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RESEARCH IN PROGRESS ABSTRACTS.

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REPORT NUMBER BR-6-1784 PUB DATE 67
CONTRACT OEC-3-6-061784-0508
EDRS PRICE MF-$0.25 HC-$1.52 36P.

DESCRIPTORS- *LANGUAGE RESEARCH, *RESEARCH REVIEWS (PUBLICATIONS), LANGUAGE SKILLS, COGNITIVE PROCESSES, *PSYCHOLINGUISTICS, BEHAVIOR PATTERNS, VERBAL DEVELOPMENT,

RESEARCH PROJECTS IN PROGRESS AT THE UNIVERSITY OF MICHIGAN'S CENTER FOR RESEARCH ON LANGUAGE AND LANGUAGE BEHAVIOR ARE OUTLINED IN THIS REPORT. EACH PROJECT DESCRIPTION INCLUDES A BRIEF SUMMARY OF THE PURPOSES, SCOPE, AND DESIGN OF THE RESEARCH, AS WELL AS AN ACCOUNT OF THE WORK ACTUALLY UNDERWAY. THE NAMES OF THE PRINCIPAL INVESTIGATORS ARE ALSO GIVEN. THE PROJECTS ARE DIVIDED INTO THREE GROUPS--LANGUAGE PROCESSES (NINE PROJECTS), LANGUAGE ACQUISITION (FOUR PROJECTS), AND LANGUAGE MODIFICATION (12 PROJECTS). RESEARCH TOPICS RANGE WIDELY, INCLUDING SUCH SUBJECTS AS DEFENSIVE BEHAVIOR, IDENTIFICATION OF COLOR HUE IN TWO CULTURES, THE MEMORY SPAN OF ADVANTAGED AND DISADVANTAGED CHILDREN, AND NEW TECHNIQUES FOR FOREIGN LANGUAGE TEACHING. THIS REPORT APPEARED IN "STUDIES IN LANGUAGE AND LANGUAGE BEHAVIOR, PROGRESS REPORT NO. IV" OF THE CENTER FOR RESEARCH ON LANGUAGE AND LANGUAGE BEHAVIOR, UNIVERSITY OF MICHIGAN, CITY CENTER BUILDING, 220 EAST HURON STREET, ANN ARBOR, MICHIGAN 48108. (JD)

# II. Research in Progress Abstracts

## Group A

## Language Processes

### The Pathology of Self-Descriptive Verbal Behavior (D. J. Bem & A. Weinstock)

Two sets of studies are planned which will extend the previous research on self-descriptive behavior into the area of "defensiveness," the apparent inability of some individuals to describe their behavior and its controlling variables accurately even when their past training history is clearly sufficient to enable them to do so.

The first set of studies explores the antecedents of "defensive" self-description. Defensiveness will be assessed by the best-validated scale for this purpose, the Crowne-Marlowe scale of Social Desirability. This scale consists of items which are descriptive of nearly everyone, but which are denied by the "defensive" individual (e.g., "There have been occasions when I felt like smashing things."). Apparatus now under construction will permit a test of the hypothesis that defensive individuals find it aversive to observe their own behavior, photographs of their own behavior, and handwritten samples of their own verbal behavior. The hypothesis that it is particularly aversive for such individuals to observe those of their behaviors that are typically punished by society (e.g., aggression, sexuality, and academic failure) will also be tested. Later work with children for whom a defensiveness scale has already been validated, will follow up the findings of these initial studies and explore the antecedents of defensiveness more directly.

A second set of studies will explore a rather surprising consequence of defensiveness. The unwillingness to observe one's own behavior is typically considered to be maladaptive. Studies in the literature on "test anxiety," however, suggest that the test performance of some individuals is impaired because they are distracted from the stimulus materials by their own reactions to the test situation. They are too concerned with their own behavior. One study suggests that highly "defensive" children may perform better in structured testing situations because they have effectively learned to avoid

observing their own behavior when under stress. The planned research will explore these suggestive findings in more detail. A replication of the original findings, with new measures of defensiveness, new behavioral indices of anxiety, and a population of adult Ss, will add "construct validation" to the entire battery of procedures which will then be employed for a more detailed analysis of defensiveness, test anxiety, and self-observation under anxiety-eliciting circumstances.

Differential Codability of Stimulus Attributes (F. Koen & Karen Newman)

Previous studies have found that when Ss are presented with incongruent combinations of color-words and the color of the ink in which the word is printed (e.g., the word BLUE printed in yellow ink), and are required to identify the color of the ink, interference results, and the time required for the task is much longer than when only the word must be identified. It is possible to view these results in terms of the concept of codability. Codability may be considered as the capacity of a stimulus to be accurately represented, thereby facilitating its symbolic manipulation across time and space. The various attributes of a complex stimulus appear to be differentially codable, in the sense that certain attributes are consistently used in describing or referring to it, while others are ignored. For example, the horsepower and "cubage" of an automobile engine are often specified; its weight seldom is. In the case of the incongruent word-color combinations, the word itself would appear to be more codable than the color of the ink. If this is indeed a general characteristic of complex stimuli, it should be possible to demonstrate it with stimuli which vary systematically along only two dimensions, but in which one of the dimensions is more codable than the other. It is suggested that color is a case in point, and that the most salient or codable aspect of color is its hue. It follows, then, that if Ss are presented with color chips which vary randomly in saturation, but systematically in hue and value, hues will cause more interference in the naming of values than will values cause in the naming of hues. Specifically, when Ss are presented with an array of color chips, and told to name both the hue and the value of each chip, the total time required when they are allowed to call out hue first and then value will be less than when they are named in the reverse order. Furthermore, when Ss are instructed to

sort the color chips into categories, and then to re-sort them a second time, the more salient attribute should be the basis upon which the first sorting is done.

The stimuli are 24 Munsell color chips in six hues and four values. Since each S is used as his own control, the codability of each hue (for him) is determined by counting the average number of words he requires to adequately describe the four chips of that hue. The independent variables are the codability of the hues (high vs. low) and the order of naming hues and values (hue-value vs. value-hue). The dependent variable is the total time required to name the hues and values of 24 color chips on a card.

Each S is tested for color-blindness, then performs two sortings of the color chips into categories, and writes out verbal descriptions of each experimental stimulus. In addition to naming hues and values, in counterbalanced order, he also names only the hues and only the values of the color chips. Comparison of the times required for these latter tasks with that for naming both hue and value will provide data for determining the relative codability of the two attributes. All stimuli have been made up. Preliminary testing of new procedures and training of a new experimenter are under way.

Relation of Physiological Arousal and Personal Opinion with Accuracy of Both Logical Inference and Recall Involving Connected Verbal Discourse. (F. Koen, Karen Newman & T. Rand)

Several studies have related physiological arousal, as measured by Galvanic Skin Response (GSR), and the recall of individual items in pair-associate learning; another has studied the relation between arousal and the recall of information presented in sound motion pictures. However, recall was measured differently in the two cases--by supplying the missing item in the first, and by identification in the second. This experiment asks the question whether these findings extend to the recall of verbal items in connected discourse (logical syllogisms). In addition, data are obtained on (a) the relation between S's agreement or disagreement with message content, and the recall of the message, and (b) the relation between both GSR and personal opinion on the one hand, and accuracy of logical inference on the other. The experimental stimuli were 12 syllogisms, three of each of four logical forms, equated in difficulty, length in words, and position of item

to be recalled. Both GSR records and expressions of agreement/disagreement were obtained from 14 Ss in Group 1 to each sentence of each syllogism, followed by judgments of the validity of the conclusion. In analyzing the data, each S is serving as her own control in the following way: Since there are three syllogisms of the same logical form, the particular one of the set which was associated in the experimental situation with the largest GSR is called "medium arousal", and that eliciting the lowest GSR, "low arousal." The data are being analyzed to determine whether there is a relation between degree of arousal and accuracy of logical inference. In addition, the same validity-judgment data are under study for evidence of a relation between the S's agreement (disagreement) with each premise and with the conclusion and accuracy of inference.

In Groups 2-5, the main effects of instructions to remember the material, and of the interval between presentation and recall (15 min. vs. one week) are being studied, with the independent variables again being GSR and personal agreement. The success with which the correct word can be guessed from context alone has been determined using the cloze technique with 15 Ss. The data for 68 Ss of Groups 2-5 were recorded on magnetic tape, and are to be analyzed by the PDP-4 computer. While the program is put in final form a preliminary comparison of computer results with individual (human) analysis is underway.

Acoustic Phonetic Analyses of Vowel Production (Rita Tikofsky)

Previous research on the phonetic characteristics of dysarthria failed to resolve questions concerning the stability of the acoustic properties of vowels for normals and dysarthrics. Recordings of 30 dysarthrics and 10 normals made for previous research are available for study. The present research is designed to examine in greater detail the acoustic phonetic characteristics of vowel production for dysarthrics and a larger sample of normal speakers.

