeper levels of such a grammar, it will still have to account for syntactic paraphrases in a similar way to Akmajian's fragment. Da uses the optional-obligatory distinction between transformational rules to relate three structures, P2-equivalent PC, C and RP, which are thought to be in free variation -- alternative choices available to a speaker at a particular point in discourse. The intuition that these structures are functionally equivalent, and have similar structures, is captured in the grammar by deriving C sentences from P2-equivalent PC sentences by the optional (and independently motivated) T-rule of EXTRAPOSITION. In addition, the same PC structure can be used as a basis for the (again, optional) derivation of RP structures. So the PC structure is assigned a priority, descriptively speaking, within Da, since without it, the other two cannot be derived.

Da is a competence grammar, as opposed to an account of performance, since it is a description of "the speaker-hearer's knowledge of his language" (Chomsky, 1965, p.4), and not a description of "the actual use of language in concrete situations" (ibid.). A competence grammar describes the sentential structure of the language product, while a description of performance, if one were available, would detail the language process. While a competence description may incorporate process terminology (for example, "derive from", "is prior to"), Da cannot be considered a process account since it does not represent a

sequence of events on the route from concept to phonetic string. Da describes, by means of partially ordered rules, the internal structure and interrelationships of clefted sentences in English, as they appear to the analyst's unaided intuition. Knowledge of the set of rules accounting for these structures and relationships is attributed to the native-speaker. A consequence of the presumed internalisation of this set of rules, which are exceptionless, by the native-speaker, is that all speakers are assumed to have equal competence. If the description of clefted sentences holds for one, it holds for all. The only way in which the grammar allows for variation is by accounting for free variation, the equivalence of two or more structures, indicated in the grammar by an optional transformation, where the structures which are input to, and output from, the optional rule, are equivalent.

De is also a competence grammar, in the sense that it is a product, rather than a process, description, describing those aspects of sentence structures which are relevant for processing, but not giving any indication of how the structure might be understood or produced. De is not seen, however, as a competence grammar which can represent the knowledge of the individual native-speaker, as on the basis of the experimental results, it has to accommodate the following facts:

1. For 46% of subjects, PC, C and RP structures with the same item focused, are paraphrases;

2. 26% of subjects, however, do not consider PC structures which have an item back-focused to be paraphrases of C and RP structures with the same item front-focused;
3. A further 26% do not require focus-equivalence to assess clefted structures as paraphrases.

De, therefore, has to account for the linguistic variability manifested by subjects. This entails that it cannot be a competence grammar in the Chomskyan sense, since it does not represent what knowledge about clefted sentences is internalised by an individual, but describes the full range of competences which speakers evince in performance. A linguistic description of the De type, while it may use a formal apparatus, which, while modified, is similar to that used for the Da, is to be interpreted differently from the Da, since it encompasses a range of group differences, with respect to paraphrase relations among clefted structures, which Da does not accommodate.

A non-linguist reviewing these results, and the skeleton of the proposed modification of the grammar, might wonder why a linguist would go to such lengths to make the rather obvious point, psychologically speaking, that people differ. That they do has been apparent for some time now, in other sciences concerned with human behaviour. The answer lies in the nature of the evidence which transformational linguists have used to validate their theoretical constructs. In most cases, at least as far as grammars of English are concerned, linguists have relied on

their own status as native-speakers, and used introspective evidence to support their syntactic analyses.

The failure of linguists to develop operational procedures to test hypotheses is in some measure due to a profound mistrust of such procedures, and to a pessimism about their efficacy, perhaps best expressed by Chomsky (1965, p.19):

> There are...very few reliable experimental or data-processing procedures for obtaining information concerning the linguistic intuition of the native-speaker. It is important to bear in mind that when an operational procedure is proposed, it must be tested for adequacy (exactly as a theory of linguistic intuition -- a grammar -- must be tested for adequacy), by measuring it against the standard provided by the tacit knowledge that it attempts to specify and describe. Thus a proposed operational test.....must meet the empirical condition of conforming .....to the linguistic intuition of the native-speaker.

These observations appear to place an intolerable restriction on linguistic inquiry. To summarise, it appears that any endeavour to provide an empirical basis for the grammarian's hypotheses, which are hypotheses about the tacit knowledge of the native-speaker, must be tested for adequacy against that same tacit knowledge. This is tantamount to saying that only those operational procedures are viable which do not falsify the linguist's hypotheses.

