This is to certify that the

thesis entitled

CONTRASTIVE STRESS
AND SENTENCE COMPREHENSION

presented by

Joanne Regina Mazzella

has been accepted towards fulfillment
of the requirements for

M.A. degree in Psychology

Gordon Wood

Major professor

Date August 3, 1979

CONTRASTIVE STRESS AND SENTENCE COMPREHENSION

by

Joanne Regina Mazzella

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Psychology

1979

ABSTRACT

CONTRASTIVE STRESS AND SENTENCE COMPREHENSION

by

Joanne Regina Mazzella

The effects of sentence stress on comprehension were investigated in two experiments. The measure of comprehension used was subject's reaction time to prerecorded sentences which varied with respect to locus of heaviest stress.

Experiment I considered the idea that placing contrastive stress on appropriate sentence items can facilitate a listener's comprehension. Results indicated that comprehension can be facilitated by using contrastive stress to point out the correct candidate for a role given in a preceding sentence. Subjects comprehended sentences carrying appropriate contrastive stress significantly faster than sentences with inappropriate or no stress.

Experiment II compared effects of stressing the new information versus the given information in sentences. Stressing the given information of a target sentence slowed down comprehension when the stressed item was the subject of the sentence but not when it was the object, indicating that the effect of the position of sentence items should be investigated further.

In both experiments, stress was used to indicate new information, but in different ways. In Experiment I, new information presented in

a target sentence functioned as a replacement for information from a previous sentence. In Experiment II this new information added to, rather than replaced, previous information. It appears that stress may function differently in different types of sentences.

These experiments demonstrate the importance of taking sentence stress factors into account in models of comprehension.

ACKNOWLEDGMENTS

I would like to express my sincere appreciation to the members of my thesis committee, Dr. Gordon Wood (Chairman), Dr. J. Kathryn Bock and Dr. Rose Zacks, whose guidance and encouragement made this work possible. I am deeply indebted to Mr. David Ehresman for his valuable instruction on the use of the PDP-11/40, and for his personal assistance in all phases of this endeavor. I would also like to thank Mr. Steven Gitterman for his help with the data analysis. Special thanks to my parents, Mr. and Mrs. Guido R. Mazzella, and to my husband, Mr. Paul G. Coady, for their never-ending faith and understanding support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

A basic function of language is the communication of new ideas. Some of the information a speaker communicates to a listener is information which is already shared by them, while other information may be previously unknown to the listener. A speaker assumes that there is certain information that is being introduced to the listener for the first time, and the speaker uses the information that they already have in common as a starting point for presenting this new information. This is done so that the listener will be able to assimilate the new information properly, i.e. so that the new information can be related to the listener's knowledge of the world in the way which the speaker intended. Information may be shared by virtue of already being in the knowledge structure of both people, by being part of the immediate physical environment that both are aware of, or by having been introduced linguistically in previous sentences (Chafe, 1970). For example, if (1) were uttered, it would typically be the case that the speaker

(1) The President of the United States is in Paris today.

assumes that the listener shares the knowledge that there exists a President of the United States, and the speaker is using that as a starting point for communicating the new information that that person is in Paris today. Information may also be shared from the physical environment. Sentence (2) could be uttered if both the speaker and

(2) The box is empty.

hearer are aware of a box before them, and one communicates to the other the information that that particular box is empty. Likewise, (3)

(3) The box was empty.

could be uttered if the speaker had already introduced the concept of a certain box in a prior sentence and now wishes to communicate the fact (previously unknown to the listener) that it was empty.

The distinction between shared and new information has been discussed by a number of authors, and a diverse set of terms has been used to designate the two types of information. The set includes the terms given-new (Halliday, 1967; Haviland and Clark, 1974; Chafe, 1974, 1976), old-new (Chafe, 1970), topic-comment (Hornby, 1971), presupposed-focused (Hornby, 1974), and theme-rheme (Halliday, 1967). The convention of using the designations given and new will be adopted in this paper unless otherwise noted.

When a speaker presents the given information of a sentence, in effect the context or reference is being set up within which the new information of that sentence is to be interpreted. Chafe (1974) suggests that what a speaker says is selected from what is in his or her consciousness at the time, and the speaker intends any utterances to enter the listener's consciousness. Since at any particular moment a listener may have things in consciousness unrelated to the information a speaker wishes to convey, the speaker must construct utterances to assure that the listener does indeed bring into consciousness that part of the knowledge store to which new information is to be related. Chafe (1970) suggests that a speaker constructs sentences so that the surface structure subject carries given information, thereby using English surface structure to signal what information the listener is to

bring out of the knowledge store and into consciousness.

Haviland and Clark (1974) propose that a tacit agreement exists between a speaker and listener as to how information is to be presented in sentences. The speaker agrees to present what is believed the listener already knows about as given information, and to present as new information the information the speaker believes the listener does not yet have knowledge of. The listener assumes that the speaker is following this convention and therefore, in order to understand what is said, uses a "Given-New Strategy" to interpret a sentence. This three-step procedure involves (1) breaking the sentence into given and new information, (2) searching memory for a unique antecedent matching the given information, and (3) attaching the new information to this antecedent. Since the authors assume that knowledge is represented in long-term memory as a set of interrelated propositions, the antecedent searched for in Step 2 corresponds to a proposition or set of propositions representing information known to the listener. By attaching new information to the appropriate antecedent in Step 3, the listener has integrated information into memory which was previously unknown.[1]

Haviland and Clark contend that in complying with the tacit agreement between speakers and listeners, or the "Given'New Contract", a speaker must try to construct sentences so that the listener has only one direct antecedent for any given information. That unique antecedent should be the one intended by the speaker. If (4) were uttered,

(4) Agnes saw somebody. It was Agnes who saw Maxine.

the speaker would be in violation of the Given-New Contract; since the existence of Agnes is established in the first sentence, the speaker should present Agnes as given information in the second sentence,[2] in

violation of the Given-New Contract requirement that a speaker present information that the listener is believed to be familiar with as given. Haviland and Clark contend that in order to comprehend this utterance, the listener uses a procedure known as "Restructuring"; that is, the listener must restructure the given and new information in the second sentence so that "Agnes saw someone" is given information rather than "someone saw Maxine", and "that someone is Maxine" is new information rather than "that someone is Agnes". Sentences which need to be restructured typically sound very awkward to the listener.

Haviland and Clark (1974) have presented psychological evidence which indicates that a listener may in fact be using the Given-New Strategy in comprehending sentences. The basic assumption of their experiments is that if a listener is able to locate a (unique) direct antecedent in memory for the given information of a sentence, it should take less time to comprehend that sentence than if no direct antecedent is readily available. Using reading time as a measure of comprehension, Haviland and Clark found that target sentences were comprehended significantly faster when preceded by a context sentence containing a direct antecedent for the given information of the target sentence, than when the context sentence did not contain a direct antecedent for this information. Holyoak and Clark (unpublished; see Clark, 1973) also found evidence that sentences which need to be restructured take significantly longer to comprehend (with reading time as the measure of comprehension) than sentences which do not require restructuring.

Many authors have noted (e.g. Halliday, 1967; Chafe, 1970; Chomsky, 1971; Clark, 1973) that items carrying new information in a sentence are in general given heavier stress than items reflecting given information.

Chafe (1970) contends that new information is spoken with higher pitch and greater amplitude since it is the primary information the speaker wishes to convey, and this pitch difference would therefore increase the effectiveness of communication. Hornby (1972) has found evidence which tends to support the notion that stressing an item may play an important role in indicating it as new information. He asked subjects to decide which of two pictures went with a simple sentence. Subjects had to choose which picture the sentence was about, in other words, which picture depicted the psychological subject (or given information) of the sentence. Neither picture was an accurate representation of the sentence since either the agent or the object differed from the sentence agent or object. When subjects were presented with an active sentence (e.g. The Indian is building the igloo), the agent was most often selected as the psychological subject of the sentence. However, when the same sentence was presented with stress on the agent (i.e. The Indian is building the igloo),[3] the agent was not selected as the psychological subject of the sentence as often as was the sentence object. In other words, the sentence constituent that was stressed was less likely to be considered as given information in the sentence. Stressing an item may thus serve to indicate it as new information.

The information in a sentence that a speaker assumes is not shared by the listener has been called the "focus" of a sentence (Jackendoff, 1972). Halliday also considers that the focus of a sentence is its new information, or information that is not recoverable from preceding discourse. In sentences (5) and (6), stress is used to indicate which

(5) Felicity eats caviar for breakfast.

(6) Felicity eats caviar for breakfast.

items carry new information, and the focus of these two sentences is different. A speaker would probably utter (5) to convey information about who it is that eats caviar for breakfast, while (6) would be uttered to convey information about what it is that Felicity eats for breakfast. Cutler (1976) contends that if a listener understands (5) and (6) as identical, these sentences have not been understood since they differ on the dimension of focus. Likewise, Cutler states that in order to successfully comprehend (7), a listener must recognize that

(7) Felicity eats caviar for breakfast?

(8) Yes, she likes to indulge herself.

(9) She's on a fish-only diet.

(10) Did you think it was Samantha who did?

(11) No, for dinner.

(8) and (9) are acceptable responses, but (10) and (11) are not.

Cutler (1975, 1976) argues that focus information constitutes an integral part of the semantic representation constructed when a sentence is understood. She points out that while most sentence comprehension models in some way incorporate the three basic stages of (1) identification of word boundaries, (2) lexical look-up, and (3) perception of syntactic structure, these stages are necessary but not sufficient to describe the sentence comprehension process. For example, Cutler (1976) notes that a listener could interpret (12) as being an expression of

(12) Cassandra is a real genius.

praise; however if (12) were spoken with an ironic intonation contour (i.e. nasalized, with heavy stress on certain words), it could be interpreted to have the reverse meaning. An ironically spoken sentence has a conveyed meaning which is the converse of its literal meaning (Cutler,

1974). In order to understand the information a speaker intended to convey when speaking (12) with an ironic intonation contour, comprehending the literal meaning of the sentence would not be sufficient.