The objectives of the present research are (1) to determine the variability of formants 1 and 2 for each speaker for each vowel and across speakers within a group for each vowel; (2) to determine the variability of the formants for a given vowel across all words in which it appears over all speakers within a group; and (3) to determine the differences between groups for each vowel.

In the present research, recordings will be made of normal Ss individually reading a list of words used in a previous dysarthric study. Spectrograms will be made of these utterances, and the vowel formants will be measured. In addition, spectrograms will be made and measurements obtained on those recordings by dysarthric Ss already available. After statistical analysis, vowel diagrams will be plotted for all speakers individually, as a group, and as compared with each other, so that additional data on the vowel production of dysarthric and normal Ss will be available for analysis.

Perception of Synthetic Vowels: Development and Use of a Test for Categorical Perception (S. Ross & J. B. Nichol)

The vowels [i] and [I] of an adult male have been recorded on four different occasions and sectioned on a sonograph. Each section has been measured on six parameters: fundamental frequency; first, second and third formant frequency; and the db level of the second and third formant relative to the of the first formant. The mean values of these parameters will be used to generate the synthetic vowels [i] and [I] on the PDP-4 computer. These synthetic vowels will be used as the boundary stimuli in a continuum comprising 10 linear steps, making 11 stimuli in all. Two sets of stimuli are to be made: Set 1 consisting of stimuli 1 thru 10, and set 2 consisting of stimuli 2 thru 11. The Ss will be 20 college students divided into two groups of 10 Ss each. One group will be told that the stimuli are "tones", whereas the other group will be told that the stimuli are the vowels [i] and [I]. Each S in both groups will be given both sets of stimuli, with an interval of one week between the presentation of each set. The stimuli will be presented in AXB triads, with A and B the defining stimuli of the set and X one of the 10 stimuli along the continuum. The Ss will be asked to indicate in each triad if X is more like A or more like B. For each S, the percentage of [I]-responses will be plotted as a function of the X-stimulus. In case of categorical perception, the stimulus value corresponding to 50 per cent [I]-responses should be the same for the two sets of stimuli. The effect of the two different instructions will be ascertained by comparing the results from the two experimental groups.

Differential Thresholds for Formant Frequencies (S. Ross)

For very low fundamental frequencies (pitches), the frequency locations of the formants of a vowel are quite well defined, due to the tight spacing of the harmonics. The higher the fundamental frequency, the less well defined these formant locations become. If vowel perception is based on a mechanism of analysis-by-synthesis, the differential threshold for formant locations should remain largely unaffected by changes in fundamental frequency. On the other hand, if vowel perception is based on a more direct mechanism of analysis, the differential threshold for formant locations should be a function of the fundamental frequency, specifically a function of the amplitudes of the individual harmonics of the vowel in question.

In order to test the validity of either of these two assumptions, differential thresholds will be determined for the formant locations of synthetic vowels. In a preliminary series of experiments, a "single-formant vowel" will be employed in order to keep the variables at a minimum, and in order to gain information on the most suitable technique. Later, synthetic vowels with three formants will be utilized. At present, a computer program for generating "single-formant vowels" is under development; the next step will be to decide on the most suitable psycho-physical method to be employed.

Function of Speaker and Listener Vowel Spaces in the Imitation and Identification of Spoken Vowels (S. Ross)

One major problem concerning perceptual identification of vowels is to account for the principles involved in recognizing vowels spoken by different speakers. Since the vowels spoken by given speakers seem to show a certain relative pattern, it has been suggested that the initial speech sounds of a given speaker serve to set up a frame of reference with respect to which subsequent sounds are perceived. The present investigation attempts to further examine the validity and the more detailed mechanics of this conception.

Phase 1 of the present research will serve to "calibrate" a limited number of Ss in terms of their spoken vowels. To this end, 10 self-approved vowels have been recorded from five Ss on four different occasions. These vowels have been analyzed on the Sonagraph in terms of fundamental

frequency, frequencies of first three formants, and levels of second and third formant relative to the level of the first formant. In addition to being analyzed in their own right, these data will be used for computing the mean parameter values for each vowel for each S. Each of these "average" vowels will be synthesized on the PDP-4 computer, and these synthesized vowels will be presented to Ss for comparison with the original vowels. If synthetic and original vowels are functionally identical to some criterion, the sets of synthetic vowels will be adopted as a library of spoken vowel-spaces for the given group of Ss. Otherwise, a representative selection of the original vowels will be used as such a library.

Once this library has been established, the "normalized" vowels will be presented to the original group of Ss in a variety of tasks. One task will require the S to imitate as closely as possible the vowel presented; the resulting "imitative vowel space" will be measured, and its relation to the vowel space of the stimuli and to the vowel space of the S will be ascertained. Another task will require the S to identify the vowel presented. The resulting performance will be evaluated in terms of the number of other vowels from the same speaker already presented, and in terms of other possible contexts. The performance of any given S will also be related to the vowel space of this particular S and the vowel space from which the stimuli were sampled.

Psychological and Associative Meaning in Auditory Recognition (R. D. Tarte, H. Gadlin, & D. Spenser)

A study by Ehrlich, Gadlin, and Tarte (1964) found that, in an auditory recognition task, Galvanic Skin Response (a measure of arousal) and associative meaning are correlated. This project is an attempt to replicate these results with better controls; it also includes an attempt to examine the critical variables involved.

One hundred and eighty female college students served as Ss. They were run individually. The procedure was as follows: each S heard 10 accelerated words, followed by an interval of .16, 1.6, or 16 sec., and then a single word at normal speed. The task was to indicate whether or not the test word had been present in the list of accelerated words, and how certain the S was. The test word was related to one of the 10 accelerated words in one of the following four ways: 1) Correct (C)--actually a word from the list; 2) Semantic (S)--

high relatedness to one of the 10 accelerated words; 3) Phonetic (P)--rhyming with one of the accelerated words; 4) Wrong (W)--not related in any ascertainable manner. Each S received 24 separate trials. There were five different conditions for the accelerated items: normal (1 word per sec.), double (2 words per sec.), double-compressed (2 words per sec., no change in pitch), mid (1 1/2 words per sec.), and mid-compressed (1 1/2 words per sec., no change in pitch). These five conditions combined with the three delay intervals make 15 groups of 12 Ss each.

GSR was recorded throughout the session and deflections were measured from the onset of each test word for 12 sec.

All data have been collected, and are presently being analyzed.

Hue Labelling and Discriminability in Two Cultures (James Kopp & Harlan Lane)

It has been demonstrated repeatedly in recent years (see Lane, 1965) that stimuli along certain continua are associated with behavior in a discontinuous fashion. The typical data from these "categorical perception" experiments consist of an identification gradient in the form of a step function over a given stimulus continuum. The identification response typically has a 100% probability of occurrence over some portion of the continuum and a 0% probability of occurrence over another portion. Probability drops suddenly from 100% to 0% at some narrow region on the continuum, as one response is replaced in complementary fashion by a second. The continuum is thus divided into two discrete sets, or categories, each set characterized by a broad range of stimuli which exercise a high degree of control over one labelling response to the exclusion of all others.

Discrimination of adjacent stimuli on these continua is directly related to the probability that the two stimuli exert the same degree of control over the same labelling response. Discrimination is better (per cent correct pair-comparison judgments) between those stimuli whose absolute identification probabilities are most disparate with respect to one of the identification responses. In the transition region between identification responses, discrimination increases and peaks, returning to its original level on the other side of the transition zone. In other words, discrimination between identification categories is better than discrimination within categories. The coincidence of step-like identification gradients and discrimination

enhancement at category boundaries is taken to define categorical perception. Categorical perception is most easily observed with speech stimuli (vowels and consonants) but has been demonstrated in the laboratory for a variety of other continua as well.

The method for establishing categorical perception involves disjunctively conditioning two incompatible responses to two extreme stimuli on a continuum (Cross & Lane, 1962). Generalization and discrimination may then be measured at discrete points across the continuum. Since categorical perception can not only be conditioned by the language community but also induced artificiall in the laboratory for a variety of non-linguistic, as well as linguistic, continua, the phenomenon is seen to result from a history of reinforcement with respect to labelling behavior and not from the discrete nature of certain articulatory responses which are involved in the production of speech- which were originally posited as mediating categorical perception (Liberman, 1957).

It was incidentally observed in our laboratory that the steplike nature of the identification gradients in the typical categorical perception experiment bears a marked resemblance to some color-labelling data collected by Aleeza C. Beare at Johns-Hopkins University (Beare, 1963). This investigator had subjects assign color names to spectral stimuli, and the resultant gradien effectively partitioned the visible spectrum into sharply-defined categories. The categories were not equally broad, and on closer inspection could be seen to abut one another at regions where wavelength discriminability is best. This fact led to the speculation that categorical perception is conditioned by the language community not only along various acoustic-phonetic continua but also along the visible spectrum.