Such a position is unacceptable, since it leads directly to the kind of description that Da is, and the results reported here indicate that Da is not an adequate representation of the linguistic facts concerning paraphrase

relationships among clefted sentences. In other words, once the data base for grammars is extended beyond the introspective report of the linguist, the grammar has to be revised, to accommodate a more complex situation, which the operational procedure has revealed. Furthermore, the revision of the grammar no longer allows it to be considered a representation of the individual's tacit knowledge, but as convenient summary of the range of linguistic patterns revealed in experimental results.

CHAPTER SIX

MODIFICATIONS AND CONCLUSIONS

In the face of the experimental results reported above, there are several alternatives which could be followed in relation to the linguistic description of clefted sentences. One could, for example, leave the description as it is, augmenting it with a verbal statement of the vagaries of subjects. Or one could eschew any attempt to provide a linguistic description in transformational terms. Both these courses are rejected here: the first, because it maintains the invulnerability of the grammar; the second, because it overlooks the convenience of representing the results obtained within a well-known descriptive framework; and both, because they ignore the importance of using external evidence, such as that provided by this study, for motivating one syntactic description over another.

Modifications

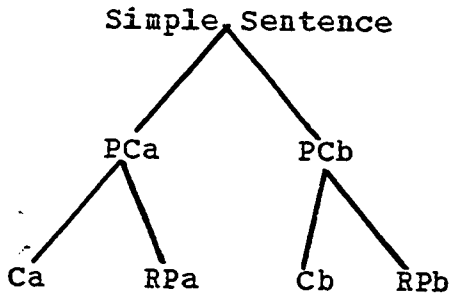
The descriptions looked at below, both Akmajian's and the suggested revision of that description, are not considered in great formal detail, but in general terms of direction of derivation, and paraphrase classification. The

assumption is made, for both descriptions, that the underlying source for clefted structures will be a simple sentence. It is assumed that the structure-building necessary to represent such a relationship can be allowed, subject to the considerations mentioned in Chapter Three (page 74).

Akmajian Description

The direction of derivation, and paraphrase classifications, for the Akmajian description, are represented in (1):

(1)



This illustrates the central place of PC sentences in the Akmajian description. The C and RP structures have to be derived from a PC form (on the assumption that RP structures, which Akmajian does not consider, are derived from PC structures by a flip rule -- see p. 73). In addition, (1) shows the paraphrase classification of this analysis: if one assumes that clefted sentences are derived from simple sentences, there are two differently focused PC sentences which can be formed on any one simple sentence (four, if passive versions are counted); other P2-equivalent

structures are then derived from the PCs. In (1), all a structures have the same focus, and all b structures have the same focus.

Some advantages of this description have already been enumerated, such as the P2-equivalence classification, and its internal coherence. Furthermore, the assumption of an underlying simple sentence accounts for the semantics of content equivalence among clefted structures. It also suggests why proper nouns, for instance, can appear as relative clause antecedents in focused position in clefted structures, but not in other, similar structures (such as sentence (9), page 68. There are therefore sound linguistic arguments for preferring the Akmajian description, now augmented by the assumptions that it has simple sentences underlying clefted structures, and that it allows the derivation of RP structures. As we have seen, however, the experimental evidence is unfavourable to this analysis.

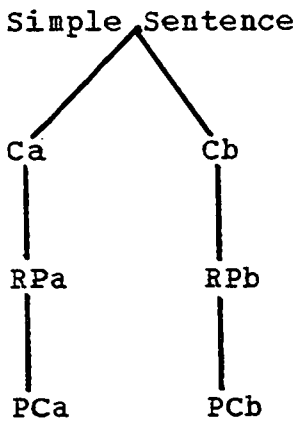
First, this description is contrary to fact in emphasising the centrality of same-focused PC structures to P2-equivalent sentence sets. The results indicate that this is not a suitable representation, and that back-focused PC structures should not be basic to an account of the P2-equivalence relationships. Second, this analysis cannot represent the attitude of the LF group towards clefted structures, since it has no single level of description at which P1-equivalent structures are of equal status,

grammatically. The bi-level surface structure, while facilitating the division into P2-equivalent sets, directly links only P1-equivalent PC structures; the other P1-equivalents are only indirectly related via the derivational relationship between PC, and C or RP. Finally, the Akmajian description does not allow for the kind of linguistic variation among subjects which the results reveal. Since Akmajian's is a competence description of the Chomskyan type, knowledge of its rules is attributed to the native-speaker; from the results of the experiment, it is obvious that some native-speakers cannot be assumed to have knowledge of some of the rules.

