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CONDITIONING SYNTACTIC PERFORMANCE OF CHILDREN AT VARING GRADE LEVELS BY AUDIO-LINGUAL DRILLS ON TRANSFORMATIONS.

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FIVE RECENT STUDIES AIMED AT MEASURING THE AMOUNT OF TRANSFER-OF-TRAINING FROM SPEECH TO WRITING (AS DEMONSTRATED BY STUDENTS PREVIOUSLY CONDITIONED THROUGH AUDIOLINGUAL CLASSROOM DRILL) ARE EVALUATED IN THIS PAPER. FOLLOWING A REVIEW OF PRELIMINARY RESEARCH, THE METHODOLOGY USED TO CONDITION THE STUDENTS AND TO TEST FOR TRANSFER IS DESCRIBED AND THE EFFECTIVENESS OF THIS METHODOLOGY AND CONDITIONING USED IN THE RECENT RESEARCH IS SUMMARIZED. NINE STATISTICAL TABLES ARE APPENDED. THIS PAPER WAS DELIVERED AT THE AERA CONVENTION (CHICAGO, FEBRUARY 8, 1968). SEE TE 000 080 FOR A RELATED REPORT. (MM)

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Recently, a number of articles and monographs have been published demonstrating that, as children mature, they use more complex sentence structures both in writing and speech (3, 6). In terms of one grammatical theory, as children mature, they use a greater number of transformations in producing sentences both in writing and speech. Since this is so, the question then arises as to whether techniques can be developed which will help the student gain control of grammatical transformations and facilitate his ability to use these operations through classroom work. In foreign language teaching, a methodology associated with audio-lingual drills has been used to achieve this very goal with students of foreign languages for a number of years (1, 4). Since 1965, this methodology has been used in four experiments in the classroom on the grade school level and one with college freshmen (2 in an attempt to foster syntax acquisition with students studying their native language.

The methodology in the four grade school experiments basically

were very similar since they followed the model of the pilot project with seventh graders reported by Ney (5). In these experiments, the attempt was made to condition the students to use sentences of predetermined syntactic types through verbal manipulation of representative sentences from oral cues. For instance, the researcher who was serving as the instructor in the experiments would read two cue sentences such as:

(1) The injured captain gave the commands.

(2) The injured captain was lying in the bow.

After being instructed on how to combine these sentences with <u>who</u> or <u>which</u>, individual students were requested to produce a correctly combined response sentence which in this case would be:

(3) The injured captain, who was lying in the bow,
gave the commands.

If the student responded correctly, he was rewarded by the instructor's acceptance of the sentence or by a simple word of praise. If the student did not respond correctly, another student was requested to perform the exercise orally until the correctly formed response sentence was elicited or provided by the instructor. At each step in these exercises, the entire class was involved through choral repetitions of correctly-formed sentences. This was followed by further checks on individuals in the class to see that they had repeated the response sentences correctly and to further reinforce the oral responses with individuals.

In each of the experiments, the attempt was made to effect transfer of training from speech to writing by including written exercises based on or related to the oral exercises.

One form of this phase of the experiment consisted merely in the instructor's reading of the cue sentences while the students wrote the appropriate response sentence. These exercises were duly corrected by the instructor between class periods.

In all but one of the grade school experiments, the progress of the students was measured at intervals by the giving of pretests and posttests employing the methodology used by O'Donnell, Griffin and Norris (6) in their study of the syntax of the speech and writing of grade school children. The tests simply consisted of the showing of a film and a request for the experimental subjects to write as much as they could within a specified period of time in a free composition on the subject of the film shown. The sentences in these compositions were then classified by type and counted following the pattern established by Kellog W. Hunt (3). In particular, the count was performed to see if in fact the students used those sentences which they had been conditioned to use and if the methodology had in fact succeeded in helping the students to mature as writers in the types of sentence structures that they used.

In the tests, the same film was shown as a pretest and a postest so that it could not be argued that a change in subject matter had influenced the types of structures that the students used in their compositions. Furthermore, generally the attempt was made to show films without narration or dialog since students very easily pick up and use the structures on the sound track of a film. In one case, where narration was present, the contamination

effect was discernible in some of the measures used.