Preliminary work suggested that this was indeed the case. Lane (1966) showed that the available discriminability functions for hue show maximum resolving power just at those wavelengths located at the boundaries of color categories. We then replicated this finding in our own laboratory. College students, who labelled stimuli on the visible spectrum and then judged successive presentations of adjacent stimulus pairs as same or different, evidenced differential discrimination as a function of the identification category to which the wavelengths belonged (see Fig. 1). The per cent of correct discriminations was low between pairs of stimuli within a color category and high between pairs of stimuli across categories. Moreover, discriminability "thresholds" were obtained both before and after the

experiment proper by repeatedly sweeping the visible spectrum back and forth from the violet to the red and instructing Ss to report "the slightest change" in the stimulus by depressing a key. The findings replicated the pair comparison results--thresholds were lower (discrimination better) at zones of transition between categories.

With the categorical perception phenomena apparently verified for the visible spectrum, a theoretical problem arose. As was noted above, the discrimination enhancement effect has been taken to result from the organism's extensive history of reinforcement with respect to identification behavior. But differential discriminability on the visible spectrum has historically been taken to reflect the physiological properties of the retina and not the reinforcement history of the organism.

At this juncture an interesting experiment suggested itself.

It has been the claim of anthropologists for a long time that there are certain cultures in which color naming behavior differs radically from that of Indo-European cultures. One investigator has listed in a single paper nine separate cultural groups all substantially different with respect to the way they label the visible spectrum (Ray, 1953). If the color naming habits of any group are truly different from those of their English-speaking counterparts, and the reinforcement history interpretation of categorical perception is valid, then these people should have wavelength discrimination functions that are different from those of English-speaking subjects. On the other hand, if the wavelength discriminations are identical across cultures, the contention that maxima and minima in the wavelength discriminability function are given physiologically would be substantiated. Then categorizing would have to be said to follow discrimination enhancement, and hue labelling behavior, while categorical would not be a true instance of categorical perception. Differences in labelling behavior across cultures would be seen, by this interpretation, as resulting either from the anthropologists' use of poor experimental procedures in determining the spectral locus of labelling categories for various language groups, or from the fact that color names are actually only casually related to the maxima and minima of the wavelength discriminability function. In the latter case the correspondence between category boundaries and enhanced discrimination in the English language would have to be considered coincidental.

In order to put the matter to test, the original experiment was replicated with subjects from one of the language groups supposedly disparate from English

with respect to the labelling of spectral colors. The original equipment was transported to an anthropological field station in Chiapas, Mexico. Subjects were obtained from a nearby Indian village. These subjects were monolingual and spoke a language (Tzotzil--a subgroup of Mayan) which, it is said, provides only four color names for the entire visible spectrum.

## Method

Apparatus. Monochromatic stimuli were generated by passing "white" (3200°K) light through a continuous interference filter (Schott type Veril S-60; Fish-Schurman, Inc.) and thence through a 1 mm vertical slit. This procedure produces relatively intense spectral stimuli with a half band-width of approximately 12 mμ over the entire range of visible wavelengths. Wavelength changes are produced by traversing the filter horizontally across the slit, the peak wavelength value in mμ being linear with the traverse distance in mm. The actual stimulus intensities are yet to be determined by means of spot photometry but may be estimated by combining the values of white light intensity through the slit (98 db re: $10^{-10}$ lamberts) and the average peak transmittance of the filter (30 per cent). These values yield stimulus intensities well above the photopic threshold. Subjects were seated in a darkened chamber, 2.5 feet from a ground glass screen. The stimuli were projected upon the obverse side of the glass through the lens system of a standard classroom slide projector. The resultant stimulus image consisted of a vertical rectangle, the dimensions of which were approximately 3/4" x 5/16". The stimulus surround was rendered completely black by masking the screen with black posterboard. All stimulus events and concomitant responses were recorded on an 8-channel event recorder. During the labelling phase, response latencies were recorded by means of a multi-vibrator-counter arrangement which allowed temporal resolution to within 64 msec.

Sweep discriminability, I. In the first part of the experiment the subject was provided with a telegraph key and instructed to report all hue changes, however slight, in the patch of light on the screen. The experimenter then actuated a motor which moved the filter continuously across the slit at a slow fixed rate from right to left and back again.

This yielded continually alternating ascending and descending sweeps of the spectrum from 430 to 630 mμ.

Hue identification. In the next phase discrete wavelength values, ranging from 430 to 630 in 14 mμ steps, were presented tachistoscopically at 7.5 sec intervals (stimulus duration = .75 sec) according to a random protocol. The

appropriate wavelengths were set manually by the experimenter by means of a dial micrometer fixed to the filter carrier. The subject was instructed to press one of several dimly illuminated buttons on a panel in front of him, each corresponding to one of the several most common color names extant in his language (for English speaking subjects these were red, yellow, green, blue, and violet and for Indian subjects /ɬoh/, /yox/, /k'on/, and /ik'lo,an/.

ABX discrimination. In the third phase adjacent stimuli from the naming task were presented in "ABX" triads. By this procedure the stimuli pair (AB) is made into a triad constructed so that the third stimulus is always a replication of one of the first two. There are four such triads possible: ABA, ABB, BAA, and BAB. Each possible triad was presented 24 times according to a random protocol. The subject was instructed to press one of two buttons to indicate whether the third stimulus was identical to the first or the second. In this phase the stimulus duration was again .75 sec. Stimulus onsets occurred at 3 sec intervals within triads. Triad onsets occurred at 19.5 sec intervals.

Sweep discriminability, II. The final phase consisted of a replication of the first phase in which the subject depressed a telegraph key to report the slightest hue change as the wavelength values were changed continuously from 430 to 630 mμ and back.

## Results

Analysis of the results is still underway. However, it can be reported that Tzotzil subjects can reliably label the visible spectrum with four color names. Variability among subjects at category boundaries is similar to that among English-speaking subjects.

Discrimination and discriminability peaks, however, occur at only two of the Tzotzil category boundaries. A third peak appears in the middle of one category (/yox/) significantly displaced from the corresponding category boundary (i.e., the /yox/-/k'on/ boundary). Data from a representative Tzotzil subject are presented in Fig. 2. A final report of this study will be included in the next progress report.

## References

Beare, A. C. Color name as a function of wavelength. *Amer. J. Psychol.*, 1963, *76*, 248-256.

Cross, D. V., & Lane, H. L. On the discriminative control of concurrent responses: The relations among response frequency, latency, and topography in auditory generalization. *J. exp. Anal. Behav.*, 1962, *5*, 487-496.

Lane, H. L. The motor theory of speech perception: A critical review. *Psychol. Rev.*, 1965, *72*, 275-309.

Lane, H. L. A behavioral basis for the polarity principle in linguistics. In K. Salzinger (Ed.), *Research in verbal behavior and some neurophysiological implications*. N. Y.: Academic Press, in press.

Liberman, A. M. Some results of research on speech perception. *J. acoust. Soc. Amer.*, 1957, *29*, 117-123.

Ray, V. F. Human color perception and behavioral response. *Trans. N. Y. Acad. Sci.*, 1953, *16*, 98-104.

## Figure Captions

Fig. 1. Labelling, labelling latency, ABX discrimination, and sweep discriminability data for an English-speaking female. Labelling distributions are plotted twice -- once above and once below to facilitate comparisons. Per cent labelling represents the number of times each label was emitted out of 20 presentations of each wavelength value. Per cent correct ABX represents the number of correct matches made by the subject in 24 presentations of triads involving a given stimulus pair. Number of responses in sweep discriminability is the total number of key presses emitted in each 14 mμ stimulus interval during 20 sweeps of the spectrum under instructions to keypress during changes in hue.

Fig. 2. Labelling, labelling latency, ABX discrimination, and sweep discriminability data for a Tzotzil male. Labelling distributions are plotted twice -- once above and once below to facilitate comparisons.