Revised Description

The minimal modification which would meet some, at least, of the conditions which the experimental evidence imposes, would be to make C structures central to P2-equivalence classification. Within such a description, RP structures would derive from C structures, and PC from RP. Schema (4) illustrates the derivational path, and the paraphrase classification, associated with such a revision. Again, the a structures have the same focus, and the b structures have the same focus:

(4)



The analysis suggested here involves deriving RP structures by an optional rule from C structures, and PC structures from RPs, by a flip rule which is the reverse of that proposed earlier to augment the Akmajian analysis. The analysis can be clarified by looking at sentences (5)-(7), which are examples of each structural type, as strings of constituents, as in (8)-(10). The basic structure is (8), the cleft, and it is by a permutation on (8) that (9b), the reverse pseudo-cleft, is derived, via the intervening <u>it + that</u> collapse, shown in (9a) and (9b). A flip rule on (9b) then generates (10), the cleft:

(5) It was the truck that hit the bus.

(6) The truck was what hit the bus.

(7) What hit the bus was the truck.

(8) It BE NP1 (that VP)
S

(9a) NP1 BE (it (that VP))
NP S

(9b) NP1 BE ((what VP))
NP S

(10) $\underset{NP}{(}$ $\underset{S}{(}$what VP)) BE NP1

In (8)-(10), NP1 = the truck, VP = hit the bus, and it is assumed that it + that is the source for what. Actually, if the analysis is to be at all general, the it pronoun has to be represented by a feature matrix, for which the minimal feature marking is (+PRO, +DEF). This is because, in analysing clefted structures with human focused nouns, the it pronoun cannot be carried through the analysis to yield the one, the required antecedent to the relative clause. So, if the feature matrix remains in intial position, it becomes it; if the feature matrix is permuted with NP1, either what results, or in the case of human focused nouns, it is realised as the one, and that remains.

It can readily be seen from the examples that (9a), the RP structure, can be formed from (8), the C, by flipping it (which is referred to here instead of the feature matrix, for convenience) and NP1 around BE. The juxtaposition of it + that, as noted above, results in what, as in (9b). To generate the PC structure, a flip transformation around BE is again utilised, but this time, the unit it + that VP changes places with NP1.

It might seem that three transformations are required here -- flip^1, for generating the RP structure from (8), it + that collapse, and flip^2, for generating PCs from RPs. However, flip^1 and flip^2 can be seen to be the same rule, if

the flip transformation is sensitive to the first NP after BE. For once it + that collapse has operated, the relative clause following BE, it + that + VP, can be considered as an NP.

The major advantage of such a revision of the Akmajian description is that it removes the PC structure from its position as the basic clefted structure. PC sentences are now derived by an optional rule from RP structures, a situation which is more in keeping with the experimental results. To recapitulate, these results revealed that, among subjects who adverted to focus, there were two modes of responding to question stimuli. The first mode was that shown by the HF group; they are, of course, as well accounted for by the original Akmajian description as by any revision (as long as the revision maintains the P2-equivalence classification of the original dscription).

The revised description, however, can more readily account for the LPC group, which only adverted to front-focus, the second mode of responding. If PC sentences are derived from RP structures by an optional rule, instead of being central to the whole analysis, then members of the LPC group can be looked upon as not having this particular rule within their individual grammars. A description of their grammatical competence, however, would include the rule associating RP structures with C structures.

The differences between the HF and LPC groups can thus be represented in a systematic fashion using the revised analysis. This is not the case with the original Akmajian description. The revised description now has the potential for reflecting the different modes of responding of the HF and LPC groups. Consequently, some of the linguistic variability apparent in the data can be accounted for. If the maximal form of the grammar, encompassing the widest range of structures available to speakers, is looked on as a standard, then deviation from the standard, (such as the non-availability of the PC transformation to a proportion of subjects), can be described in relation to it, and individual speakers assessed accordingly. The manner in which the deviation is represented is immaterial. It may or may not be convenient, for instance, to attach a probability value to an optional rule available only to some of the population, where the value indicates the proportion of the population using the rule. An approach to linguistic variability along these lines has been suggested by Labov, 1969. The important step, in representing the experimental results, is the initial revision of the grammar, so that it can be used as a standard from which deviation can be systematically described.

The problem of the LF group still remains, despite the descriptive revisions. There was no obvious way within the Akmajian description to account for these subjects who did not advert to focus; since the revised description still

classifies same-focused items together via one basic structure, there is still no convenient representation of the mode of responding of the LF group. It is possible that the LF group, with its apparently random approach to the structural features of interest, is an unstructured group of subjects, and that some finer experimental mesh would be needed to determine if they all do regard P1-equivalence as a sufficient criterion for paraphrase. In which case, the revised description can stand until further facts are available.