Cutler (1976) notes further that if (13) were spoken with heavy stress on the word "above", this would imply that some other sentence

(13) The above sentence was ironically intended.

was not ironically intended. Stress used in this way is said to be contrastive. Bolinger (1961) has described contrastive stress as a phenomenon

> by which two or more items are counterbalanced and a preference indicated for some member or members of the group. It is the most conspicuous of all the occurrences of phonetic highlighting by reason of its frequency and the extra oomph that we put into it, and because our attention is focused in a way that makes us aware of our speech and not just of our meaning. (p.83)

According to Chafe (1976), three factors are involved in the use of contrastive stress. When contrastive stress is used, as in (14), the

(14) <u>Ronald</u> made the hamburgers.

speaker is assuming (1) that the listener knows that someone made the hamburgers and therefore treats this information as given. The speaker is also assuming (2) that the listener has a limited number of candidates in mind for the role of the person who made the hamburgers. Finally, the most important aspect of a contrastive sentence is (3) that the correct candidate for this role is pointed out to the listener. That the particular role exists is given information, and the speaker is presenting new information by pointing out the correct candidate for that role.

Cutler (1975) contends that the expectation of contrastive stress can facilitate sentence processing. A phoneme-monitoring task was given

to subjects in which sentences such as (15a) and (15b) were presented.

(15) a. She managed to remove the dirt from the rug, but not the berry stains.

b. She managed to remove the dirt from the rug, but not from their clothes.

c. She managed to remove the dirt from the rug.

It should be noted that in (15a) the word "dirt" would receive heavy stress since it is contrasted with "berry stains", and in (15b) the word "rug" would receive heavy stress since it is contrasted with "their clothes". The target phoneme in these sentences was /d/ and therefore was the initial sound of a high stress item ('dirt") in (15a), but in (15b) the item "dirt" would receive low stress. Sentence (15c) was also recorded, in a neutral tone of voice. In (15c) the target-bearing item received an intermediate level of stress, and this item was spliced into (15a) and (15b) in place of the target-bearing item in those sentences. As a result, the target-bearing items in (15a) and (15b) were acoustically identical, but the intonation contours preceding them were different. In (15a) the intonation contour was consistent with the occurrence of a high stress item in the position of the target-bearing word, and in (15b) the contour was consistent with the occurrence of a low stress item in that position. Phonemes were detected significantly faster in sentences such as (15a) than in sentences such as (15b), even though the target-bearing items were acoustically identical. Since reaction time to target phonemes in phoneme-monitoring tasks is assumed to be directly related to processing difficulty (i.e. shorter reaction times are expected when processing is less difficult), Cutler's results suggest that subjects' sentence comprehension was facilitated by the information contained in the intonation contour preceding the

target-bearing item. However, Newman and Dell (1978) have presented evidence indicating that phoneme detection latencies are strongly affected by the length of the word preceding a target-bearing item, with phonemes being detected faster as the length of the preceding word increases. Since the intonation contour preceding a high stress word is longer than the contour preceding a low stress item (Lehiste, 1970), Cutler's results may reflect the extra processing time subjects had to detect target phonemes. It should be noted however that giving a listener extra processing (comprehension) time may in fact be an implicit function of sentence stress.

Shields, McHugh and Martin (1974) and Cutler and Foss (1977) found that phonemes are detected faster in target-bearing items which are stressed than in items which are unstressed. Cutler (1975) contends that phoneme detection is faster when the target-bearing item is stressed because the stress indicates sentence focus, and rapid identification of focal (i.e. new) information facilitates comprehension. Cutler and Fodor (1979) reasoned that if this is true, phoneme detection should also be faster for target-bearing items whose focus in indicated in another way (i.e. without the use of stress). Cutler and Fodor manipulated sentence focus by preceding the target sentence with a question, the answer to which was the focus of the target sentence. For example, instead of presenting sentences such as (16) and (17) in which

(16) The man on the <u>corner</u> was wearing the blue hat.

(17) The man on the corner was wearing the <u>blue</u> hat.

focus is indicated by stress, the authors presented an acoustically identical version of (18) preceded by either (19) or (20). If (18)

(18) The man on the corner was wearing the blue hat.

(19) Which man was wearing the hat?

(20) What hat was the man wearing?

were preceded by the question in (19), the focus of (18) would be the same as the focus of (16). Likewise, the focus of (18) would be the same as that of (17) if (18) were preceded by the question in (20). Therefore, if the phoneme /k/ were to be detected, the target-bearing item in (18) would be focussed information if (18) were preceded by (19), but would be non-focussed information if (18) were preceded by (20).[4] By using these preceding questions to indicate focus, Cutler and Fodor eliminated the confounding factor of the length of stressed versus unstressed sentences, since the sentences containing target items were acoustically identical. Results indicated that phonemes were detected faster when the target-bearing item was the focus of the sentence. That this finding occurred in the absence of stress factors suggests that stress may facilitate phoneme detection because it indicates focal (i.e. new) information, and not simply because subjects are afforded more time for detection when the target-bearing item is stressed.

Cutler (1975, 1976) and Cutler and Fodor (1979) have argued that the reason sentence stress facilitates phoneme detection is because the stress allows a listener to identify the new information of a sentence more rapidly. Since reaction time to target phonemes is assumed to be directly related to the difficulty of sentence processing when the target phoneme occurs, faster detection of phonemes contained in stressed items indicates that stress facilitates sentence processing.

Speakers usually place heaviest stress on a sentence's new information, and it may be that in doing so the speaker increases the

effectiveness of communication by making new information explicit so that a listener can readily identify it as new information when trying to comprehend a sentence. It can be argued that appropriate use of stress will facilitate sentence comprehension, while inappropriate use will slow it down. Since contrastive stress can be used to designate a particular role as given information and a particular element as the correct candidate (i.e. new information) for the given role, the effects of stressing both appropriate and inappropriate items in contrastive sentences can be investigated. Appropriate use of contrastive stress (i.e. designating an appropriate candidate for a given role) should facilitate comprehension, while inappropriate use (i.e. contrastively stressing an inappropriate candidate for a given role) should slow down comprehension. These predictions were investigated in the following experiments.

EXPERIMENT I

Sentence (21) has at least three scopes of negation. This sentence

(21) George didn't kill Bill.

could be taken to mean (1) that it wasn't George, but rather someone else, who killed Bill, (2) that George did something to Bill other than kill him, or (3) that George killed someone but not Bill. The negation introduces a contrast, but doesn't explicitly point out where the

contrast is. A speaker could use stress to indicate the locus of the contrast, and thereby communicate to a listener which of these meanings were intended. If the first meaning above were intended, (22) would be

(22) George didn't kill Bill.

(23) George didn't kill Bill.

(24) George didn't kill Bill.

uttered. Sentence (23) would be uttered if the second meaning were intended, and likewise (24) for the third meaning.

In the case of (22), the listener is (explicitly) led to believe that someone other than George was the killer. If this sentence were followed by a statement of who the killer actually was, (i.e. someone other than George), contrastive stress would be placed on the candidate being pointed out as the correct one for the role of Bill's killer, as in (25). Likewise, if (23) were followed by a statement of what George

(25) George didn't kill Bill. Alfred killed Bill.

did to Bill rather than killing him, stress would be placed on the item reflecting George's alternate action, as in (26). And finally, if sen-

(26) George didn't kill Bill. George wounded Bill.

tence (24) were followed by a statement of who George killed (in contrast to Bill), stress would be placed on the candidate being pointed out as the correct one for the role of George's victim, as in (27).[5]

(27) George didn't kill Bill. George killed Alfred.

In (25)-(27), the item stressed in the second sentence of each pair is the one which is being pointed out by the speaker as the correct alternative for the role which is put in question in the first sentence of the pair. The stress pattern of the first sentence of the pair informs the listener as to which item is being negated. After hearing the

first sentence in (28a) a listener knows that it wasn't George, but

(28) a. George didn't kill Bill. Alfred killed Bill.
b. George didn't kill Bill. Alfred killed Bill.
c. George didn't kill Bill. Alfred killed Bill.
d. George didn't kill Bill. Alfred killed Bill.

rather someone else, who killed Bill. The listener then has as given information that a role exists (i.e. the role of Bill's killer). In the second sentence in (28a) the new information "Alfred" is presented, pointing out the correct candidate for the role. In processing this sentence, the listener may perform the operations of locating the given information of the previous sentence and filling in this new information about the correct candidate for the role in question. In other words, the new information replaces previous information; for example, in (28a) Alfred replaces George in the role of Bill's killer.

The first sentence in (28c) provides the given information that the role of George's victim exists, and that the correct candidate for the role is someone other than Bill. The second sentence in (28c) presents the new information that Alfred is the correct candidate for the role of Bill's killer. However, when the listener tries to locate the given information of the first sentence, the role of "George's victim" is found, and the new information doesn't replace someone in that role. In order to make sense of the second sentence and make the new information fit, the listener may have to locate different given information in the first sentence; that is, that someone other than George was Bill's killer. This "Restructuring" operation should take time; therefore it was predicted that the second sentence in (28c) would take longer to comprehend than the same sentence in (28a), since in (28a) the new information "Alfred" is an appropriate replacement for the role (given information) of the preceding sentence. In other words, in (28a) the context

sentence provides a direct antecedent for the given information that someone other than Alfred killed Bill, but the context sentence in (28c) does not.

In the first sentence of (28b), no item is stressed and therefore what is given information may not be as clearly established as in (28a) and (28c). The second sentence in (28b) presents the new information that Alfred is the correct candidate for the role of Bill's killer. The presentation of this new information may resolve the ambiguity of the first sentence and suggest that the role of Bill's killer was the role in question. Since the second sentence in (28b) is not actually inappropriate in the context of its preceding sentence, it was predicted that it would be comprehended faster than the second sentence in (28c), which is inappropriate. Since the information that the role of Bill's killer is in question is explicitly given through the use of contrastive stress in the first sentence of (28a), it was also predicted that the second sentence in (28a) would be comprehended faster than the second sentence in (28b) which is preceded by an ambiguous context sentence.

In (28d) no contrastive stress is present in either sentence. It was predicted that the second sentence in (28b) would be comprehended faster than the second sentence in (28d). These sentences are preceded by identical (unstressed) context sentences; however, contrastively stressing the new information of the target sentence in (28b) may facilitate comprehension by more clearly identifying that sentence's new information.

To summarize, it was predicted that comprehension time for (a) target sentences would be shorter than for (c) target sentences, comprehension time for (b) target sentences would be shorter than for (c) target

sentences but longer than for (a) target sentences, and comprehension time for (b) target sentences would be shorter than for (d) target sentences.