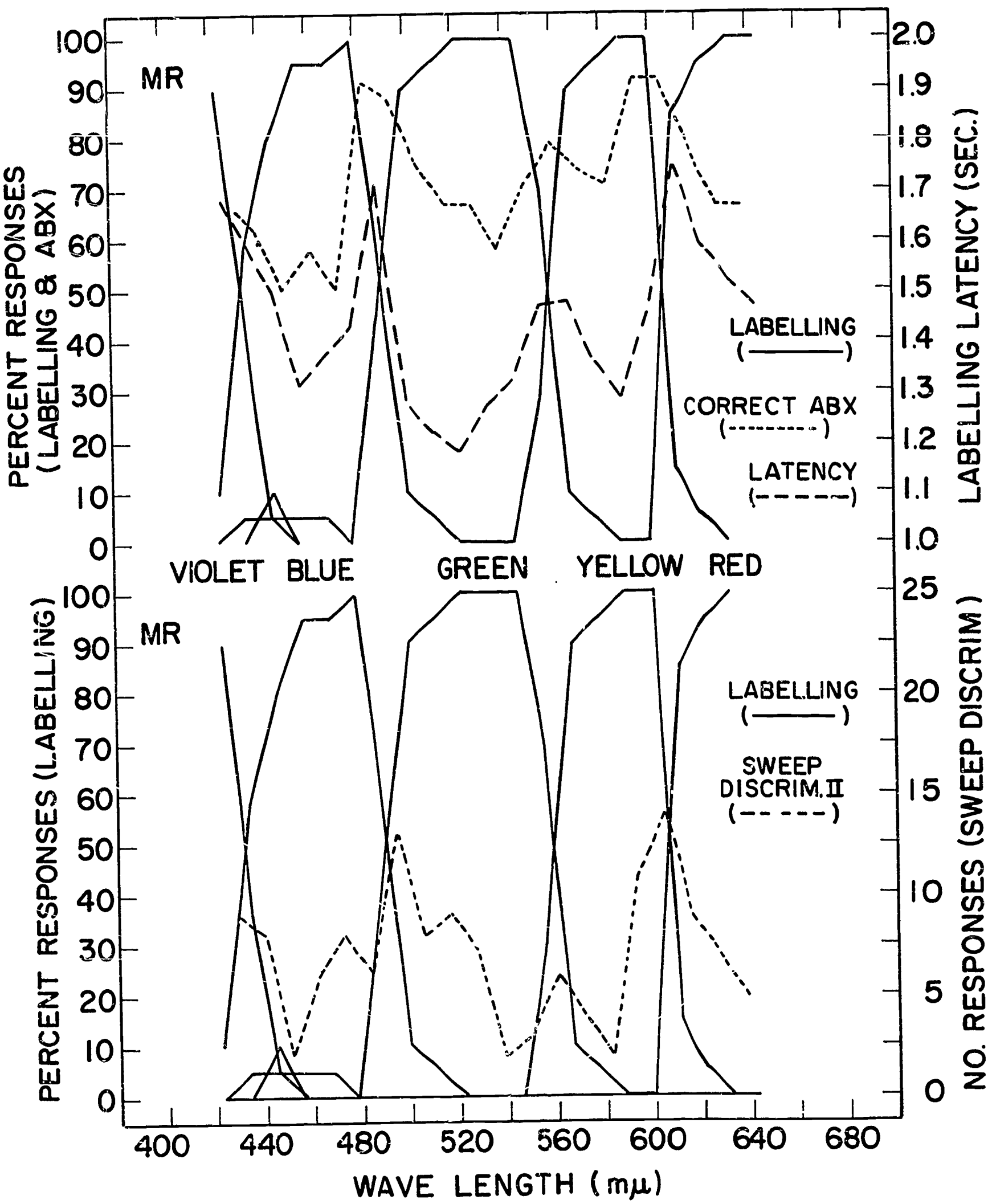
MR
PERCENT RESPONSES (LABELLING & ABX)
LABELLING
CORRECT ABX
LATENCY
LABELLING LATENCY (SEC.)
VIOLET
BLUE
GREEN
YELLOW
RED
MR
PERCENT RESPONSES (LABELLING)
LABELLING
SWEEP DISCRIM.II
NO. RESPONSES (SWEEP DISCRIM)
WAVE LENGTH (mμ)

Fig. 1

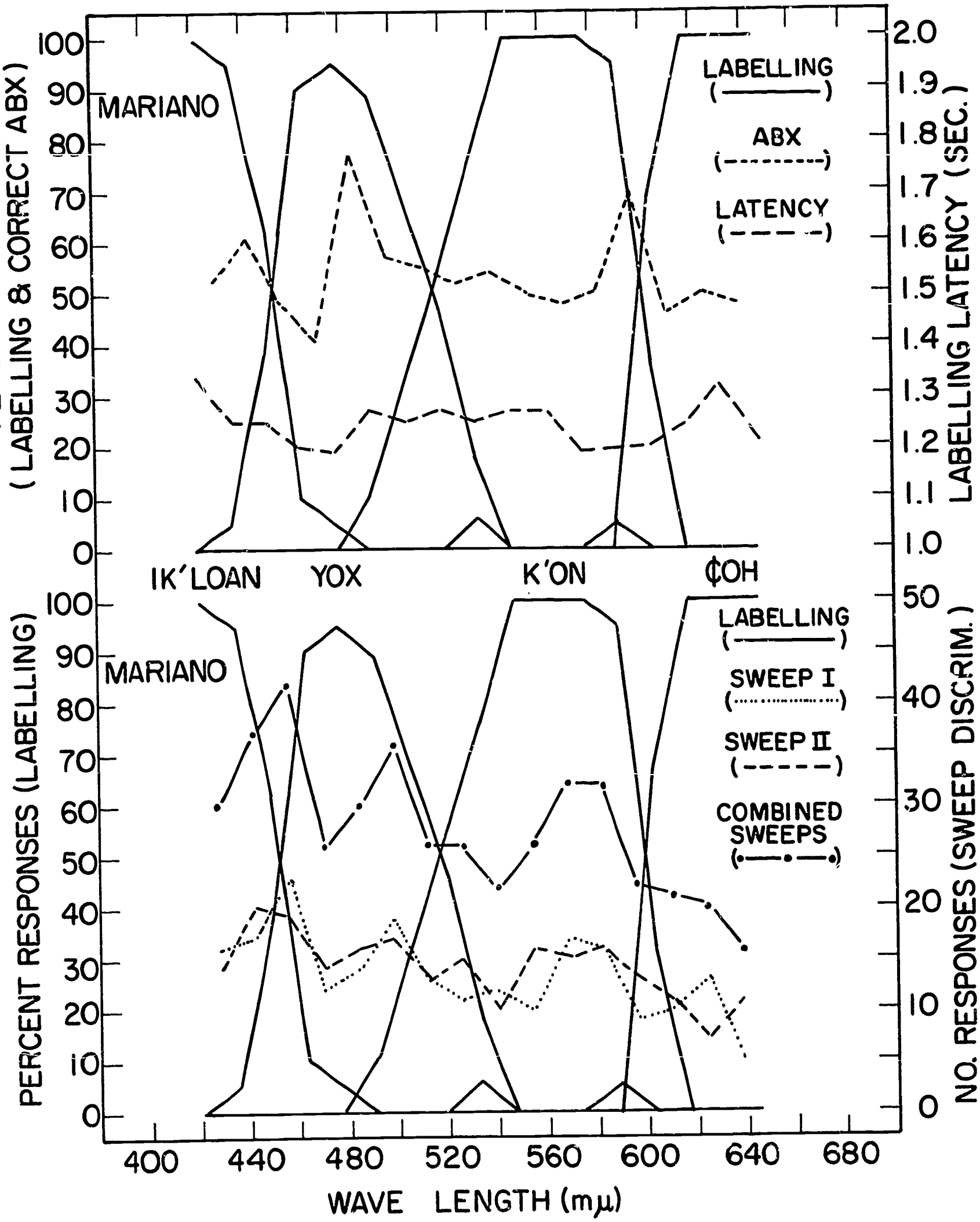
MARIANO
LABELLING
ABX
LATENCY
IK'LOAN
YOX
K'ON
¢OH
PERCENT RESPONSES
( LABELLING & CORRECT ABX)
LABELLING LATENCY (SEC.)
MARIANO
LABELLING
SWEEP I
SWEEP II
COMBINED SWEEPS
PERCENT RESPONSES (LABELLING)
NO. RESPONSES (SWEEP DISCRIM.)
WAVE LENGTH (mμ)

Fig. 2

## Group B

## Language Acquisition

### The Effects of Dialect Differences on the Immediate Recall of Verbal Messages

(P. Weener)

We are here concerned with the general problem of communicating in different dialects and, more specifically, with the effects of different dialects on a child's memory for verbal material. The related educational problem is illustrated by the setting in which a teacher speaks one dialect and the children in the classroom speak another dialect. Some have claimed that this setting results in problems of communication between teacher and pupils and, furthermore, that it can result in a lowered achievement record for the children who speak a dialect other than that of the teacher.

Three hypotheses will be considered:

1. Children will remember a verbal message better if it is presented by a speaker of their home dialect than by a speaker from another dialect.
2. When messages have no, or minimal, contextual constraints among words, children will remember better a string taken from the spoken sample of their dialect than a string taken from the spoken language of an unfamiliar dialect.
3. The greater the contextual constraints among the words in a verbal message, the greater will be the effect of the interaction between the Ss' dialect background and the source of the message.