Conclusions

The introductory section of this study was devoted to an endeavour to find consistency, or at least, continuity, where there seemed to be contradiction. It ended with a hypothesis which seemed unlikely to be falsified, since it arose from an apparently soundly based linguistic description. Though its originator did not suggest this, the description could be seen as an extension of well-tried structural techniques (such as those worked out in Harris, 1951) to an extra-sentential domain. If the linguistic domain of interest is extended to include question-answer as a formal unit, classes of paraphrases can be set up according to the questions they cooccur with. In much the same way, isolable units within the sentence (for example, morpheme classes), were classed together , by structuralists, according to their privileges of

cooccurence. The final arbiter for class-inclusion, for both paraphrase classification and morpheme classes, is the linguist, using his own intuition or that of an informant. This reliance on individual cases results in a weak link between predictions based on formal linguistics, and empirical evidence, or at least, empirical evidence from a broader data base than has been commonly used within linguistics.

In a sense, the hypothesis based on the Akmajian description was not falsified. The majority of subjects, for the majority of structures, support the experimental hypothesis, and its basic assumptions concerning clefted and interrogative structures. In an important sense, nevertheless, it was falsified, by the proportion of subjects who failed to recognise what had been defined as focus, or recognised it but regarded it as irrelevant to their task, or found some structures more difficult to process than others. A grammar which treats all speakers equally cannot cope with these problems. In addition, by virtue of the way in which it was organised, this particular description was unequal to the task of accounting for the majority opinion concerning paraphrase classification of clefted sentences, and those of the minorities.

It seems clear that the hypothesis which was tested in this study, and by implication other hypotheses from similar sources, can only serve as the start of an enquiry. They

cannot substitute for one. It may seem odd that this point has to be made, since the invalidation of hypotheses in the search for explanation is a normal procedure in other sciences. However, the immurement of linguists behind the barrier of their own introspection has brought about a situation within the discipline where it is salutary to emphasise the point. The limited methodology of linguistics, with respect to language use, has to be supplemented by approaches which will illuminate the complexities inherent in individual or group differences with regard to language structures[1].

Indeed, the demonstration of subject differences is itself only a beginning. The next step is to determine why there is variation, first in broad terms, by correlating group differences with other measures of performance, particularly educational tests. Next, and more specifically, if the linguistic differences seem to correlate with differences in educational ability, the linguistic structures can be re-examined in an attempt to determine what might make some structures more difficult than others. What is there about the effect of back-focus

---

[1] There are, of course, exceptions to the general criticism being levelled here. Within the transformational-generative framework, Labov (e.g. 1969, 1972) has made efforts to incorporate his findings on inherent variability within a description, and has attacked the reliance on intuition as a scientific procedure. Elsewhere, various publications from the Survey of English Usage (e.g. Quirk and Svartvik, 1966, and Greenbaum and Quirk, 1971), testify to the efforts of these investigators to come to grips with the problem of linguistic variation.

on sentence-structures, for example, which might make PC structures more difficult to process than the other clefted structures?

Assumptions made by way of explanation for such phenomena themselves require to be tested. By proceeding in this fashion, it would be possible to construct a set of tests of linguistic ability, of which a paraphrase classification test would only be one. It should be obvious that this is a long-term goal, but it is one which deserves the attention of linguists.

REFERENCES

Akmajian, A. On deriving cleft sentences from pseudo-cleft sentences. Linguistic Inquiry, 1, 149-168, 1970.

Austin, J.L. How to do things with words. New York: Oxford University Press, 1965.

Bach, E. & Harms, R.T. (Eds.) Universals in linguistic theory. New York: Rinehart, Holt & Winston, 1968.

Baker, W.J., Prideaux, G.D., & Derwing, B.L. Grammatical properties of sentences as a basis for concept formation. Journal of Psycholinguistic Research, in press.

Bar-Hillel, Y. Review of J. Fodor & J.J. Katz, The structure of language. Language, 1967, 43, 526-550.

Blumenthal, A. Observations with self-embedded sentences. Psychonomic Sciences, 1966, 6, 453-454.

Bolinger, D. (Ed) Intonation. Harmondsworth, Middlesex: Penguin Books, 1972.

Chafe, W. Language as symbolisation. Language, 1967, 43, 57-91.

Chafe, W.L. Meaning and the structure of language. University of Chicago Press, 1970.