In the three experiments in which pretests and posttests were given, improvement in the form of a greater frequency of occurrence on the posttests of the structures practiced was always measureable although it did not always reach a level at which the improvement was statistically significant. In the Ney 1965 experiment (5), the gain from pretest to posttest missed statistical significance at the .05 level of confidence by .03 on the tests of 17 seventh graders after approximately 20 hours of instruction. In the Raub 1966 experiment (7) which was designed around a control group of 25 students and an experimental group of 12 students, a statistically significant level of improvement was reached by the experimental group after two months on the test compositions elicited by a film with no narration. (The test compositions elicited by a film with narration did not show the same results -- a phenomenon duplicated by Ney in his 1967 experiment reported below.) The success of the Raub experiment on this measure, dulled in some respects by a lack of success on other measures, is nevertheless remarkable in that the control and experimental groups used by Raub were not matched: the experimental group had a lower IQ (107.6 mean) than the control group (IQ 113.8 mean), and furthermore, the experimental group students were not as proficient in writing as the control group subjects. The Ney 1967 experiment demonstrated marked differences between an experimental group of 26 students and a control group of 24 students in a fourth grade class. This experiment, however, was conducted

over an entire academic year (from September to June) with randomly selected matched groups. Generally speaking, then, it is possible to conclude that the success of the methodology herein reported is in direct proportion to the number of experimental subjects involved, and the duration of the experiment, and also the matching of experimental and control groups.

In the Ney 1967 experiment, two fourth grade classes were selected as control and experimental groups in a suburban elementary school. Although the subjects in these two classes were randomly selected, they were closely matched in ability as seen in the Iowa Test of Basic Skills and also in their scores on the first pretest. (See Tables I and II). The experiment with these classes was conducted in two phases. The first phase extended from the middle of September to the first week in December of 1966. The second phase extended from the first week in January to the first week of June in 1967. In the first phase of the experiment, the experimental group was subjected to audio-lingual drills based on readings during four class periods per week of from thirty to forty minutes, a total of thirty-seven class meetings. At the beginning of the first phase the students were given a pretest using the film Spotty, Story of a Fawn (Coronet film no 309). This film has narration throughout and the sound was left on during the pretest showing. The posttest was conducted using the same stimulus film shown under the same conditions for both the experimental and control groups at the end of the first phase of the experiment.

In the second phase of the experiment, the stimulus film for both pretest and posttest was entitled The Hunter and the Forest (Encyclopedia Brittanica film no. 878). This film has only a musical background on the sound track; it has no narration or dialogue whatsoever. During the second phase of the experiment, the experimental group was subjected to two sessions of the experimental methodology per week, a total of 30 periods of from 35 to 45 minutes in length. The control group was not given any practice in manipulating the types of sentences which were practiced by the experimental group.

After the classroom phase of the experiment had been completed, the pretest and posttest compositions were subjected to rigorous analysis. In the first place, the sentence types which were practiced by the experimental group were counted on all of the pretestest and posttests. (See Table I). On the first pretest and posttest both groups showed an increment on this measure from pretest to posttest but only the increment of the experimental group attained a statistically significant level of confidence and that at less than the .01 level. On the second pretest and posttest, the experimental group from the start was slightly ahead of the control group, but on the posttests the control group showed no gain at all from pretest to posttest, but the experimental group showed an increment which was significant at the .001 level of confidence.

From the first pretest to the first posttest it seemed that possibly the occurrence of the structures practiced was related

to the number of words written on the tests and since the number of words written increased for both experimental and control groups (See Table II), the number of structures taught increased also. However, the second pretest and posttest tended to disprove this, since, although the number of words written on the tests increased from pretest to posttest, the number of structures taught did not increase at all for the control group but it more than doubled for the experimental group. Therefore it is hypothesized that the narration from the film used for the first pretest and posttest tended to contaminate the results.

On the measure of the number of words written within the half-hour time limit of the tests, the experimental group showed a larger gain from pretest to posttest than did the control group. On this measure, the control group was slightly superior to the experimental group on the first pretest. (See Table II: C-group mean = 80.6, E-group mean = 72.7) From the first pretest to the first posttest, both groups showed a statistically significant gain, but the gain of the experimental group was much larger than the gain of the control group. From the second pretest

to the second posttest, ~~the gain of~~ the gain of the experimental group was statistically significant, but the gain of the control group was not. From the scores in Table II, two interesting phenomena become evident: (1) as might be expected, a group of students write more about a given film within a given period of time at the second showing of that film than they do at the first showing of the film, and (2) on both posttests the control group subjects wrote on the average of slightly more than 120 words within a period of one half-hour. This might turn out to be the maximum for students of this caliber who are not given systematic writing exercises after the pattern of the experimental methodology used here. Again, on the measure of the number of words written, the contamination effect of the narration of the first stimulus film is evident in the greater gain made by the control group on the first film than on the second film. In any case, if it is true as Griffin and others maintain that ". . . there is a general positive correlation between age-grade advancement and increasing word length of total responses to a particular stimulus situation . . ."(6, p. 97), then the results of the experiment are favorable.