Verbal strings will be collected, according to a procedure described by Miller and Selfridge (1950), from adult speakers of a nonstandard dialect (NSD) and from a group of adult speakers of the standard dialect (SD) of the area. The Miller and Selfridge procedure yields strings of words with different approximations to English word order (AEWO'S). These lists will then be used as stimulus materials in an immediate recall task. The Ss for this recall task will be two groups of children, one group from SD-speaking parents and another group from NSD-speaking parents.

The population of NSD-speaking adults and children will be lower social class Negro women with residences in a predominantly Negro neighborhood

of a metropolitan area. The SD-speaking population will be Caucasian women and children who reside in a predominantly Caucasian neighborhood in the same metropolitan area. A sample of 15 women will be selected from each dialect group to provide the stimulus lists. Forty-eight children between the ages of 75 and 87 months will be selected from the first grade in each dialect population to participate in the immediate recall task.

The stimulus messages will be constructed and presented so that the effects of phonetic, syntactic, and semantic differences can be isolated. Stimulus messages of 1-, 2-, and 4-order AEWO'S will be constructed from the spoken language of each group of adults. Two 15-word sequences of both 2- and 4-order approximations will be collected from each group of adult Ss. The 1-order approximation sequences will be obtained by selecting 15 words at random from the sentences provided by the adult Ss in collecting the 2- and 4-order approximations. This procedure will yield 12 stimulus lists--two lists at each of three AEWO'S from two dialect groups.

Three of the 15 adult Ss used to provide the stimulus words will be selected from each dialect group to read the stimulus lists which have been constructed. These six adults will each record all of the stimulus lists on tape. This means that lists which were constructed from the speech of NSD speakers will be read by both an SD and an NSD speaker, and likewise with the messages constructed from the speech of SD speakers.

The effect of phonetic differences can be seen by comparing the performance of two groups of children from the same dialect group in the following manner. One of these groups will be presented a list by a nonstandard dialect speaker; the other group will be presented the same list by a standard dialect speaker. The performance differences between the groups will be attributed to the differences in the phonetic aspect of the message.

In comparing a nonstandard list to a standard list at a given AEWO greater than 1, both semantic and syntactic differences are present. But at AEWO-1 only semantic differences are present; the effects of syntax are eliminated because the words are selected randomly for each position in these lists. As the contextual constraints among the words in a message increase, the effect of syntax on recall should increase. That is, when a person is presented a message which has familiar structural features, he will remember it better than a message which has less familiar structural features. And,

most important for isolating the syntactic factor, the effect of a familiar syntax will increase as the structure of the verbal message increases.

The effects of semantic differences will then be had by looking at differences at AEWO-1 between a group's recall performance on messages derived from their home dialect and messages derived from another dialect. The hypothesis regarding the effects of syntax would be supported by an increasing difference at higher AEWO's between the performance of a dialect group on a message from their home dialect and their performance on a message from another dialect. In other words, the difference observed at AEWO-1, attributed to semantic differences, should increase at AEWO-2 and AEWO-4 due to the added effect of syntactic differences between messages from different dialect groups.

The results should have implications for programs of language adaptation among children who speak a nonstandard dialect. The strength and direction of the hypotheses for the problem would indicate which specific areas (i.e., phonetic, syntactic, or semantic) should be emphasized in such programs. Furthermore, the results should contribute to an understanding of the relationship between language comprehension and language production in children of this age.

The Application of the Cloze Technique to the Study of Grammatical Proficiency in Retarded and Normal Children (M. I. Semmel, L. S. Barritt, S. W. Bennett, & C. A. Perfetti)

This study is part of a larger investigation designed to evaluate the role of grammatical habits in the language functioning of retarded and normal children. Four groups of 20 children each were tested: institutionalized retardates (I-R); public school retardates (PS-R); a group of normal Ss matched with the retardates on chronological age (CA-N); and a normal group matched on mental age (MA-N). Forty simple four-word sentences were constructed to produce five equally-represented sentence types, differing in the sequential ordering of the grammatical classes. The words were systematically deleted to yield an equal number of deletions across sentence types for each of the four positions.

The results showed significant effects due to position of deleted word, form class, and sentence type. Performance of both normal groups was

consistently superior to that of the retarded groups, but an interaction indicated that retardate performance significantly improved when the deleted word was located in the final position. The adjective-adjective-noun-verb sentence type was the most difficult for all groups, while the adjective-noun-verb-adjective type was the easiest. With respect to form class, nouns and adjectives were most easily replaced, except in the I-R subgroup where nouns and verb slots were most easily completed. Performance on the cloze sentence completion task was found to be related significantly to paradigmatic responding in a word-association task, after partialling out the effect of mental age.

Immediate Memory Span of Children from 'Advantaged' and 'Disadvantaged' Backgrounds (L. S. Barritt, M. I. Semmel, & P. D. Weener)

Three groups of children differing in socio-economic background were asked to recall strings of information at four levels of conceptual difficulty, specifically: (1) nonsense words, (2) high frequency nouns, (3) anomalous sentences, (4) meaningful sentences.

Three predictions, based upon previous research (Barritt, Semmel, & Weener, 1966), were made.

1. Children would recall more information when previously established language habits were allowed to operate. Thus it should be easier for all children to recall six words in a meaningful sentence than in an anomalous sentence and, further, a six-word anomalous sentence should be easier to retrieve than a six-word string of high-frequency nouns.
2. Children from different socio-economic backgrounds would reveal increasing differences in their ability to recall information as prior language habits (semantic as well as syntactic) were brought into use.
3. Children at different grade levels (in this study first and second grades) would reveal increasing differences in the amount recalled as language habits were used. Thus, first- and second-graders should be more alike on nonsense words than on meaningful sentences.

Predictions one and three were confirmed; prediction two was not. There were non-significant differences between children from different socio-economic backgrounds at each of the four levels used in this study. The predicted interaction between list and group was not observed.

These results duplicate the findings of prior research with meaningless strings of numbers (Barritt, Semmel, & Weener, 1966) but go beyond these earlier findings to demonstrate that the auditory memory of lower and middle class children is also similar on meaningful tasks.

The Changes in Psycholinguistic Functioning of Children After One Year in an "Integrated" School (L. S. Barritt, M. I. Semmel, & P. D. Weener)

Children in the kindergarten and first grade from three school settings were tested with the Illinois Test of Psycholinguistic Abilities(ITPA) in Spring, 1965. One group of children attended a de facto segregated school (approx. 70 per cent Negro). This school was closed during the 1965-1966 school year. The predominantly Negro population was bussed to schools in the suburbs which were made up of predominantly Caucasian pupils.

Group Two was made up of children from the same geographic area as the first group but these children attended a different school (approx. 50 per cent Negro) which continued to operate during the 1965-1966 school year.

Group Three children were in attendance at schools scheduled to receive Group One children. Group Three children were predominantly Caucasian.

All of these children were post-tested in Spring, 1966, with the ITPA. The selected results follow:

1. The average gain in raw score points across all ITPA subscales was: Group One - +2.9, Group Two - +2.8, and Group Three - +3.7.
2. The greatest gain for group one (the "integrated" group) was 4.4 points on the auditory decoding subscale. Group Two gained the most (4.1 raw score points) on the Motor Encoding subtest. The children attending "receiver" schools (Group Three) showed the greatest gain; 8.3 points on the Motor Encoding subscale.
3. All groups increased their standing in comparison to the test norm group. Group Three showed an average standard score increase across all subscales of +.44 points. Groups One and Two gained +.17 and +.16 points respectively.

Group C

Language Modification

Research in Classroom Management of a Reading Program (D. Brethower, R. Cabot, A. Irwin, C. Semmelroth, & D.E.P. Smith)

Six elementary school children, referred by their school principals, are receiving reading instruction in a special classroom. Dependent variables are number of responses and number of pages per day in self-instructional materials changes on standardized tests, and records kept by observers who record 18 categories of behavior.

The research is in a baseline phase during which the classroom is divided work and non-work areas and a functional difference is being established betwe the two. While in the work area, the student is instructed to perform a designated unit of work. After each unit is completed the child chooses eithe to perform another unit or to go to the non-work area. Systematic manipulation the size of the work unit, the procedure for setting it, and the consequences of completing the work are planned.

Electronic Aids for Teaching Languages (Emmanuel Companys)

The goal of our research is to contribute to a better understanding of the problems posed by the utilization of audio-visual aids and, more particularly, language laboratories. Secondarily, we hope to furnish new means of research and application, new methods and techniques, new machines, new programs of te or experimentation, which are necessary to the realization of this project, an which eventually will be of use to other investigators.