Chafe, W. Directionality and paraphrase. Language, 1971, 47, 1-26.

Chambers, J.K. Focused noun phrases in English syntax. Unpublished doctoral dissertation, University of Alberta, 1970.

Chomsky, N. Syntactic structures. The Hague: Mouton, 1957.

Chomsky, N. Aspects of the theory of syntax. Cambridge, Mass.: M.I.T. Press, 1965.

Chomsky, N. Deep structure, surface structure, and semantic interpretation. In Steinberg & Jakobovits, 1971.

Clifton, C., & Odom, P. Similarity relations among certain English sentence constructions. Psychological Monographs, 1966, 80, 613.

Cohen, L.J. The diversity of meaning. London: Methuen, 1966.

Crystal, D. Prosodic systems and intonation in English. Cambridge, England: Cambridge University Press, 1969.

Danes, F. A three-level approach to syntax. Travaux Linguistiques de Prague, 1964, 1, 225-240.

Danes, F. Some thoughts on the semantic structure of the sentence. Lingua, 1968, 21, 55-69.

Derwing, B.L. Transformational grammar as a theory of language acquisition. Cambridge University Press, In press.

Dik, S. Coordination -- its implications for the theory of general linguistics. Amsterdam: North-Holland Publishing Co., 1968.

Dingwall, W.O. A survey of linguistic science. Maryland: University of Maryland, 1971.

Dixon, T.R. & Horton, D.L. (Eds). Verbal Behavior and General Behavior Theory. Englewood Cliffs, N.J.: Prentice-Hall, 1968.

Fillenbaum, S. On the use of memorial techniques to assess syntactic structures. Psychological Bulletin, 1970, 73, 231-237.

Fillmore, C.J. The case for case. In Bach, E., & Harms, R.T. (Eds.), Universals in linguistic theory. New York: Holt, Rinehart, & Winston, 1968.

Fillmore, C.J. Verbs of judging. In Linguistic semantics. New York: Holt, Rinehart, & Winston, 1971.

Fletcher, P.J. Question and response in English, with special reference to the language-deviant child. Unpublished M.Phil. Thesis, University of Reading, 1969.

Fodor, J.A., Garrett, M., & Bever, T.G. Some syntactic determinants of sentential complexity II: verb structure. Perception and Psychophysics, 1968, 3, 453-461.

Fodor, J.A., & Katz, J.J. (Eds.) The structure of language. Englewood Cliffs, N.J.: Prentice-Hall, 1964.

Geer, S., Gleitman, L. & Gleitman, H. Paraphrasing and remembering compound words. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 348-355.

Gleitman, L. & Gleitman, H. Phrase and Paraphrase: Some Innovative Uses of Language. New York: W.W.Norton & Co., 1970.

Greenbaum, S. & Quirk, R. Elicitation experiments in English. London: Longmans, 1970.

Gunter, R. Intonation and relevance. In Bolinger, 1972.

Halliday, M.A.K. The linguistic study of literary texts. In Lunt, 1964.

Halliday, M.A.K. Notes of transitivity and theme in English, Part II. Journal of Linguistics, 1967, 3, 199-244.

Harris, P.R. On the interpretation of generative grammars. Unpublished M.Sc. Thesis, University of Alberta, 1970.

Harris, Z. Structural linguistics. Chicago: University of Chicago press, 1951.

Harris, Z.S. Co-occurrence and transformation in linguistic structure. Language, 1957, 33, 283-340.

Harris, Z. Transformational theory. Language, 1965, 41, 363-401.

Harris, Z.S. Transformations in linguistic structure. Proceedings of the American Philological Society, 1964, 108, 418-422. Reprinted in Harris, 1970.

Harris, Z.S. Papers in structural and transformational linguistics. Dordrecht, Holland: D. Reidel Publishing Co., 1970.

Hiz, H. The role of paraphrase in grammar. In C.I.J.M. Stuart (Ed.) Report of the fifteenth annual (first international) round table meeting on linguistics and language studies. Washington, D.C.: Georgetown University Press, 1964.

Hockett, C.F. Two models of grammatical description. Word, 1954, 10, 210-231. Reprinted in Joos, 1957.

Hockett, C.F. The state of the art. The Hague: Mouton, 1971.

Honeck, R. A study of paraphrases. Journal of Verbal Learning and Verbal Behavior, 1971, 10, 367-381.

Hornby, P.A. The role of topic-comment in the recall of cleft and pseudo-cleft sentences. In Papers from the seventh regional meeting, Chicago Linguistic Society, pp. 454-453, 1971.