Method

Subjects. Subjects were 40 adult native speakers of English, participating for extra credit in an introductory psychology course at Michigan State University. All subjects were tested individually and participated in both Experiments I and II within a single session. Twenty subjects, selected at random, served in Experiment I first and the remaining 20 served in Experiment II first. Within each set of 20 subjects, individuals were assigned at random to each of the 4 lists described below, 5 subjects to a list. Therefore, each of the 4 lists was presented to a total of 10 subjects.

Materials. The verbal materials consisted of the 20 sets of 4 sentence pairs listed in Appendix A, plus sentence pairs i-iii listed in Appendix A which were used in practice trials for all subjects. Each set consisted of 4 sentence pairs which varied with respect to (A) whether any item was stressed in the second (target) sentence (A_1: stress; A_2: no stress), and (B) whether the stress in the first (context) sentence was placed on the same item as in the target sentence, placed on no item, or placed on a different item from the one stressed in the target sentence (B_1: same stress; B_2: no stress; B_3: different stress). The sentence pairs from (28) above corresponding to each possible condition are presented below:

A_1B_1: George didn't kill Bill. Alfred killed Bill. (same, stress)

A_1B_2: George didn't kill Bill. Alfred killed Bill. (no stress, stress)

A_1B_3: George didn't kill Bill. Alfred killed Bill. (different, stress)

A_2B_2: George didn't kill Bill. Alfred killed Bill. (no stress, no stress)

Over the 20 sets of sentences, the item stressed in the target sentence was either the subject, verb, object, adjective, or object of the preposition of the sentence an equal number of times. Therefore, in 4 sentence sets the stressed item was the subject of the sentence, in 4 it was the verb, and so on.

Four lists of 20 sentence pairs each were constructed so that each list contained 5 randomly selected sentence pairs from each of the 4 possible conditions, with no list containing more than one sentence pair from any sentence set. Each of the (20x4) or 80 possible sentence pairs was present in the lists, so that 20 pairs from each condition were presented in all. Each list of 20 sentence pairs was preceded by the same 3 practice sentence pairs (i.e. pairs i-iii in Appendix A).

All sentences were recorded by the experimenter on Scotch brand magnetic tape using a Revox A-700 tape recorder. Using the above example, only the following sentences were actually recorded for this particular (representative) set:

A_1B_1: George didn't kill Bill. Alfred killed Bill.

A_2B_2: George didn't kill Bill. Alfred killed Bill.

B_3: George didn't kill Bill.

The 2 types of target sentences (A_1 and A_2) and the 3 types of context sentences (B_1, B_2 and B_3) were then used to construct the 4 different context sentence/target sentence combinations in the following way. All sentences which had been recorded were digitized using a 16-bit audio to digital converter, constructed by Three Rivers Computer

Corporation. The digital form of each sentence was then stored on magnetic disc. Using a PDP-11/40 computer, 4 lists were constructed by playing the sentences back in the proper order for each list through a digital to audio converter, and recording them on Scotch brand magnetic tape using a Revox A-700 tape recorder. Therefore the final recording consisted of 4 lists of the original 20 sentence pairs (and the 3 practice sentence pairs) in the proper order for each list.

Procedure. Four groups of 10 subjects each were asked to listen to a list of 23 prerecorded pairs of sentences, the first 3 pairs of which were practice trials. Subjects were assigned to groups at random and each group received one of the 4 lists described above. Lists were played on a Teac A-3340S tape recorder, and were presented to subjects binaurally via headphones. Subjects were seated in front of a panel of 2 buttons, in a separate room from the tape recorder. When subjects were ready to begin the experiment, they pressed the button on the left side of the panel, designated as the "Ready" button, which initiated presentation of the first sentence. This button was pressed only to begin the experiment. Subjects were instructed to press the button on the right side of the panel as soon as they understood each sentence. Any subject inquiries as to what was meant by "understanding" the sentence were answered by telling subjects to press the button just as soon as they felt they understood what the sentence meant. The inquiring subjects' primary concern was that highly complicated or technical sentences would be presented. When assured they would hear "simple" sentences (the example "John loves Mary" was given verbally to concerned subjects), all subjects appeared satisfied that they understood the instructions before the experiment began.

A one-second silent interval elapsed between the subject's response to the first sentence of each pair and the beginning of the second sentence of that pair. A five-second silent interval elapsed between the subject's response to the second sentence of a pair and the beginning of the first sentence of the next pair. However, each time a response was made before a sentence ended, these silent intervals were measured from the end of that sentence rather than from the subject's response. In other words, if a subject responded before a sentence ended, the next sentence was presented after a silent interval which was measured from the end of the preceding sentence. If a subject responded after a sentence ended, the next sentence was presented following a silent interval which was measured from the subject's response.

The button switches which the subjects pressed to begin the experiment and to indicate their responses were interfaced with a PDP-8i computer. The computer was programmed to monitor a subject's button presses, and to start and stop the tape recorder at the appropriate times. The computer recorded the length of time measured from the beginning of each sentence to the subject's button press. The exact length of each sentence had been determined earlier when the lists were being constructed. The length of each sentence was subtracted from the time measured from the beginning of each sentence to the subject's button press, and the resulting values were considered as the subject's reaction times. These values were subsequently used in all data analyses. Reaction times to sentences in the 3 practice trial pairs were disregarded.

After all sentences had been presented, subjects were given a paper and pencil recognition memory test (see Appendix B). Test items

consisted of a random listing of all the target sentences which had just been presented, plus an equal number of distractor sentences interspered in a random fashion. The distractor sentences were similar to the sentences which had been presented. Subjects were asked to indicate whether or not each sentence was one that was just heard by writing "Yes" or "No" after each sentence.

The purpose of the memory test was to provide a check on whether subjects were actually comprehending the sentences presented to them. It would have been possible for subjects to merely press the button after hearing each sentence without actually trying to comprehend them. However, if a subject were able to recognize the sentences in a later memory test with a high degree of accuracy, it could be concluded that the sentences were actually comprehended. Memory test results were used for no other purpose than as an overall comprehension check.

Subjects were not informed of the memory test at the beginning of the experiment. It was suspected that if informed, subjects might not respond as soon as each sentence was comprehended, but rather would rehearse the sentences before responding in hopes of improving memory test performance. Therefore the memory test at the end of the first experiment was a surprise. However, subjects very likely suspected that another memory test would be presented at the end of the second experiment (since the procedures of both experiments were identical), but by that time would not be likely to initiate a rehearsal strategy. The ordering of the two memory tests was counterbalanced since half the subjects received Experiment I first and Experiment II second, while the other half received the two experiments in the reverse order.

Results

Mean reaction times (RTs) for target sentences in each of the 4 conditions were computed, collapsing across subjects within each condition. These mean RTs are presented in Table 1.

Table 1. Mean reaction time to target sentences in Experiment I.

Condition	Description of Condition	Mean RT (in msec)
A_1B_1	Stress in context sentence; same item stressed in target sentence (e.g. George didn't kill Bill. Alfred killed Bill.)	-14
A_1B_2	No stress in context sentence; stress in target sentence (e.g. George didn't kill Bill. Alfred killed Bill.)	75
A_1B_3	Stress in context sentence; different item stressed in target sentence (e.g. George didn't kill Bill. Alfred killed Bill.)	137
A_2B_2	No stress in context sentence; no stress in target sentence (e.g. George didn't kill Bill. Alfred killed Bill.)	143

Several planned comparisons were carried out with the following results: Mean RT for condition A_1B_1 (same, stress) was less than mean RT for condition A_1B_3 (different, stress), $t(39)= -4.68$, $p<.0001$; mean RT for condition A_1B_1 (same, stress) was less than mean RT for condition A_1B_2 (no stress, stress), $t(39)= -3.00$, $p<.005$; mean RT for condition A_1B_2 (no stress, stress) was less than mean RT for condition A_1B_3 (different, stress), $t(39)= -1.68$, $p<.1$; and mean RT for condition A_1B_2 (no stress, stress) was less than mean RT for condition A_2B_2 (no stress, no stress), $t(39)= -2.23$, $p<.05$.

Thirty-four of the 40 subjects showed the effect of a reaction

time difference in the predicted direction between conditions A_1B_1 (same, stress) and A_1B_3 (different, stress); 27 of the 40 subjects showed this directional effect between conditions A_1B_1 (same, stress) and A_1B_2 (no stress, stress); 24 of the 40 subjects showed the effect between conditions A_1B_2 (no stress, stress) and A_1B_3 (different, stress); and 28 of the 40 subjects showed the effect between conditions A_1B_2 (no stress, stress) and A_2B_2 (no stress, no stress).

Mean RT for stressed context sentences (261 msec) was not significantly different from mean RT for unstressed context sentences (281 msec), $F(1,39)=.76$.

The physical lengths of all sentences presented in this experiment were measured. Stressed sentences ($\bar{X}$=2125 msec) were significantly longer than unstressed sentences ($\bar{X}$=1861 msec), $F(1,98)=12.8$, $p<.001$.

Memory test performance was .90, indicating that subjects did comprehend the sentences presented to them. Performance of subjects who received the experiments in the I-II order was .895 for Experiment I, while performance of subjects receiving the experiments in the II-I order was .905 for Experiment I. Since memory test performance in Experiment I of subjects receiving Experiment I first was virtually identical to the performance of subjects who received Experiment I after Experiment II, it appears that anticipation of a memory test made no difference in recognition performance.

Discussion

This experiment was designed to consider whether the use of contrastive stress influences sentence comprehension. Target sentences containing items stressed appropriately in the context of the intended

meaning of the preceding sentence were comprehended faster than inappropriately stressed target sentences and target sentences preceded by an unstressed context sentence. Inappropriately stressed target sentences were also comprehended more slowly than target sentences preceded by unstressed context sentences. The fact that the target sentences prededed by these unstressed sentences were not inappropriate lends further support to the notion that contrastively stressing information that is explicitly presented as given in a preceding sentence does in fact facilitate comprehension.