To achieve this goal our project includes four parts: theoretical (pedagogical) studies; the design, fabrication and testing of devices; the creation of programs (exercises and experimental materials); and phonetic res especially on suprasegmental features. The latter research is necessary beca suprasegmental facts are poorly understood, although they are of fundamental importance to language learning and are necessarily present in every stimulus wherein they determine the perception of other linguistic phonemes.

Theoretical Studies

A 20-page interim report entitled "About variables in language laboratory efficiency and projected machines for studying it" describes the problems and the projected manner of attacking them. The article "Language laboratories: Methods of utilization and other variables" presents an area of study in which language laboratories are appropriate. A paper presented at the first Language and Language Behavior Conference on "Auditive discriminability and language learning" presents a research method.

Machines

Three machines (Polymatic, Plurilingua, Linguacontrol) have been designed, including a study of the integration of various components, whose delivery is imminent. Models of the first two have been constructed; tests have led to modifications in the original plans. An experiment is scheduled in which 15 University of Michigan students of Arabic will utilize Plurilingua.

The Polymatic is a highly versatile, automatic language tape recorder which will permit: (a) duplication of the principle types of recording apparatus currently used, (b) elimination of the variables of machine operation leading to more exact studies of language behavior as a function of the learning method, and (c) utilization of the students' tape recorder in conjunction with other research tools.

The Plurilingua is a special tape recorder which can be used simultaneously by several students, each one having the same facilities offered by an individual machine, except that the students must proceed at the same pace.

Model C (four or twelve students) of this machine employs the cyclic method, in which items are compared at the end of the response cycle; version S (three or nine students) is for use with the step-by-step method (comparison of each item before continuing to the next).

Linguacontrol is a device for collecting data. It provides for magnetic recording of the first and last response to each item, with elimination of intermediate responses and pauses, and a paper tape recording, using symbols to indicate the nature and order of each operation undertaken by the student.

Programs

A series of 25 language laboratory exercises of an entirely new type has been

prepared and specially recorded to test the different methods with each type of machine. Designed to teach rapid conversation, this series represents a sort of compromise between the present situation and the classical pattern drill, and can be administered to beginning students as well as to those on the second-year level. The linguistic material is very much reduced, and consists of a few verbs in the present tense and the imperative and possessive adjectives (always singular) which appear only before consonants.

This research has been conducted in collaboration with the University of Michigan's Program of Corrective French Phonetics, taught by Madame Janine Capelle, which will also be the subject of experiments. A program for the study of supra-segmentals is being prepared.

Research on French Suprasegmentals

We are working in collaboration with Mlle. M. Callamend, Lecturer at the University of Michigan, on the parameters of accent in French. Two experiments with native speakers of French are presently underway, one using a recorded test, and the other using sentences based on logatomes.

Research in this area is only beginning. We have planned experiments using aural stimuli with American and French subjects, and then the same stimuli furnished by the SAID system. The pitch and amplitude contours and the spectographic patterns of these stimuli will be determined.

In order to study the interference effect of suprasegmental phonemes on the perception of segmental phonemes, experiments have been undertaken in which 40 students were administered a test requiring discrimination of French phonemes. Using this test as a basis, we plan on a program to investigate the discriminatory disturbances caused by varying the melodic line. This work is now being pursued by Mlle. G. Moreau, University of Michigan Teaching Fellow. (The preceding abstract was translated from the French by Cyrus R. Sisson, CRLLB Research Assistant.)

French Prepositions: A Study in Applied Linguistics (Donald Dugas)

A statistical analysis of errors committed by 35 third-year (intermediate-advanced) French students in some 278 compositions indicates that students have the most difficulty in mastering French prepositional usage. This is not surprising since in the linguistic literature there is a general lack of cohesiveness in most analyses of the French preposition; the tendency is toward lists.

We hope to put more unity into the data by restructuring them in terms of transformations and rules. Next, we would compare these rules with those already proposed for English prepositional usage (Fraser, 1966; Nielson, in preparation). Finally, we would compare these two rule-systems with that which the French student devised for himself.

The Role of Incentives and Achievement in Program and Past-Program Performance (G. Geis, S. Nielsen, & N. Palchick)

During the next three months three groups of paid male college students will serve in a study involving programed instructional material. The experiment attempts to study the effects of "incentive" and achievement on "learning" (performance during and after the program) and "performance" (post-test scores). The experimental procedure includes these steps in order: (1) Thematic Apperception Test; (2) Pre-test; (3) Program I; (4) Post-test; (5) Instruction for group II; (6) Instruction for group III; (7) Post-test. All Ss will be given a Thematic Apperception Test (TAT) in order to determine Need Achievement level. They will then be divided into three groups of ten each, including equal numbers of high and low achievers.

All Ss will then be given a pre-test to determine their content knowledge relevant to the programed material to be used later. Each S will then go through a program, either Hypersensitivity and Allergy or Physician's Liability. Records will be kept of student responses on each frame of the program and whether or not the answer to each frame is observed by the S. After completing the program each S will take a post-test to determine how much he learned in the program. After this, Group II will be instructed that they will be paid on the basis of the post-test score following Program II. Each S will then go through the program he has not previously done. Next, each S in Group III will be instructed, as was Group II. All groups will then be given the appropriate post-test.

Dependent variables include TAT score (Need Achievement), pre-test scores, frame responses, answer observing, and post-test scores.

Differential Reinforcement of a Vocal Operant (Stephen F. Knapp & Susan Nielsen)

While previous studies have demonstrated that the vocal response /u/ can be changed in duration by differential reinforcement, this study plans to place two other parameters, pitch and amplitude, under reinforcement control. Thus, the first goal is to investigate the feasibility of controlling (through reinforcement) two or more of these parameters simultaneously Consequently, the optimal sequence can be determined for advancing an S from a given response range of pitch, amplitude, and duration to a new response range.

A computer program has been prepared for measuring precisely the peak amplitude, the peak pitch, and the duration of each response. From the first 26 responses a criterion response is established eight standard deviations above the mean. An upper limit (18 standard deviations), a lower limit (minus two standard deviations), and a step size (1/10 of one standard deviation) are also established. So long as the percentage of reinforced responses is above 80, the upper limit is decreased one (or more) step(s) and the lower limit is increased one (or more) step(s) after each reinforced response. The E can make reinforcement contingent upon any combination of parameters (singly, doubly, or triply). The combination can be changed once the criterion has been reached (+ or - 1/2 standard deviation) for ten consecutive responses; the parameter criteria used previously remain in effect and the new ones may be added or the experiment terminated.

Initially, all correct responses (those within the limits) were reinforced by a counter. This procedure produced high rates of inaccurate responding. When an add-subtract counter was used, performance improved. However, error rates were still high enough so that a further change in procedure has been made. Percent accuracy is now displayed to the student, along with a green indicator light which follows a correct response. When the percentage of correct responses is 80 percent or better, another counter shows "bonus points" for which the student will be paid. When each bonus point occurs (after CRF), the limits change our step. It is felt that this procedure will bring "changing the limit behavior" under reinforcement control.

The Effects on Second-Language Fluency of Motivated Communication in the Language During Sensitivity Training (H. Lane, A. Guiora, R. Hertel, & C. Sisson)

The motives for speaking to another person in our native language, and the things we say are intimately related. If we report an observation, usually it is because we have something to report; if we make a request it is because we wish to fulfill a need. When these functional controls do not operate on what we say, as in reading an observation or a request, the language is being put to a quite different use, and this is apparent from several features of a speaker's performance. To keep distinct these two kinds of controls over speaking, we may call the speech produced by the former functional and that produced by the latter intraverbal.

When we examine second-language instruction in this light, we are led to an interesting conclusion. The student's use of his native language is primarily functional. The avowed goal of the audio-lingual course is to provide functional use of the foreign language, and the text materials generally sample functional episodes in that language. Nevertheless, the course of instruction is almost purely intraverbal; the student rarely speaks under functional control. In the early stages of learning the second language (that is, during the first two years which constitute the entire contact with the language for most students), the student rarely asks, in the second language, for something that he wants, rarely reports something that he has in fact observed. In the present study we considered that the absence of functional controls over speech during second-language instruction might be partly responsible for the limited fluency attained by most students.

To examine this notion, we employed a "sensitivity group" as the setting for an experiment. In this setting, virtually all communication is under functional control, and the group leader can, to a degree, regulate the intensity of motivation of the speakers. Rather in the manner of group therapy. the conversation tends to focus on issues important to the speakers, and each is able and often desires greatly to report, request, adjure, and the like. We hypothesized that if a sensitivity group, comprised of fledgling speakers of a second language, were conducted exclusively in that language the fluency of the participant would be enhanced. To ensure that any improvement in fluency could be attributed to the opportunity for functional rather than intraverbal use of the language, we arranged a control group of students who engaged in second-language conversations under the supervision of a teaching fellow. The 16 students who comprised the experimental and control groups were selected from a larger population, on the basis of several

measures of performance and aptitude, so that the groups sampled a range of fluency and were very closely matched.