Huddleston, R. The sentence in written English. Cambridge, England: Cambridge University Press, 1971.

Jacobs, R.A., & Rosenbaum, P.S. English transformational grammar. Waltham, Mass.: Blaisdell, 1968.

Joos, M. (Ed.) Readings in linguistics I. Chicago: University of Chicago Press, 1957.

Kac, M.B. Should the passive transformation be obligatory? Journal of Linguistics, 1969, 5, 145-147.

Katz, J.J. & Fodor, J. The structure of a semantic theory. Language, 1963, 39, 170-210.

Katz, J.J., & Postal, P. An integrated theory of linguistic descriptions. Cambridge, Mass.: M.I.T. Press, 1964.

Kiparsky, P & Kiparsky, C. Fact. In Steinberg & Jakobovits, 1971.

Labov, W. Contraction, deletion, and inherent variability of the English copula. Language, 1969, 45, 715-762.

Labov, W. Methodology. In Dingwall, 1971.

Lakoff, G. Irregularity in syntax. New York: Holt, Rinehart & Winston, 1970.

Leech, G.N. Some assumptions in the metatheory of linguistics. Linguistics, 1968, 39, 87-102.

Leech, G. On the theory and practice of semantic testing. Lingua, 1970a, 24, 343-364.

Leech, G. Towards a semantic description of English. Bloomington & London: Indiana University Press, 1970b.

Lees, R. Analysis of the so-called cleft sentence in English. Zeitschrift fur Phonetik Sprachwissenschaft und Kommunikationsforschung. 1963, 16, 381-388.

Livant, W. Productive grammatical operations: I, The noun compounding of 5-year-olds. Language Learning, 1961, 12. 15-26.

Lunt, H. (Ed). Proceedings of the Ninth International Congress of Linguists. The Hague: Mouton, 1964.

Lyons, J. Introduction to theoretical linguistics. Cambridge, England: Cambridge University Press, 1968.

Matthews, P.H. Review of C.F. Hockett, The state of the art. International Journal of American Linguistics, 1971, 37, 49-51.

McCawley, J. Lexical insertion in a grammar without deep structure. In Papers from the Fourth Regional Meeting, Chicago Linguistic Society, 1968.

Moore, T. The topic-comment function: a performance constraint.... Unpublished Ph.D. Thesis, University of California at Los Angeles. 1967.

Morton, J. (Ed). Biological and social factors in psycholinguistics. London: Logos Press, 1970.

Muraki, M. Presupposition and pseudo-clefting. In Papers from the Sixth Regional Meeting, Chicago Linguistic Society, 1970.

Nolan, R. Foundations for an adequate theory of paraphrase. The Hague: Mouton, 1970.

Osgood, C.F. Towards a wedding of insufficiencies. In Dixon & Horton, (Eds.), 1968.

Prideaux, G.D. Paraphrase and ambiguity. Unpublished paper, presented at the Centre for Linguistic Studies, University of Toronto, March 1972.

Quirk, R. & Svartvik, J. Investigating linguistic acceptability. The Hague: Mouton, 1966.

Quirk, R., Svartvik, J. & Leech, G. Grammar of contemporary English. London: Longmans, 1972.

Quine, W.V.O. Word and object. Cambridge, Mass.: M.I.T. Press, 1960.

Schachter, P. Focus and relativisation. Duplicated, Indiana University Linguistics Club, 1972.

Searle, J.R. Speech acts: an essay in the philosophy of language. Cambridge, England: Cambridge University Press, 1970.

Sebeok, T.A. (Ed.) Current trends in linguistic theory, Vol. III. The Hague: Mouton, 1966.

Smaby, R.M. Paraphrase grammars. Dordrecht, Holland: D. Reidel Publishing Co., 1971.

Smith, C. Determiners and relative clauses in a generative grammar of English. Language, 1964, 40, 37-52.

Steinberg, D. & Jakobovits, L.A. (Eds.) Semantics: interdisciplinary reader in philosophy, linguistics and psychology. Cambridge, England: Cambridge University Press, 1971.

Svartvik, J. On voice in the English verb. The Hague: Mouton, 1966.

UESP. Integration of transformational theories on English syntax. (UCLA English Syntax Project). 2 vols. Los Angeles: UCLA, 1969.

Veldman, D.J. FORTRAN programming for the behavioral sciences. New York: Holt, Rinehart, & Winston, 1967.

Wales, R. Comparing and contrasting. In Morton, 1970.