Stressed target sentences preceded by unstressed context sentences were comprehended faster than unstressed target sentences preceded by this type of context sentence. It appears that comprehension may be facilitated when new information is explicitly pointed out to a listener via stress, perhaps because the presence of stress lengthens a sentence and allows more time for comprehension. However, evidence can also be presented from this experiment indicating that sentences are not made easier to comprehend simply by placing heavy stress on an item in the sentence. Stressed context sentences were comprehended no more rapidly than unstressed context sentences. This indicates that in the absence of other factors, the higher pitch and amplitude of stressed items and/or the extra processing time they afford cannot in itself account for appropriately stressed target sentences being comprehended faster than unstressed (but appropriate) target sentences. However, it may be that after a listener hears a context sentence and encounters ambiguity in establishing what information is new and what is given, the presence of a stressed item in the target sentence helps the listener resolve this ambiguity and facilitates comprehension. It is unclear at this

time what operations a listener may perform in order to disambiguate unstressed sentences, and it is also unclear what effect the extra processing time afforded by stressed sentences actually has on comprehension.

Results of this experiment show that inappropriately stressed target sentences were comprehended about as rapidly as unstressed target sentences preceded by unstressed context sentences. Examples of these types of sentences are given in (28c) and (28d), respectively, which are reprinted below with mean RT for the target sentences in each. Although

(28c) George didn't kill Bill. Alfred killed Bill. (137 msec)

(28d) George didn't kill Bill. Alfred killed Bill. (143 msec)

the stress in the target sentence of (28c) is inappropriate and the sentence may have to be restructured in some way to be understood, it was still not significantly more difficult to understand than the unstressed target sentence in (28d), which does not appear to be inappropriate. Perhaps the greater length of the target sentence in (28c) allowed adequate time for the extra operations needed for comprehension. It is also possible that the lack of stress in the target sentence of (28d) made the identification of given and new information more difficult and slowed down comprehension. It is impossible to argue for the merit of one of these explanations over the other given the conditions of this experiment; thus, reasons for the relatively slow comprehension time for the target sentence of (28d) remain unresolved. However, if an experiment could be performed in which the length of the context sentences in (28c) and (28d) were identical, the amount of processing time afforded subjects by stressed and unstressed sentences could be controlled, and more light would be shed on the results obtained here.

The feasibility of such an experiment would depend on whether the length of a stressed context sentence such as the one in (28c) could be compressed to equal the length of the unstressed context sentence in (28d) without the sentence sounding unnatural.

The results of the present experiment lend support to the notion that a listener processes intonational features in the course of comprehending a sentence. Results indicate that placement of contrastive stress can greatly influence the speed of sentence comprehension depending on whether an appropriate or an inappropriate item is indicated (through the use of stress) as the correct candidate (new information) to replace an incorrect candidate in a given role. In Experiment I, given roles were established in context sentences through the use of contrastive stress. Experiment II examined unstressed context sentences with target sentences which require as an antecedent for the contrastive role component the same role (as in Experiment I) and a different role element (also as in Experiment I); however, in the types of sentences used in Experiment II, the new role element does not replace the old but is instead added to it.

EXPERIMENT II

As discussed above, Chafe (1976) contends that a speaker who utters the contrastive sentence "Ronald made the hamburgers" is assuming that the listener knows that someone made the hamburgers and therefore treats this information as given. The correct candidate (Ronald) for the role of hamburger maker is presented as new information and receives heaviest stress.

A simple active sentence spoken under normal intonation contains no specific markers of presupposition and new information is generally considered to be found at the end of the sentence (Halliday, 1967; Chafe, 1970). Therefore, upon hearing (29), it would in general be assumed

(29) Annie slew a gnu too.

that the presupposed information (which would be earlier in the sentence) is that Annie slew something else. However, if (29) were uttered as in (30), the higher pitch on "Annie" would identify that item as new

(30) Annie slew a gnu too.

information, leaving as presupposed that someone else slew a gnu, or in other words that someone else is also a correct candidate for the given role of gnu slayer.

If stressing an item in fact indicates that it contains new information, then (30) should be comprehended faster when found in the context of a sentence like (31), which contains a direct antecedent for the

(31) Debbie slew a gnu.

presupposed information that someone else slew a gnu, than when found in the context of (32), which does not contain a direct antecedent for the

(32) Annie slew a yak.

given information of (30). In other words, the target sentence in (33) should be comprehended faster than the target sentence in (34) in which

(33) Debbie slew a gnu. Annie slew a gnu too.

(34) Annie slew a yak. Annie slew a gnu too.

the stressed item carries information that is given in the context sentence.

In (33), "Annie" is presented in the target sentence as new information, indicating that she too is a gnu slayer, a role which is considered given information. That role was set up in the context sentence, where Debbie was pointed out as a correct candidate for the role. The new information of the target sentence indicates that Annie is also an appropriate candidate for the role. The new information of the target sentence indicates that Annie is also an appropriate candidate for the role, and therefore it appears that in these sentences the new information (Annie) is added to previously given information (Debbie) in a role established in the context sentence.

Likewise, in the target sentence of (34) Annie is presented as an additional correct candidate for the (supposedly given) role of gnu slayer. However, such a role was not established in the context sentence of (34). Rather, the role of yak slayer was set up, with Annie as the correct candidate for it. In the target sentence of (34) "Annie" is given information by virtue of the information presented in the sentence preceding it. Therefore, it is the fact that a gnu was slain in addition to a yak that is new information in the target sentence, and

Annie is given information. If stressing a sentence item does indicate that it is new information, then stressing "Annie" in the target sentence of (34) is inappropriate. The inappropriately stressed target sentence in (34) should be comprehended more slowly than the same sentence in (33), which is stressed appropriately given its context.

Experiment II tested this prediction by presenting subjects with pairs of prerecorded sentences in which the target sentence of each pair was a simple active sentence containing one of the adverbs "still", "either", "again", or "too", and by manipulating the locus of heaviest stress in these target sentences. The context sentence of each pair contained either an appropriate antecedent for the stressed information of the target sentence, as in (35), or contained an inappropriate antecedent for that information, as in (36). It was predicted that it would

(35) Jane had a cold. Mary had a cold too.

(36) Mary had the measles. Mary had a cold too.

take listeners more time to comprehend the target sentence in (36) than in (35). Likewise, the target sentence in (37) was expected to be comprehended faster than the same sentence in (38).

(37) Mary had the measles. Mary had a cold too.

(38) Jane had a cold. Mary had a cold too.

Method

Subjects. Subjects were the 40 participants described in Experiment I.

Materials. The verbal materials consisted of 16 sets of sentences of the same form as sentence pairs (39)-(42), which are representative of one sentence set (using the adverb "either"). Each set consisted of

(39) Fred can't play the violin. Bob can't play the violin either.
(40) Bob can't play the piano. Bob can't play the violin either.
(41) Bob can't play the piano. Bob can't play the violin either.
(42) Fred can't play the violin. Bob can't play the violin either.

4 sentences pairs which varied with respect to locus of heaviest stress and whether or not the context sentence contained an appropriate antecedent for the stressed information of the target sentence. Type of context sentence and locus of heaviest stress were varied factorially to produce 64 defferent sentence pair/intonation combinations. Therefore each set contained on sentence pair from each of the following conditions:

a) Appropriate Antecedent, Subject (AS): Context sentence containing an appropriate antecedent for stressed information of the target sentence; heaviest stress on subject
b) Appropriate Antecedent, Object (AO): Context sentence containing an appropriate antecedent for stressed information of the target sentence; heaviest stress on object
c) Inappropriate Antecedent, Subject (IS): Context sentence containing an inappropriate antecedent for stressed information of the target sentence; heaviest stress on subject
d) Inappropriate Antecedent, Object (IO): Context sentence containing an inappropriate antecedent for stressed information of the target sentence; heaviest stress on object

The 16 sentence sets, plus 3 additional sentence pairs used in practice trials at the beginning of the experiment, are presented in Appendix C.

Four lists of 16 sentences each were constructed in the following way. A random order of the 16 sentence sets was chosen and held constant over lists. The 16 sentence pairs of List 1 were made up of 4 sentence pairs from each of the 4 (AS, AO, IS and IO) conditions, selected at random. Lists 2-4 contained the same ordering of the 16 sentences as List 1, and were constructed so that over the 4 lists each sentence was represented as an AS, AO, IS, and IO sentence exactly once. Therefore each list contained 4 sentence pairs from each of the 4 conditions. Each list of 16 sentence pairs was preceded by the same 3

practice sentence pairs (i.e. pairs i-iii in Appendix C). The 4 lists are presented in Appendix D.

All sentences were recorded by the experimenter on Scotch brand magnetic tape using a Revox A-700 tape recorder. Only AS and AO sentences were actually recorded. These sentences were then used, in a different order, for the sentences in the IS and IO conditions. In this way the recorded target sentences in the AS and IS conditions were identical, as were the target sentences in the AO and IO conditions. As in Experiment I, all sentences which had been recorded were digitized and the digital form of each sentence was stored on magnetic disc. Using the PDP-11/40 domputer, 4 lists were constructed by playing the sentences back in the proper order for each list through the digital to audio converter, and recording them on Scotch brand magnetic tape using the Revox A-700 tape recorder. The final recording consisted of 4 lists of the original 16 sentence pairs (and the 3 practice sentence pairs) in the proper order for each list.

The recognition test used in Experiment II is found in Appendix E.

Procedure. The procedure followed in conducting this experiment was the same as in Experiment I.

Results

Mean reaction time (RT) for each type of target sentence (AS, AC, IS, and IO) was computed, collapsing across lists and subjects. These mean RTs are presented in Table 2.

A 2 x 2 x 40 x 4 repeated measures analysis of variance was carried out on the data. The major comparison of interest was the comparison of mean RT for the Appropriate Antecedent condition with the Inappropriate

Table 2. Mean reaction time to target sentences in Experiment II.