The groups met for two hours each week, for eight weeks, while also attending classes in an intensified, introductory French course two hours each day. At the end of the term, the students received a battery of psychological tests, designed to assess several facets of fluency in the second language, including: speed of encoding and decoding, rate of speech, patterning of semantic associations, extent of "habituated direct association," and other measures. The findings are undergoing statistical analysis.

Foreign Language Innovative Curricula Study--FLICS (J. McClafferty)

FLICS is a state-wide planning project sponsored by the Ann Arbor Board of Education (under a contract to the U. S. Office of Education). CRLLB aids the project by executing (under the terms of a subcontract) parts of the five facets of the project, described below.

Evaluation Program (R. Benjamin)

Since Title III, Elementary and Secondary Education Act of 1965, makes provision in each project for rigorous appraisal of every objective stated in funded projects, a substantial evaluation effort is planned as we move to operation in several school systems with our Humanities in French Curriculum and the Learning Lab Program, as well as the Educational Service Centers in Bilingualism, and Associates in Instruction, and, eventually, the various bilingual curricula developed in association with local schools.

The planning for this evaluation of the applied research efforts has been progressing for several months under the supervision of Richard Benjamin. He has been working to help specify measurable program objectives and to develop strategies for appraising attainment in the many linguistic, cultural and humanistic, as well as attitudinal and personality areas which affect foreign- and second-language learning.

A number of different kinds of evaluation activities are planned: Developmental testing of materials, quantitative measures of use or requests for aid, standardized testing of student achievement, measures of attitude change, and surveys of community opinion.

Since new objectives are being pursued, some areas of our work lack measures of attainment. We hope to remedy this by developing new instruments. At present, negotiations are underway with the staff of Educational Testing Service to arrange for their cooperation.

The Bilingualism Program (D. G. Dugas & Julie Fata)

The problem. Many American children do not learn English as their mother tongue. In fact, they may not even know any English when they first attend school. Yet they are asked to learn content in a tongue unknown to them. Even though they may barely speak the language, they must take tests, written in the "foreign" language, of their knowledge of diverse subject matters. Finally, they must learn that foreign language completely on their own. Although our high schools and colleges seek (with limited success) to make bilinguals out of monolingual young adults, our grade schools endeavor to make monolinguals out of bilingual young children. The purpose of the bilingualism project is to help the bilingual child grow into a bilingual adult.

We have visited schools with bilingual programs in the Southeast and Southwest United States. We have also attended two conferences on bilingualism in the Southwest. Presently, we are hiring staff (linguists, social psychologists, elementary school specialists) and defining our subject population. Five Michigan cities have been identified as particularly suited for a bilingual program: Lansing, Grand Rapids, Fennville, Adrian, and Hamtramck. In order to assemble information on bilingualism for school administrators who may adopt the experimental program, we have begun to abstract some of the more recent and relevant bilingual materials for dissemination. We also plan to sponsor an informational conference for school administrators on March 16, 1967, in conjunction with the State Department of Education. In addition, there will be a two-day workshop on bilingualism at the Center for Research on Language and Language Behavior, at the request of Mrs. Barbara Ort, the state foreign language coordinator.

Future steps include visits by linguists and other personnel to selected areas in Michigan to determine precisely the nature and level of learning problems that may be expected in preserving bilingualism; the specification of a curriculum; the training of personnel; the creation of demonstration programs. To insure a firmly structured base for future activities in this field, we are applying for federal funds to support a Bilingual Education Resources Center.

Discussions with teachers who have experience in working with the bilingual child have pointed to problem areas and potential solutions that will receive systematic study. It will be necessary to assess the relative competence of the child in the languages that he speaks. When the predominant tongue is not

English, it may be desirable to teach the traditional "language skills" in that tongue, while approaching the teaching of English skills from the vantage point of second-language learning. There may be merit in including under the heading of bilingualism the problem of bidialectalism, and in addressing ourselves to the preservation of the non-standard dialect while teaching the standard dialect as a second language with populations such as Negro children.

Although the problems can only be tentatively stated at this preliminary stage, the preceding may serve to indicate five parameters of this applied project: We are concerned with (1) preserving and strengthening (2) bilingual skills (3) in the child (4) by applying in the public schools (5) techniques derived from research in second-language pedagogy.

Associated Staff Training Program (G. L. Geis, Winnie Beasley, S. Knapp, H. Wallace, & A. Weinstock)

Most attempts at innovation in education fail; those that do succeed for a time eventually succumb. The high failure rate of innovative efforts may in part be due to the quality of the innovation. But often it seems to be true that an effort fails because it is developed away from the site in which it is eventually to be placed. Consequently, the system into which it is introduced is not prepared to receive or sustain that innovation.

A higher success rate might be achieved if: (1) the innovation grows up in the location that is to be its final home; (2) special preparations are made at that site for the infusion of the innovation into the system, and for its later continued maintainance; and finally, (3) provision might be made for continued examination and, when needed, revision of the introduced innovations--a monitoring system with corrective functions.

An attempt to develop a system for continued successful innovation in the schools might well begin with the introduction of a person, acceptable to the school system and part of that system, whose role is roughly that of innovative agent and guide. The training of such a person, to aid in the improvement of foreign language learning in the secondary school, is the concern of the Associated Staff Training Program of FLICS.

The first phase of the year's work involved holding a week-long conference at Haven Hill. The conference brought together a variety of psychologists,

educators, and training specialists. The participants concentrated on such questions as the definition of the role or job of an "innovative agent," the objectives of his work, the curriculum for training such a person, the support system needed to maintain him, etc.

In phase two the staff of this program began developing monographs in four areas:

1. Procedures necessary for successful innovation in Education;
2. educational problems as perceived by language teachers;
3. evaluation in second-language learning; and
4. current education technology in language learning.

These monographs are meant to be supplementary or background papers. A major interim report is being readied. It will report not only the Haven Hill conference but the impact of the conference on the program staff, as reflected in the suggested strategy of innovation, and a broad curriculum outline for training the innovative agent.

The third phase, which began in January, will seek to develop:

1. Clear statements of the behaviors to be produced by the proposed training program;
2. evaluation material derived from the statements referred to above;
3. plans for specific curricula designed to produce competent performances on the evaluation tests; and
4. lists of available materials, workshops, etc., which might be used in translating the curriculum into a training program;
5. a plan for selection of trainees; and
6. the sections of an operational proposal which are relevant to training innovative agents.

All of these developments will contribute to the final report of the FLICS Planning Project.

A Comparative Civilizations Approach to Team-Teaching in French: An Area Studies and Humanities Program (G. T. Eddington)

Increased and improved elementary foreign language instruction in Michigan (and in other parts of the U. S.) has made its impact felt upon the curriculum of the senior high school. Therefore, it is imperative that attention be given

to the culmination of the secondary-school sequence. Great interest in the proposed secondary-level program has been demonstrated at the planning conferences and other work-sessions by the following groups: Advanced language students, local and national university representatives, teachers in schools and colleges, and the community-at-large.

Research on team-teaching shows that there is a need: for clear definition of roles, precise guidelines, daily operation schedules, a personnel trainer, adequate resources, time for team-planning and to remedy curriculum deficiencies, teachers favorable to the program, greater student initiative, and self-sufficiency and enthusiasm.

Leading national curriculum theorists (such as Trump, Bruner, and Goodman) have long urged educators to dissolve the artificial barriers that separate the various aspects of school subjects in an attempt to provide students with a more comprehensive picture of the inter-relationship among the various disciplines and bodies of knowledge. Other leaders urge more creative uses of existing instructional personnel. The traditional lock-step organization (25-35 students in five 50-min. classes) during the high school day has been challenged.

The units of work in preparation at the present time are built around a comparative study of the French-speaking world and the United States, and cover these general topics: Youth, values, language, communication, technology, and environment.

Teacher activites. The worksheet for curriculum development, i.e., the outline for each of the units, will contain background information for teachers, suggested introductory material for students, a suggested initial presentation, small group discussion topics, discussion outlines (for large group, small group, tutorial, remedial, creative), topics for independent study, suggested student projects, language-related activities, alternative approaches to the curriculum, evaluation techniques, instructional materials, and a comprehensive bibliography.

Student activities. Students in fourth-year French will be assigned to their humanities course for 10 hours per week. A typical week might find all students attending for two hours as a total group. Four hours will be spent in small-group discussion of topics introduced during the initial presentations. Finally, each student will be provided time to follow his own interests and spend the balance of his time allotment working on an independent or team project related either to the unit under consideration or as part of a long-term project of his choice.