Watt, W.C. On two hypotheses concerning psycholinguistics. in Hayes, 1970.

Weinreich, U. Explorations in semantic theory. In Sebeok, 1966.

APPENDIX A

Basic Informational Sentences for Experimental Materials

1. The officer was shadowing the fugitive.
2. The office manager preferred Jane.
3. The little boy is pursuing Pete's sister.
4. The coach had picked Henry.
5. The trainer was encouraging the fighter.
6. The boy helped the girl.
7. The youth is attacking the policeman.
8. Mary had selected Anne.
9. The neighbour was helping my brother.
10. Bill annoyed Trevor.
11. The politician is criticising the journalists.
12. The teacher had annoyed the student.
13. The pitcher was scaring the batter.
14. The detectives cornered the suspect.
15. George is watching the experimenter.
16. The security guard had seen the thief.
17. The cat was watching the dog.
18. The truck hit the bus.
19. The wolf is stalking the deer.
20. The stick had broken the window.
21. The mule was kicking the horse.
22. The bullet shattered the vase.
23. The hawk is watching the rabbit.
24. The fish was avoiding the shark.

25. The wheel struck the curb.

26. The cab is following the car.

27. The cougar had killed the fawn.

28. The stone had cracked the windshield.

29. The cat was eyeing the bird.

30. The chain-saw cut the log.

31. The tow-truck had removed the car.

32. The foal was following the pony.

APPENDIX B

Instructions to Subjects

Thank you for your cooperation in this project.

Please read these instructions with care, before going on to the next part of the booklet.

This is an experiment designed to survey students' sensitivity to similarities and differences in meaning among English sentences. It is not a test -- there are no 'right' or 'wrong' answers, as in an examination. What is important is your own reaction to sentences in your language.

Following these instructions, on each page of this booklet is a question; beneath the question are twelve possible answers to it. What you are asked to do is to decide which of these seem to be the most suitable answers to the question. This might seem to be a fairly simple matter. However, your problem is complicated by the fact that the twelve answers are all rather similar to one another. We can illustrate the difficulty with some examples. Suppose the question you were asked was (1):

(1) Who did Helen choose?

And you were requires to select a suitable answer from (2) and (3):

(2) It was George who Helen chose.

(3) It was a green dress that Helen chose.

You would have no difficulty in selecting (2), since it is obvious that an answer containing 'green dress' is not a suitable answer to a who-question. Your task here, however, is not quite as easy as that. You will be required, for example, to evaluate (2) and (4), in addition to ten similar sentences, as suitable answers to (1):

(1) Who did Helen choose?

(2) It was George who Helen chose.

(4) The one who chose George was Helen.

Clearly such a task requires you to look very closely at the sentences you are faced with. Take your own time in going through the booklet. Read the question at the top of the page, take the first sentence from the answer set beneath, and evaluate its suitability as an answer to the question. Then repeat this procedure for all twelve sentences in the answer set, making sure to read the question at the top of the page before evaluating each answer. If you think a particular answer is suitable, mark it with a + (plus) at the beginning. If it is not suitable, mark it with a - (minus).

There are thirty-two sets altogether. If the instructions are clear to you, please begin. If not, ask the experimenter about any difficulties you may have.

Turn the page only after completing a set, and please do not refer back once you have finished a set.