Condition	RT (in msec)
AS	137
AO	206
IS	270
IO	198

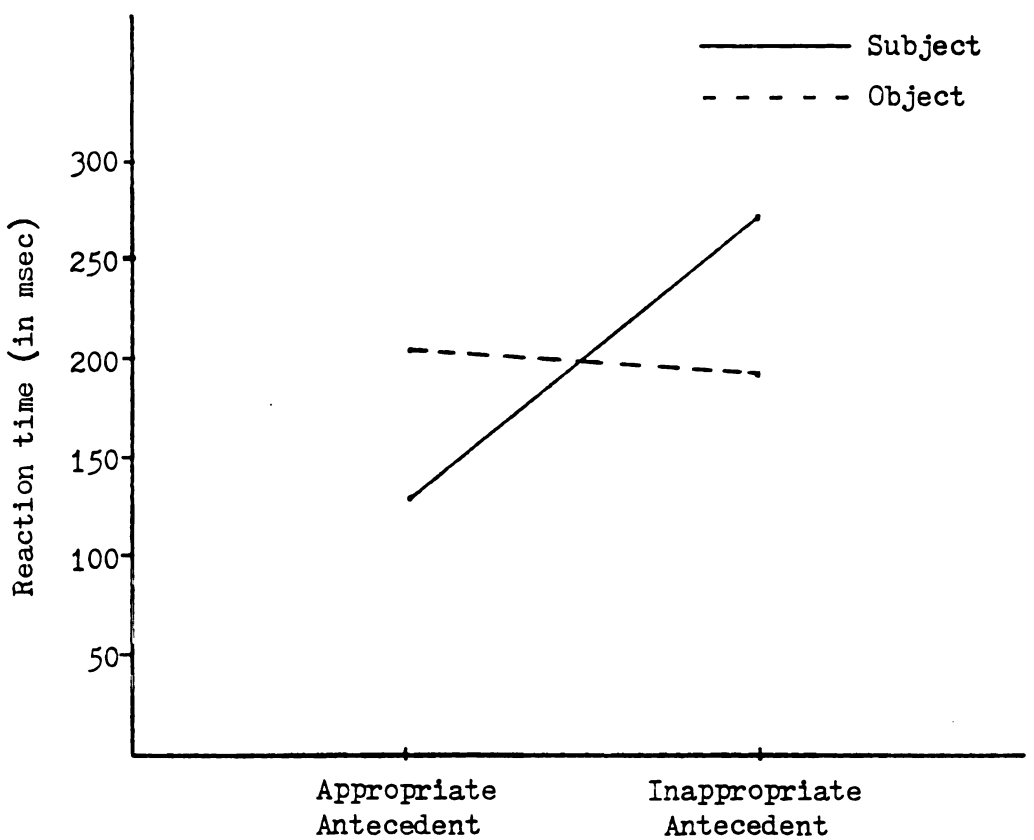

Figure 1. Mean reaction time to target sentences in Experiment II.

Antecedent condition. It was predicted that mean RT in the Appropriate Antecedent condition would be significantly faster than in the Inappropriate Antecedent condition. Mean RT for the Appropriate Antecedent condition (171 msec) was in fact faster than mean RT for the Inappropriate Antecedent condition (234 msec), $F(1,39)= 4.83$, $p<.05$. Thirty of the 40 subjects in the experiment showed this effect. No main effect of Subject versus Object was found; however an interaction between the Appropriate Antecedent/Inappropriate Antecedent and Subject/Object factors occurred, $F(1,39)= 13.62$, $p<.001$ (see Figure 1). This interaction reveals that the main effect of the Appropriate Antecedent/Inappropriate Antecedent factor is a result of a difference between the AS and IS conditions; mean RT in the AO condition was not significantly different from mean RT in the IO condition.

Memory test performance was .90, indicating that subjects did comprehend the sentences presented to them. Performance of subjects who received the experiments in the II-I order was .88 for Experiment II, while performance of subjects receiving the experiments in the I-II order was .92 for Experiment II. Memory test performance was slightly, but insignificantly, better in Experiment II when this experiment was the second one presented. Therefore, it appears that anticipation of a memory test made little or no difference in recognition performance.

Discussion

In this experiment, subjects were presented with sentence pairs in which the context sentence contained either an appropriate or an inappropriate antecedent for the stressed information of the target sentence. It took subjects longer to comprehend target sentences in the

Inappropriate Antecedent condition than in the Appropriate Antecedent condition when the stressed item was the subject of the sentence. However, when the stressed item was the object of the sentence, there was no difference between comprehension time of Appropriate Antecedent and Inappropriate Antecedent condition target sentences. In other words, a target sentence such as the one in (39) was comprehended faster than the same sentence in (41), but a target sentence such as the one in (40) was not comprehended faster than the same sentence in (42). These results do not fully support the prediction that sentence comprehension will be facilitated when an item carrying new information (in the context of a preceding sentence) receives heavy stress, and that comprehension will be slowed down by stressing an item (i.e. designating an item as new information) which carries given information in the context of a previous sentence.

Since all sentences used in this experiment were active, the underlying subject of each sentence always occurred at the beginning and the underlying object was found at the end of the sentence. It appears that the position of the stressed item in the target sentence is an important variable influencing comprehension time in this experiment, but the confounding of underlying subject and object with surface position requires further investigation.

These results suggest that a model describing the way listeners comprehend the types of sentences presented should incorporate both of the following factors: (1) the type of information (given or new) which receives heaviest stress in the sentence, and (2) the position of the given and new information in the sentence. It appears that comprehension is facilitated when new information is given heaviest stress

but slowed down when it is the given information which is stressed. This effect was predicted in Experiment II. However, it also appears that comprehension is facilitated when new information occurs at the beginning of a sentence, but slowed down when given information is present in that position. This finding is contradictory to the traditional production hypothesis (Halliday, 1967; Chafe, 1970) that new information is usually presented at the end of simple active sentences.

Mean comprehension time was fastest in the AS condition (137 msec), slowest in the IS condition (270 msec), and intermediate in the AO (206 msec) and IO (198 msec) conditions. In the fastest (AS) condition, the new information is stressed and is found at the beginning of the sentence; both of these could be considered facilitating (+) factors. In the slowest (IS) condition, the given information is stressed and the new information is found at the end of the sentence; both could be considered as inhibiting (-) factors. In the two conditions with intermediate comprehension times, one facilitating and one inhibiting factor are present: in the AO condition the new information is stressed (+) but is found at the end of the sentence (-), and in the IO condition the new information is at the beginning of the sentence (+) but the given information is stressed (-). Examples of sentences in each of the 4 conditions are given in (43)-(46):

(43) AS Evelyn kissed Jeremy. Rhonda kissed Jeremy too. (+ +)
(44) AO Rhonda kissed Jason. Rhonda kissed Jeremy too. (+ -)
(45) IS Rhonda kissed Jason. Rhonda kissed Jeremy too. (- -)
(46) IO Evelyn kissed Jeremy. Rhonda kissed Jeremy too. (- +)

To determine whether the two factors described above (i.e. the type of information (given or new) which is given heaviest stress, and the position of given and new information in the sentence) have the predicted effects on comprehension time, it would be necessary to repeat

Experiment II with several added conditions. In an active sentence the underlying subject is found at the beginning and the underlying object at the end of the sentence. In a passive sentence the underlying subject is found at the end of the sentence while the underlying object occurs at the beginning. Since only active sentences were used in this experiment, there was no control for position of underlying subject and object in the sentences. If passive sentences such as (47)-(50) were

(47) Evelyn kissed Jeremy. Jeremy was kissed by Rhonda too. (+ -)
(48) Rhonda kissed Jason. Jeremy was kissed by Rhonda too. (+ +)
(49) Rhonda kissed Jason. Jeremy was kissed by Rhonda too. (- +)
(50) Evelyn kissed Jeremy. Jeremy was kissed by Rhonda too. (- -)

to be used, the original predictions made in Experiment II should be supported when the stressed item is the object of the sentence but not when it is the subject. This result would be the opposite of that found in Experiment II, and would support the notion of incorporating a position factor in a description of the comprehension process. The relative comprehension times listed in Table 3 are predicted for target sentences such as those in (43)-(46) and (47)-(50).

Table 3. Relative reaction times for active and passive target sentences.

Active Sentences		Passive Sentences	
Condition	Relative RT (Obtained-Experiment II)	Condition	Relative RT (Predicted)
AS	(+ +) Fastest (137 msec)	AS	(+ -) Intermediate
AO	(+ -) Intermediate (206 msec)	AO	(+ +) Fastest
IS	(- -) Slowest (270 msec)	IS	(- +) Intermediate
IO	(- +) Intermediate (198 msec)	IO	(- -) Slowest

In Experiment II, sentences having their new information at the beginning were comprehended faster than sentences with their new

information at the end. Since all sentences were of the same form as those in (51)-(54), it is possible that after several trials a subject

(51) AS Jane had a cold. Mary had a cold too.
(52) AO Mary had the measles. Mary had a cold too.
(53) IS Mary had the measles. Mary had a cold too.
(54) IO Jane had a cold. Mary had a cold too.

could "comprehend" a target sentence once its new information was heard, since the given information was always information which had been given in the context sentence. In other words, if new information was located at the beginning of a target sentence, as in (51) and (54), a subject might be able to accurately predict the rest of the sentence and could press the button indicating comprehension before the target sentence had been completed. If new information were found at the end of the sentence, as in (52) and (53), subjects might be less likely to respond prematurely because the end of the sentence could not be accurately predicted. Although there is the possibility that this type of subject strategy was responsible for the faster RT results for target sentences with new information at the beginning, this does not appear to have been the case in this experiment. If subjects were actually responding more quickly to target sentences with their new information at the beginning because the given information of the sentence wasn't necessary for comprehension, more premature responses would be expected to those target sentences with their new information at the beginning than to target sentences with their new information at the end.

The data analyzed in this experiment were the responses of 40 subjects to 16 target sentences each, for a total of 640 responses. Of the 640 responses obtained, 143 of these were made before the end of the target sentence. Of these 143 premature responses, 82 of them, or 57% were responses to sentences with the new information at the beginning

of the sentence. In other words, subjects were almost as likely to respond prematurely to target sentences with new information at the beginning as they were to sentences with the new information at the end (i.e. differential responding was close to chance level).

The set of 82 premature responses to target sentences with their new information at the beginning, and the set of 61 premature responses to target sentences with their new information at the end were analyzed to determine if subjects' responses were more premature in the former set than the latter. Mean RT for the former set was -390 msec, while mean RT for the latter set was -319 msec (RTs measured from the physical end of the sentence). A Mann-Whitney U analysis was carried out on these data, and no significant difference was found between the two sets of responses ($z=.14$, n.s.). The Mann-Whitney test was considered appropriate because the distribution of premature responses was nonnormal.