Library facilities. Students will be provided with reading lists, annotated bibliographies, newspapers, contemporary magazines, and discussion questions, instead of a single text or set of texts.

Learning laboratory. In addition, students will have access to mini-courses, and other resources compiled by the staff of FLICS Learning Laboratory program. During and following the first year of operation, it is expected that a further integration of the Learning Laboratory and the Humanities program will be effected so as to develop what does not now exist, namely a culturally-significant elementary- and intermediate-level, foreign language curriculum which involves teachers and students in vital and realistic experiences and uses of the target language. Such a program will be fully operational in the third year of this project as a Demonstration Curriculum Center for teaching the culture of the French-speaking world. Language study will be put in its proper place as a tool for all students, not an end in itself.

Other activities. Speakers on many phases of the civilizations under study will be brought to the school to address the students. Such presentations will be recorded and preserved for repeated hearings and further study by interested students. Furthermore, these lectures will provide a bank to be duplicated and shared with other schools throughout the state and nation. Authorities in various fields included in the curriculum, who might be unable to attend the class meetings, will be invited to present their message through the medium of tape, or perhaps via the tele-lecture from any part of the country.

Emphasis. The proposed humanities program is being developed thematically, rather than upon the more traditional chronological basis. Innovative features for a high school Humanities-in-French curriculum will include team teaching; area and culture study; discussion outlines to improve and deepen study habits and the training of students; choice of vital themes; student contracts on projects; tutorial sessions (we will build in extra teacher time for this, if necessary); small group sessions; student teams for projects; and materials packaged and available for independent study and team discussion.

The potential for the non-grading approach has such promise in other areas of curriculum that we want to see it exploited more fully in the language classroom where it often occurs because of the elective nature of the subject.

Evaluation. Because of the nature of some of the stated objectives for the proposed pilot instructional program it will be necessary to develop tests locally with the assistance of consultants in testing and evaluation. Existing tests in culture do not fit the curriculum currently being developed.

Conferences or interviews and observation of students, questionnaires and other means of determining student progress will be used to supplement loca objective examinations and student projects.

Standardized instruments such as the ETS Advanced Tests for Teachers and Students will be used to appraise student achievement and maintenance of langua skills.

Dissemination. At the conclusion of the planning period of the Humanities in-French program, the tentative curriculum guide for the pilot program will have been printed. A special statewide meeting will be scheduled to discuss the materials. The proceedings of the nine planning meetings held during the 1966-1967 year will be available. This will contain the speeches and remarks made by the national authorities who participated.

Learning Laboratory (H. Regenstreif)

Objectives of the program:

1. Students will demonstrate gains in proficiency in the four fundamental linguistic skills of their target language.
2. Students will know significant achievements in the humanities of the people whose language is studied.
3. Students will know significant features of the country of the people whose language is studied--anthropological, geographic, economic, and political concepts, as well as their contemporary values and behavior patterns.

Implementation of broad objectives. It was decided to limit our work program to French and Spanish the first year. This decision was made in order to serve the greatest number of students and teachers, while at the same time avoiding the danger of "spreading ourselves too thin" by attempting to do work in all the languages.

Once the languages were identified, the next step was to choose those neglected areas pertinent to, and supportive of, language study where our work would be truly innovative. The areas identified included: Hispanic and Frenc art, music, social studies, and certain aspects of literature, plus the audio-visual technology necessary for the proper use of materials felt to be essenti to achieving our objectives.

Concurrent with the identification of work areas was the identification of the means of presenting this supplementary material to the students in a manner consistent with special conditions. The work schedule of the classroom teacher was to be protected from further overloading by placing responsibility for operation and maintenance of the learning laboratory on the person in charge of the Instructional Materials Center. Student-teacher contact time was to be preserved by locating the learning laboratory in the library and or study hall, with the recommendation that its use be restricted to those periods of time when the foreign language class is not in session.

The objective related to improved achievement in the four fundamental skills and literature is to be met by extending the work begun by the teacher and the language laboratory (or electronic classroom) into the learning laboratory. This will be accomplished by making available, through the learning laboratory carrels, those tapes and records, provided by the publisher of the textbook, which are designed to improve the student's command of one or more of the fundamental skills, and the literature included in some textbooks. In addition, other tapes and records, and programmed materials designed to help teach the fundamental skills will also be made available through the carrel. In a similar way, literature study will be assisted by stocking the carrel library with quality recordings of significant literary selections.

The areas mentioned in objective 2 are to be covered by multi-media presentations in the carrel which will make use of films, tapes, records, slides, albums and other print and non-print materials presently available which will be organized so as to present a "miniature course" in each of the various areas. Since this type of study is not generally found in the typical classroom, this aspect of our work will be more than supportive; it will be truly innovative, both as to content and means.

The realization of the third objective will be the natural outgrowth of achieving objectives 1 and 2, since improved achievement levels and the introduction of welcome variety into the curriculum must inevitably lead to increased interest.

Identification and hiring of competent staff members. The staff hired includes both school and university-connected people. All those working in a specific language area are native speakers who possess some teaching experience in American schools.

Identification and retaining of competent continuing consultants. These continuing consultants were retained to assist the staff members through counseling in their special areas.

## Group D

## Language Structure

### A Generative Statement of the English Subject Tagmeme (A.L. Becker)

In recent years tagmemic theory has faced important criticisms which reflect, in part, new emphases and assumptions in linguistics. In the first place, there has been no extended tagmemic description of English, a fact which has made tagmemic theory less accessible than other theories. Secondly, while Noam Chomsky and others have shown linguists the value of producing highly formal and generative statements of language structure, tagmemic grammars have not been formal and generative in Chomsky's sense of the terms -- i.e., that a grammar produce all and only the sentences of a language and do so in such a way that it can be proved true or false. In his book *Grammar discovery procedures* (to be published soon by Morton and Co.) Robert Longacre has shown that tagmemic grammars can be formal and generative in the above sense. This dissertation proposes to answer these criticisms by analyzing and presenting in generative form a limited but central aspect of English structure, the subject of English sentences.

First, this study will entail an inventory of the constructions which function as the subject of English clauses, including noun phrases, various substitutes, verb phrases, prepositional phrases, adjectival phrases, and clauses. These constructions will be gathered from two kinds of sources: (1) previous descriptions of English grammar, including Otto Jespersen's *A modern English grammar*, Robert Lees' *The grammar of English nominalizations*, and Eugene Nida's *A synopsis of English syntax;* and (2) six recent issues of *Harper's magazine* which will serve as a check on the other sources and provide sentences in various styles and genres. This primary and secondary data will be entered on data sheets. After compiling the corpus, subject constructions will be classified according to the procedures described by Longacre. This classification will entail defining the units which function as subjects, stating the criteria used to separate different forms, and listing the different classes and sub-classes of subject constructions. These initial tasks are taxonomic.

After the corpus has been ordered, the subject tagmeme will be presented according to Longacre's generative-tagmemic model, adding to it certain features of matrix presentation recently developed by Kenneth L. Pike. Longacre's generative model of tagmemics is made up of three sorts of rules, plus ordered inventories of constructions. The rules are for reading, permutation, and

exponence. The procedures of generation can be described briefly as follows:

1. A formula of a clause level (or any other level) construction is written in as many readings as are possible.
2. Each of these readings is permuted in all possible ways (e.g., an adverb may be permuted from final position to initial position).
3. The exponent of each symbol in the formula is written. These exponents are fillers of a tagmeme, and may be units of a lower or higher level, or nesting units of the same level.
4. The exponents are written as formulae, and we proceed once again through R, P, E rules until only sequences of individual morphemes or symbols representing morpheme classes remain. This string is the terminal grammatical string. (Only after similar operations in the phonological and lexical systems are English sentences produced.)

The use of matrices with this model has at least three advantages: (1) matrices facilitate rapid insight into complex systems, and (2) they allow one to treat related constructions as sets, instead of individual items, leading to a simpler description of concord and agreement, and to transformations of sets, rather than individual items. (3) Furthermore, by establishing matrices one can quite clearly justify the use of "grammatical meaning", or, in tagmemic terms, "slot meaning", which is now defined as the meaning of a category in a matrix.

This proposed study will differ from previous descriptions of English in a number of ways:

1. Constructions will be segmented into string constituents, not immediate constituents.
2. Phonological and lexical structure will be kept separate from grammatical structure.
3. The use of grammatical meaning will be justified and kept separate from lexical meaning.
4. Pattern, not process, will be emphasized.
5. Matrix presentation will be used both for greater clarity and greater economy of statement.

If this study turns out as planned, it will show that English subject constructions, though very complex, can be described and generated with precision, economy, and clarity via the tagmemic model.