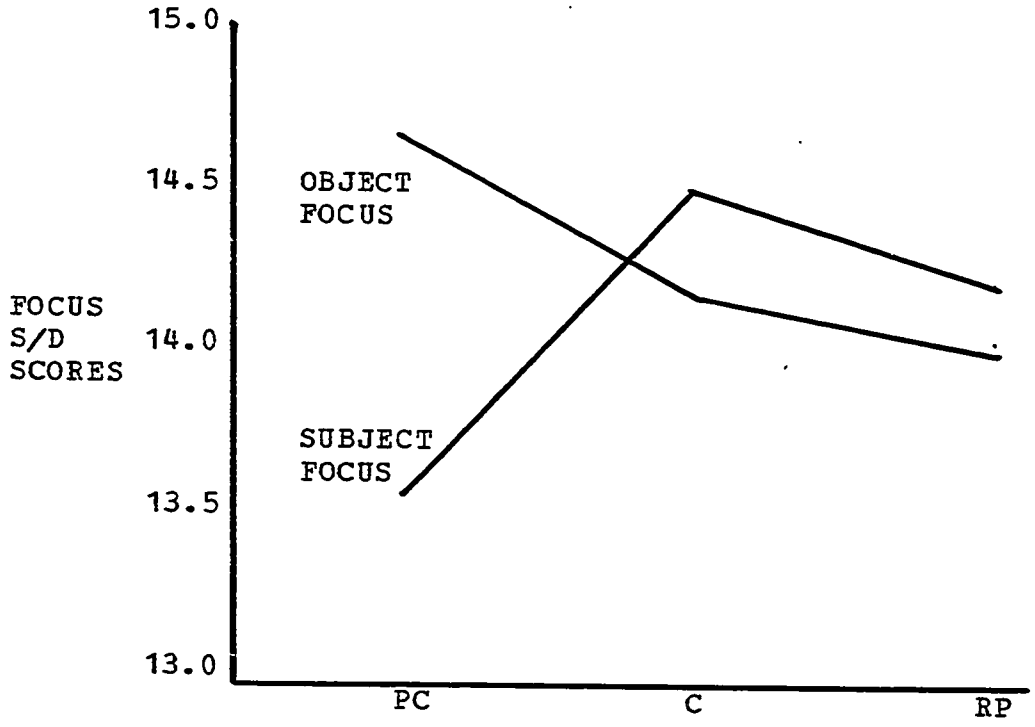
APPENDIX C

Tabulation of Incidence Scores

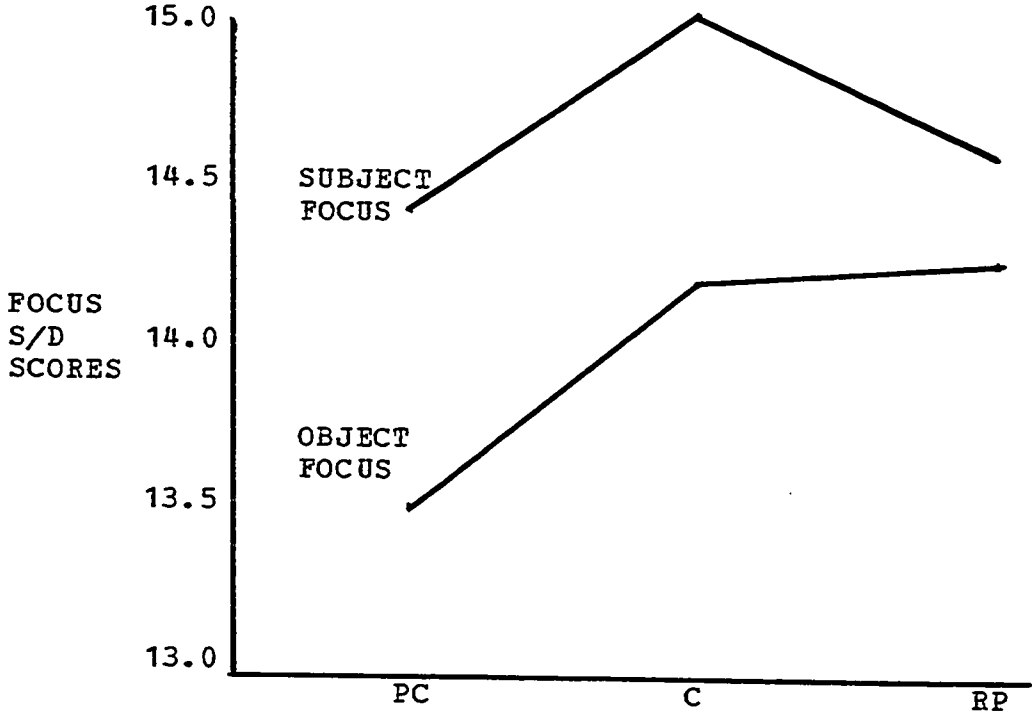
	QUESTION FORM			
	ACTIVE		PASSIVE	
RESPONSE PATTERN	OBJ	SUBJ	OBJ	SUBJ
PC/ACT/OBJ	432	161	414	150
PC/ACT/SUBJ	139	406	171	415
PC/PASS/OBJ	388	108	409	89
PC/PASS/SUBJ	131	361	130	404
C/ACT/OBJ	533	113	493	117
C/ACT/SUBJ	125	530	153	513
C/PASS/OBJ	435	92	519	94
C/PASS/SUBJ	82	411	117	455
RP/ACT/OBJ	531	99	524	121
RP/ACT/SUBJ	154	532	125	512
RP/PASS/OBJ	497	112	509	111
RP/PASS/SUBJ	98	419	99	493

APPENDIX D

QV x QF Interaction



ACTIVE QUESTION



PASSIVE QUESTION