There was no significant difference between the sets of premature responses in the AS condition ($\bar{X}=$ -389 msec, $n=42$) and the IO condition ($\bar{X}=$ -390 msec, $n=40$), $z=$ -.45, n.s.; there was also no significant difference between the sets of premature responses in the AO condition ($\bar{X}=$ -335 msec, $n=33$) and the IS condition ($\bar{X}=$ -300 msec, $n=28$), $z=$ -.31, n.s. The former conditions (AS and IO) had their new information (i.e. information not recoverable from the context sentence) at the beginning of the target sentence and the latter conditions (AO and IS) had their new information at the end; the stressed item in the AS and IS conditions occurred at the beginning of the target sentence, while in the AO and IO conditions the stressed item was at the end of the target sentence. The above analysis by condition yields no evidence that either the location of stress or the location of new information influenced

the occurrence of premature responses.

Little evidence can be derived from this experiment for the possibility that subjects responded more rapidly to target sentences with new information at the beginning because they realized the given information which followed was unnecessary for comprehension. However, in future experiments the precautionary measure could be taken of including target sentences which contain all new information, as in (55)-(58).

(55) Jane had a cold. Mary had the measles too.
(56) Mary had the measles. Jane had a cold too.
(57) Mary had the measles. Jane had a cold too.
(58) Jane had a cold. Mary had the measles too.

Including such sentences presumably would prevent subjects from using the response strategy discussed above, since they would be unable to predict whether given or new information was going to follow initial new information.[6]

GENERAL DISCUSSION

The two experiments in this study were designed to consider the role of stress in sentence comprehension. It was postulated that a particular communicative function is served by the appropriate use of stress in that such use can facilitate a listener's comprehension of certain types of utterances.

The phenomenon of contrastive stress is a conspicuous form of

phonetic highlighting which appears to have a significant effect on sentence comprehension. Contrastive stress plays an important communicative function by focusing a listener's attention on a particular sentence item and by indicating how the listener should interpret that sentence. In a sentence such as "George didn't kill Bill", contrastive stress is used to indicate the sentence's scope of negation and that a particular role is given information. In a sentence such as "George killed Alfred", contrastive stress is used to mark a particular item as new information carrying the correct candidate for the role in question, thereby excluding other candidates the listener may have been considering. It appears that contrastive stress may have this dual function of indicating both given and new information in these types of sentences. Results indicated that proper use of contrastive stress can facilitate comprehension, and that inappropriate use makes comprehension more difficult for listeners. Contrastive stress appears to be an important factor in determining the speed at which sentences are understood.

In Experiment II, context sentences were unstressed and the new information of target sentences was designated by placing heaviest stress on a particular sentence item. The item stressed was either information which had an appropriate antecedent in the preceding sentence, or information which had an inappropropriate antecedent. An appropriate antecedent was one to which the new (stressed) information of the target sentence could be added; i.e. an appropriate antecedent would carry the same role as the new information but a different (although not incorrect) role element. It was predicted that stressing a target sentence item with an inappropriate antecedent would slow down comprehension. This occurred when the stressed item was the subject of the sentence but did

not occur when it was the object. Position of the item in the sentence could be an important factor contributing to such a result. A future experiment using both active and passive sentences could control for the position factor and shed more light on the results obtained here.

Haviland and Clark (1974) contend that when a direct antecedent is presented for the given information of a sentence, that sentence will be easier to comprehend than if a direct antecedent were not presented. Haviland and Clark's analysis is different from the one presented here in that the present study assumes that new information must have an appropriate antecedent (i.e. a given role) if comprehension is to proceed smoothly. It is not possible to determine at this time whether listeners' comprehension is slowed down (in the conditions considered here as being inappropriate) because the antecedent for the new (stressed) information is inappropriate, or alternatively because the antecedent for the given (unstressed) information is inappropriate.

Haviland and Clark (1974) presented to subjects for comprehension sentences such as (59) in which presupposition is indicated by the

(59) Annie slew a gnu too.

adverb "too". The given information of this sentence (on one reading) is that someone else slew a gnu. In Experiment II of the present study, target sentences such as (60) were presented in which both the adverb

(60) <u>Annie</u> slew a gnu too.

and the presence of stress served to indicate presupposition, or what information was given. It is unclear how the Haviland and Clark model would handle information which is given by virtue of the existence of a role, when that existence is implied by contrastive stress. Therefore, the present description of sentence comprehension may not be inconsistent

with the Haviland and Clark model.

Haviland and Clark (1974) found that a target sentence whose given information had a direct antecedent in a preceding sentence took less time to comprehend than if the preceding sentence contained no direct antecedent for the given information. These authors used reading time as the measure of comprehension in their experiments, whereas the measure used in the present experiments was reaction time to aurally presented sentences. Perfetti and Lesgold (1977) have argued that comprehension by listening and comprehension by reading are highly similar at some level of analysis. Jackson and McClelland (1979) found that faster readers performed more accurately in a listening comprehension test than did poorer readers. These authors suggest that the ability to comprehend spoken material is an important correlate of reading ability. That the results of the present experiment (in which an auditory task was employed) were similar to the results of Haviland and Clark's experiments (in which a visual task was used) lends support to such a claim.

Sequences such as (61) were presented to listeners in Experiment I.

(61) George didn't kill Bill. Alfred killed Bill.

That the role of Bill's killer exists is established in the context sentence, and in the target sentence Alfred is indicated as the correct candidate for the role, replacing George (an incorrect candidate).

Sequences such as (62) and (63) were presented in Experiment II.

(62) Jane had a cold. Mary had a cold too.

(63) Fred can't play the violin. Bob can't play the violin either.

In the target sentence of (62), Mary is new information which is pointed out as an additional correct candidate for the role of "person who had a cold". In the target sentence of (63), Bob is new information which

is pointed out as a correct candidate for the role of "someone who can't play the violin", in addition to Fred.

In both experiments, stress was used to indicate new information. However, in the types of sentences used in Experiment I, the new information of a target sentence replaced information from a previous sentence, whereas in the types of sentences used in Experiment II, this new information added to, rather than replaced, previous information. It appears that sentence stress may function differently in different types of sentences.

As these experiments have demonstrated, the phenomenon of stress plays a major role in the communication of ideas between speakers and listeners. It appears that stress is an important factor which should be more fully considered in future psycholinguistic research, and should be incorporated into models of sentence comprehension.

FOOTNOTES

FOOTNOTES

[1]Chafe (1976) objects to Haviland and Clark's (1974) notion that given information is information that the listener already knows about and new information is information not yet known to the listener. Chafe argues that given information should be thought of as "that knowledge which the speaker assumes to be in the consciousness of the addressee at the time of the utterance" and new information as "what the speaker assumes he is introducing into the addressee's consciousness by what he says" (p.30). Chafe points out that a speaker may assume that a listener is not thinking about certain information at the time, even though it is actually "known" by the listener (for example, the existence of a particular person), and that presenting it as new information serves to activate it in the listener's knowledge store. Haviland and Clark refer to given and new information in terms of what the listener does and does not "know", but it is often clearly the case that the listener does have some prior knowledge of some aspect of the information presented as new. Chafe argues that the terms "already activated" and "newly activated" are actually more appropriate, but yields to the less awkward terms "given" and "new", pointing out that the distinction should be kept in mind.

[2]The sentence "It was Agnes who saw Maxine" is an example of the cleft sentence structure. This type of structure was termed "cleft" by Jesperson (1961): "Cleft sentences. A cleaving of a sentence by means of <u>it</u> <u>is</u> (often followed by a relative pronoun or connective) serves to single out one particular element of the sentence and very often, by directing attention to it and bringing it, as it were, into focus, to mark a contrast" (pp. 147-148). The so-called "pseudo-cleft" sentence structure is reflected in a sentence such as "The one who saw Maxine was Agnes", which again directs attention to the new information (Agnes) by making it the focus of the sentence.

[3]Sentence items which should be read with heaviest stress will be underlined in the examples used in this paper.

[4]Cutler and Fodor (1979) also controlled for the position of the target-bearing item in the sentence by having half the subjects detect a phoneme in the first part of the sentence and the other half detect a phoneme occurring in the latter part of the sentence. For example, in (18) half the subjects would be given the phoneme /k/ as a target and half would be given the phoneme /b/.

(18) The man on the corner was wearing the blue hat.

[5]The highest stress level in the first and second sentences in each of these sequences may not necessarily be the same.

[6]A target sentence containing all new information would presumably be very difficult for subjects to comprehend since the context sentence would contain no antecedent for any information in the target sentence.

APPENDIX A

APPENDIX A

Experiment I Sentence Materials

i. The cat isn't on the roof. The cat is in the tree.
ii. Ralph doesn't go to college. Ralph goes to high school
iii. The house isn't made of wood. The house is made of brick.

1. a. George didn't kill Bill. Alfred killed Bill.
   b. George didn't kill Bill. Alfred killed Bill.
   c. George didn't kill Bill. Alfred killed Bill.
   d. George didn't kill Bill. Alfred killed Bill.

2. a. Lynn didn't go to Brazil. Joan went to Brazil.
   b. Lynn didn't go to Brazil. Joan went to Brazil.
   c. Lynn didn't go to Brazil. Joan went to Brazil.
   d. Lynn didn't go to Brazil. Joan went to Brazil.

3. a. Arnold didn't fix the radio. Doris fixed the radio.
   b. Arnold didn't fix the radio. Doris fixed the radio.
   c. Arnold didn't fix the radio. Doris fixed the radio.
   d. Arnold didn't fix the radio. Doris fixed the radio.

4. a. Dennis wasn't drinking warm milk. Dan was drinking warm milk.
   b. Dennis wasn't drinking warm milk. Dan was drinking warm milk.
   c. Dennis wasn't drinking warm milk. Dan was drinking warm milk.
   d. Dennis wasn't drinking warm milk. Dan was drinking warm milk.

5. a. Henry doesn't have an older sister. Henry has an older brother.
   b. Henry doesn't have an older sister. Henry has an older brother.
   c. Henry doesn't have an older sister. Henry has an older brother.
   d. Henry doesn't have an older sister. Henry has an older brother.

6. a. Frank isn't growing a beard. Frank is growing a moustache.
   b. Frank isn't growing a beard. Frank is growing a moustache.
   c. Frank isn't growing a beard. Frank is growing a moustache.
   d. Frank isn't growing a beard. Frank is growing a moustache.

7. a. Ray didn't play football in college. Ray played baseball in college.
   b. Ray didn't play football in college. Ray played baseball in college.
   c. Ray didn't play football in college. Ray played baseball in college.
   d. Ray didn't play football in college. Ray played baseball in college.

8. a. Jack isn't reading a newspaper. Jack is reading a magazine.
   b. Jack isn't reading a newspaper. Jack is reading a magazine.
   c. Jack isn't reading a newspaper. Jack is reading a magazine.
   d. Jack isn't reading a newspaper. Jack is reading a magazine.

9. a. Jill doesn't take dancing lessons. Jill takes singing lessons.
   b. Jill doesn't take dancing lessons. Jill takes singing lessons.
   c. Jill doesn't take dancing lessons. Jill takes singing lessons.
   d. Jill doesn't take dancing lessons. Jill takes singing lessons.

10. a. Marcia isn't wearing a red coat. Marcia is wearing a blue coat.
    b. Marcia isn't wearing a red coat. Marcia is wearing a blue coat.
    c. Marcia isn't wearing a red coat. Marcia is wearing a blue coat.
    d. Marcia isn't wearing a red coat. Marcia is wearing a blue coat.

11. a. Betty didn't buy a new car from Mike. Betty bought a used car from Mike.
    b. Betty didn't buy a new car from Mike. Betty bought a used car from Mike.
    c. Betty didn't buy a new car from Mike. Betty bought a used car from Mike.
    d. Betty didn't buy a new car from Mike. Betty bought a used car from Mike.

12. a. The plastic bottle didn't break. The glass bottle broke.
    b. The plastic bottle didn't break. The glass bottle broke.
    c. The plastic bottle didn't break. The glass bottle broke.
    d. The plastic bottle didn't break. The glass bottle broke.

13. a. Harry doesn't live near Chicago. Harry lives near Detroit.
    b. Harry doesn't live near Chicago. Harry lives near Detroit.
    c. Harry doesn't live near Chicago. Harry lives near Detroit.
    d. Harry doesn't live near Chicago. Harry lives near Detroit.

14. a. The hockey game isn't on Tuesday. The hockey game is on Friday.
    b. The hockey game isn't on Tuesday. The hockey game is on Friday.
    c. The hockey game isn't on Tuesday. The hockey game is on Friday.
    d. The hockey game isn't on Tuesday. The hockey game is on Friday.

15. a. The officer wasn't in the Army. The officer was in the Navy.
    b. The officer wasn't in the Army. The officer was in the Navy.
    c. The officer wasn't in the Army. The officer was in the Navy.
    d. The officer wasn't in the Army. The officer was in the Navy.

16. a. John didn't get a job in Michigan. John got a job in Wisconsin.
    b. John didn't get a job in Michigan. John got a job in Wisconsin.
    c. John didn't get a job in Michigan. John got a job in Wisconsin.
    d. John didn't get a job in Michigan. John got a job in Wisconsin.

17. a. Marvin doesn't own the building. Marvin rents the building.
    b. Marvin doesn't own the building. Marvin rents the building.
    c. Marvin doesn't own the building. Marvin rents the building.
    d. Marvin doesn't own the building. Marvin rents the building.

18. a. Alice didn't buy the banana bread. Alice baked the banana bread.
    b. Alice didn't buy the banana bread. Alice baked the banana bread.
    c. Alice didn't buy the banana bread. Alice baked the banana bread.
    d. Alice didn't buy the banana bread. Alice baked the banana bread.

19. a. Ralph didn't direct the movie. Ralph produced the movie.
    b. Ralph didn't direct the movie. Ralph produced the movie.
    c. Ralph didn't direct the movie. Ralph produced the movie.
    d. Ralph didn't direct the movie. Ralph produced the movie.

20. a. Jane didn't get married in June. Jane got divorced in June.
    b. Jane didn't get married in June. Jane got divorced in June.
    c. Jane didn't get married in June. Jane got divorced in June.
    d. Jane didn't get married in June. Jane got divorced in June.

APPENDIX B

APPENDIX B

Recognition Test for Experiment I

Read each of the sentences below and decide whether or not it is one that you just heard. In the space after each sentence, write "Yes" if it is a sentence you heard and "No" if you did not hear the sentence.

1. The hockey game is on Friday. _____
2. Lee was eating french fries. _____
3. Ray bought a new television. _____
4. Frank is growing a moustache. _____
5. The glass bottle broke. _____
6. Alice baked the banana bread. _____
7. Kay is growing tomato plants. _____
8. The accountant gave flowers to Michelle. _____
9. Ralph produced the movie. _____
10. Henry has an older brother. _____
11. Jean works for a dentist. _____
12. Dan was drinking warm milk. _____
13. The policeman arrested the thief. _____
14. The chief led the Indians. _____
15. The student is going to Hawaii. _____
16. John got a job in Wisconsin. _____
17. Dale went to church on Sunday. _____
18. Jill takes singing lessons. _____
19. Jane got divorced in June. _____
20. The old woman sold the painting. _____
21. Alfred killed Bill. _____
22. The book was in the library. _____
23. Sam wrote the term paper. _____
24. Jack is reading a magazine. _____
25. The officer was in the Navy. _____
26. Marshall has two daughters. _____
27. Doris fixed the radio. _____
28. Nick was in the Marines. _____
29. Tammy is married to a carpenter. _____
30. Harry lives near Detroit. _____
31. Joan went to Brazil. _____
32. The manager fired the clerk. _____
33. Beth was driving a school bus. _____
34. Marvin rents the building. _____
35. Gina tore her new skirt. _____
36. Ray played baseball in college. _____

37. Marcia is wearing a blue coat. _____
38. The tennis palyer broke his ankle. _____
39. Betty bought a used car from Mike. _____
40. Rose went to the play. _____

APPENDIX C

APPENDIX C

Experiment II Sentence Materials

i. Linda doesn't have an Oldsmobile. Linda doesn't have a Cadillac either.
ii. Brenda ordered a hamburger. Jennifer ordered a hamburger too.
iii. The student doesn't take biology anymore. The student still takes chemistry.

1. (AS) Jane had a cold. Mary had a cold too.
   (AO) Mary had the measles. Mary had a cold too.
   (IS) Mary had the measles. Mary had a cold too.
   (IO) Jane had a cold. Mary had a cold too.

2. (AS) The butcher joined the Credit Union. The tailor joined the Credit Union too.
   (AO) The tailor joined the Men's Club. The tailor joined the Credit Union too.
   (IS) The tailor joined the Men's Club. The tailor joined the Credit Union too.
   (IO) The butcher joined the Credit Union. The tailor joined the Credit Union too.

3. (AS) The Joneses went to Cleveland. The Smiths went to Cleveland too.
   (AO) The Smiths went to Pittsburgh. The Smiths went to Cleveland too.
   (IS) The Smiths went to Pittsburgh. The Smiths went to Cleveland too.
   (IO) The Joneses went to Cleveland. The Smiths went to Cleveland too.

4. (AS) Carl was drinking beer. Paul was drinking beer too.
   (AO) Paul was drinking whiskey. Paul was drinking beer too.
   (IS) Paul was drinking whiskey. Paul was drinking beer too.
   (IO) Carl was drinking beer. Paul was drinking beer too.

5. (AS) Fred can't play the violin. Bob can't play the violin either.
   (AO) Bob can't play the piano. Bob can't play the violin either.
   (IS) Bob can't play the piano. Bob can't play the violin either.
   (IO) Fred can't play the violin. Bob can't play the violin either.

6. (AS) The lawyer doesn't like apples. The doctor doesn't like apples either.
   (AO) The doctor doesn't like bananas. The doctor doesn't like apples either.
   (IS) The doctor doesn't like bananas. The doctor doesn't like apples either.
   (IO) The lawyer doesn't like apples. The doctor doesn't like apples either.

7. (AS) Dave doesn't know how to ski. John doesn't know how to ski either.
   (AO) John doesn't know how to ice skate. John doesn't know how to ski either.
   (IS) John doesn't know how to ice skate. John doesn't know how to ski either.
   (IO) Dave doesn't know how to ski. John doesn't know how to ski either.

8. (AS) Diane didn't give Mark a gift. Rachel didn't give Mark a gift either.
   (AO) Rachel didn't give Mark a card. Rachel didn't give Mark a gift either.
   (IS) Rachel didn't give Mark a card. Rachel didn't give Mark a gift either.
   (IO) Dian didn't give Mark a gift. Rachel didn't give Mark a gift either.

9. (AS) Pat doesn't have a collie anymore. Ann still has a collie.
   (AO) Ann doesn't have a beagle anymore. Ann still has a collie.
   (IS) Ann doesn't have a beagle anymore. Ann still has a collie.
   (IO) Pat doesn't have a collie anymore. Ann still has a collie.

10. (AS) Barry can't speak Russian anymore. Vivian still speaks Russian.
    (AO) Vivian can't speak German anymore. Vivian still speaks Russian.
    (IS) Vivian can't speak German anymore. Vivian still speaks Russian.
    (IO) Barry can't speak Russion anymore. Vivian still speaks Russian.

11. (AS) Marilyn doesn't like to knit anymore. Kathy still likes to knit.
    (AO) Kathy doesn't like to crochet anymore. Kathy still likes to knit.
    (IS) Kathy doesn't like to crochet anymore. Kathy still likes to knit.
    (IO) Marilyn doesn't like to knit anymore. Kathy still likes to knit.

12. (AS) The floor isn't dirty anymore. The window is still dirty.
    (AO) The window isn't broken anymore. The window is still dirty.
    (IS) The window isn't broken anymore. The window is still dirty.
    (IO) The floor isn't dirty anymore. The window is still dirty.

13. (AS) Bill never returned to the drug store. Carol went to the drug store again.
    (AO) Carol never returned to the shoe store. Carol went to the drug store again.
    (IS) Carol never returned to the shoe store. Carol went to the drug store again.
    (IO) Bill never returned to the drug store. Carol went to the drug store again.

14. (AS) The prince won't hunt tigers anymore. The king will hunt tigers again.
    (AO) The king won't hunt bears anymore. The king will hunt tigers again.
    (IS) The king won't hunt bears anymore. The king will hunt tigers again.
    (IO) The prince won't hunt tigers anymore. The king will hunt tigers again.

15. (AS) Henry will never go back to Canada. Max will visit Canada again.
    (AO) Max will never go back to Mexico. Max will visit Canada again.
    (IS) Max will never go back to Mexico. Max will visit Canada again.
    (IO) Henry will never go back to Canada. Max will visit Canada again.

16. (AS) The barber won't date Ellen anymore. The mailman will date Ellen again.
    (AO) The mailman won't date Judy anymore. The mailman will date Ellen again.
    (IS) The mailman won't date Judy anymore. The mailman will date Ellen again.
    (IO) The barber won't date Ellen anymore. The mailman will date Ellen again.

APPENDIX D

APPENDIX D

Lists Presented in Experiment II

List 1.

10.b. Vivian can't speak German anymore. Vivian still speaks Russian.
1.a. Jane had a cold. Mary had a cold too.
12.d. The floor isn't dirty anymore. The window is still dirty.
15.b. Max will never go back to Mexico. Max will visit Canada again.
5.c. Bob can't play the piano. Bob can't play the violin either.
2.d. The butcher joined the Credit Union. The tailor joined the Credit Union too.
6.d. The lawyer doesn't like apples. The doctor doesn't like apples either.
8.c. Rachel didn't give Mark a card. Rachel didn't give Mark a gift either.
4.d. Carl was drinking beer. Paul was drinking beer too.
14.a. The prince won't hunt tigers anymore. The king will hunt tigers again.
13.a. Bill never returned to the drug store. Carol went to the drug store again.
7.c. John doesn't know how to ice skate. John doesn't know how to ski either.
11.b. Kathy doesn't like to crochet anymore. Kathy still likes to knit.
16.b. The mailman won't date Judy anymore. The mailman will date Ellen again.
3.c. The Smiths went to Pittsburgh. The Smiths went to Cleveland too.
9.a. Pat doesn't have a collie anymore. Ann still has a collie.

List 2.

10.c. Vivian can't speak German anymore. Vivian still speaks Russian.
1.b. Mary had the measles. Mary had a cold too.
12.a. The floor isn't dirty anymore. The window is still dirty.
15.c. Max will never go back to Mexico. Max will visit Canada again.
5.d. Fred can't play the violin. Bob can't play the violin either.
2.a. The butcher joined the Credit Union. The tailor joined the Credit Union too.
6.a. The lawyer doesn't like apples. The doctor doesn't like apples either.
8.d. Diane didn't give Mark a gift. Rachel didn't give Mark a gift either.
4.a. Carl was drinking beer. Paul was drinking beer too.

14.b. The king won't hunt bears anymore. The king will hunt tigers again.
13.b. Carol never returned to the shoe store. Carol went to the drug store again.
7.d. Dave doesn't know how to ski. John doesn't know how to ski either.
11.c. Kathy doesn't like to crochet anymore. Kathy still likes to knit.
16.c. The mailman won't date Judy anymore. The mailman will date Ellen again.
3.d. The Joneses went to Cleveland. The smiths went to Cleveland too.
9.b. Ann doesn't have a beagle anymore. Ann still has a collie.

List 3.

10.d. Barry can't speak Russian anymore. Vivian still speaks Russian.
1.c. Mary had the measles. Mary had a cold too.
12.b. The window isn't broken anymore. The window is still dirty.
15.d. Henry will never go back to Canada. Max will visit Canada again.
5.a. Fred can't play the violin. Bob can't play the violin either.
2.b. The tailor joined the Men's Club. The tailor joined the Credit Union too.
6.b. The doctor doesn't like bananas. The doctor doesn't like apples either.
8.a. Diane didn't give Mark a gift. Rachel didn't give Mark a gift either.
4.b. Paul was drinking whiskey. Paul was drinking beer too.
14.c. The king won't hunt bears anymore. The king will hunt tigers again.
13.c. Carol never returned to the shoe store. Carol went to the drug store again.
7.a. Dave doesn't know how to ski. John doesn't know how to ski either.
11.d. Marilyn doesn't like to knit anymore. Kathy still likes to knit.
16.d. The barber won't date Ellen anymore. The mailman will date Ellen again.
3.a. The Joneses went to Cleveland. The Smiths went to Cleveland too.
9.c. Ann doesn't have a beagle anymore. Ann still has a collie.

List 4.

10.a. Barry can't speak Russian anymore. Vivian still speaks Russian.
1.d. Jane had a cold. Mary had a cold too.
12.c. The window isn't broken anymore. The window is still dirty.
15.a. Henry will never go back to Canada. Max will visit Canada again.
5.b. Bob can't play the piano. Bob can't play the violin either.
2.c. The tailor joined the Men's Club. The tailor joined the Credit Union too.
6.c. The doctor doesn't like bananas. The doctor doesn't like apples either.
8.b. Rachel didn't give Mark a card. Rachel didn't give Mark a gift either.

4.c. Paul was drinking whiskey. Paul was drinking beer too.
14.d. The prince won't hunt tigers anymore. The king will hunt tigers again.
13.d. Bill never returned to the drug store. Carol went to the drug store again.
7.b. John doesn't know how to ice skate. John doesn't know how to ski either.
11.a. Marilyn doesn't like to knit anymore. Kathy still likes to knit.
16.a. The barber won't date Ellen anymore. The mailman will date Ellen again.
3.b. The Smiths went to Pittsburgh. The Smiths went to Cleveland too.
9.d. Pat doesn't have a collie anymore. Ann still has a collie.

APPENDIX E

APPENDIX E

Recognition Test for Experiment II

Read each of the sentences below and decide whether or not it is one that you just heard. In the space after each sentence, write "Yes" if it is a sentence you heard and "No" if you did not hear the sentence.

1. Ann still has a collie. _____
2. Janice is moving again. _____
3. Ernie doesn't smoke cigars either. _____
4. The king will hunt tigers again. _____
5. Carla still works as a waitress. _____
6. The tailor joined the Credit Union. _____
7. The doctor doesn't like apples either. _____
8. Anita is wearing lipstick too. _____
9. Barbara is still a student. _____
10. Richard doesn't know how to swim either. _____
11. The Smiths went to Cleveland too. _____
12. Vivian still speaks Russian. _____
13. The Johnsons went on vacation again. _____
14. Paul was drinking beer too. _____
15. Julia visited the zoo again. _____
16. Rachel didn't give Mark a gift either. _____
17. Max will visit Canada again. _____
18. Jim paid the electric bill too. _____
19. The door isn't locked either. _____
20. John doesn't know how to ski either. _____
21. The tourist is still taking pictures. _____
22. The window is still dirty. _____
23. The mailman will date Ellen again. _____
24. Bob can't play the violin either. _____
25. The governor is still in office. _____
26. Mary had a cold too. _____
27. Nancy spoke to the gardener too. _____
28. Sandra doesn't like cats either. _____
29. Kathy still likes to knit. _____
30. The necklace was stolen too. _____
31. Arthur has the flu again. _____
32. Carol went to the drug store again. _____

LIST OF REFERENCES

LIST OF REFERENCES

Bolinger, D.L. Contrastive accent and contrastive stress. Language, 1961, 37, 83-96.

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

Chafe, W.L. Language and consciousness. Language, 1974, 50, 111-133.

Chafe, W.L. Givenness, contrastiveness, definiteness, subjects, topics, and point of view. In C.N. Li (Ed.), Subject and topic, New York: Academic Press, 1976.

Chomsky, N. Deep structure, surface structure, and semantic interpretation. In D.D. Steinberg and L.A. Jakobovits (Eds.), Semantics: An interdisciplinary reader in philosophy, linguistics, and psychology. London: Cambridge University Press, 1971.

Clark, H.H. Comprehension and the given-new contract. Paper presented at conference of "The role of grammar in interdisciplinary linguistic research", University of Bielefeld, Bielefeld, Germany, December 1973.

Cutler, A. On saying what you mean without meaning what you say. Papers from the Tenth Regional Meeting of the Chicago Linguistic Society, Chicago: Chicago Linguistic Society, 1974.

Cutler, A. Sentence stress and sentence comprehension. Unpublished Ph.D. dissertation, University of Texas, 1975).

Cutler, A. Beyond parsing and lexical lood-up: An enriched description of auditory sentence comprehension. In R.J. Wales and E. Walker (Eds.), New approaches to language mechanisms: A collection of psycholinguistic studies. Amsterdam: North-Holland Publishing Company, 1976.

Cutler, A. and Fodor, J.A. Semantic focus and sentence comprehension. Cognition, 1979, 7, 49-59.

Cutler, A. and Foss, D.J. On the role of sentence stress in sentence processing. Language and Speech, 1977, 20, 1-10.

Halliday, M.A.K. Notes on transitivity and theme in English (Part 2). Journal of Linguistics, 1967, 3, 177-244.

Haviland, S.E. and Clark, H.H. What's new? Acquiring new information as a process in comprehension. Journal of Verbal Learning and Verbal Behavior, 1974, 13, 512-521.

Holyoak, K.H. and Clark, H.H. The given-new strategy and the comprehension of relative clauses. Unpublished manuscript.

Hornby, P.A. The role of topic-comment in the recall of cleft and pseudo-cleft sentences. Papers from the Seventh Regional Meeting of the Chicago Linguistic Society. Chicago: Chicago Linguistic Society, 1971.

Hornby, P.A. The psychological subject and predicate. Cognitive Psychology, 1972, 3, 632-642.

Hornby, P.A. Surface structure and presupposition. Journal of Verbal Learning and Verbal Behavior, 1974, 13, 530-538.

Jackendoff, R.S. Semantic interpretation in generative grammar. Cambridge, Mass.: The M.I.T. Press, 1972.

Jackson, M.D. and McClelland, J.L. Processing determinants of reading speed. Journal of Experimental Psychology: General, 1979, 108, 151-181.

Jesperson, O. A modern English grammar on historical principles, part VII, syntax. London: Allen and Unwin, 1961.

Lehiste, I. Suprasegmentals. Cambridge, Mass.: The M.I.T. Press, 1970.

Newman, J.E. and Dell, G.S. The phonological nature of phoneme monitoring: A critique of some ambiguity studies. Journal of Verbal Learning and Verbal Behavior, 1978, 17, 359-374.

Perfetti, C.A. and Lesgold, A.M. Discourse comprehension and sources of individual differences. In M.A. Just and P.A. Carpenter (Eds.), Cognitive processes in comprehension. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Shields, J.L., McHugh, A. and Martin, J.G. Reaction time to phoneme targets as a function of rhythmic cues in continuous speech. Journal of Experimental Psychology, 1974, 102, 250-255.