In an analysis of variance, the observations of the differences between the experimental group and the control group are generally borne out on the measure of the number of words written and the occurrences of the structures taught in the pretest and posttest compositions (See Tables III and IV). It is merely interesting to note that on the measure of the structures taught the variance between the performance of the experimental group and the control group did not reach a statistically significant level of confidence

until the second posttest.

On the measures developed by Kellog W. Hunt (3), the performance of the two groups shows the same pattern that it did on the measure of the occurrence of the taught structures. Here again the experimental group shows a statistically significant gain in the number of multi-clause T-units (roughly, complex sentences) on the second posttest while the control group does not. (See Table V.) Here also the contamination effect of the narration of the film is even more evident in that the score of the control group equals that of the experimental group on the first posttest. This same patterning is evident in the number of words in multi-clause T-units (Table VI) and thus requires no further comment. On various other measures discussed by Hunt, there is very little difference in the performance of the control and experimental groups (See Table VII). Only on the subordination ratio, the ratio of all clauses to subordinate clauses, do the scores show any marked difference. Here again the contamination effect of the narration on the first film shows itself most clearly. The control group has a much higher subordination ratio on the first posttest than the experimental group. On the second posttest, however, the relationship is reversed; the experimental group has a much higher subordination ratio than the control group. Since many of the sentence types practiced by the experimental group contained subordinate clauses, the gain on the second post test can be attributed to the experimental methodology.

In conclusion, two questions might be asked: (1) What further experimentation needs to be done to demonstrate more conclusively the effectiveness or ineffectiveness of the methodology employed in the experiments reported here? And (2) what are the age-grade limits for the employment of the type of methodology used here? From the projects reported in this paper, the answer to the second questions is that this oral methodology can be started in the primary school. Second graders can handle the sentence combining exercises orally with facility as another as yet unreported pilot project has shown. The upper limit of this type of methodology might be the eighth or ninth grade in the public schools as they are now constructed. One teacher who attempted to use this method with tenth graders in Lansing Michigan reported complete failure. For the older students, except for remedial students, a written exercise may be more succesful than an oral exercise.

In any case, further experimentation needs to be done. In succeeding experiments, the experimental design will call for the use of structured oral and written exercises for the experimental group and only written exercises for the control group. Both groups would then practice the same sentence types. Later on, refinements of this oral methodology and other oral methodologies will be tested to determine their relative merits. Furthermore, the need for attitudinal studies of the experimental subjects is apparent.

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TABLE I: THE OCCURRENCE OF STRUCTURES TAUGHT ON PRETESTS AND POSTTESTS

	PRETEST - 1 Total	Mean	SD	POSTTEST - 1 Total	Mean	SD	Mean Increment	F	P
C Group	29	1.2	1.4	50	2.1	1.7	.9	3.649	.062
E Group	30	1.2	1.4	73	2.8	2.3	1.4	9.588	.003**

	PRETEST - 22 Total	Mean	SD	POSTTEST - 2		SD	Mean Increment	F	P
C Group	80	3.3	3.2	79	3.3	2.4	.0	.002	.959
E Group	98	3.8	2.1	191	7.4	3.9	3.7	17.307	.001***

* Significant at the .05 level of confidence or less.

** Significant at the .01 level of confidence or less.

*** Significant at the .001 level of confidence or less.

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TABLE II: THE NUMBER OF WORDS WRITTEN ON PRETESTS AND POSTTESTS

	PRETEST - 1 Total	Mean	SD	POSTTEST - 1 Total	Mean	SD	Mean Increment	F	P
C Group	1935	80.6	41.1	2932	122.2	44.5	42.4	11.289	.002**
E Group	1888	72.7	35.9	3934	151.3	54.2	78.6	38.101	.0005***
	PRETEST - 2 Total	**Mean**	**SD**	**POSTTEST - 2 Total**	**Mean**	**SD**	**Mean Increment**	**F**	**P**
C Group	2368	98.7	44.6	2900	120.8	52.7	22.1	2.477	.122
E Group	2892	111.2	46.6	4149	159.6	56.2	48.4	11.399	.001***

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TABLE III: ANALYSIS OF VARIANCE: NUMBER OF WORDS WRITTEN

Source of Variance	Sum of Squares	Degs. of Freedom	Mean Square	F	P
PRETEST I					
Between Categories	800.641	1	800.641	.540	.466
Within Categories	21171.799	48	1482.745		
Total	71972.420	49			
POSTTEST I					
Between Categories	10598.008	1	10598.008	4.280	.044*
Within Categories	118852.871	48	2476.101		
Total	129450.880	49			
PRETEST 2					
Between Categories	1970.051	1	1970.051	.946	.335
Within Categories	99873.949	48	2080.707		
Total	101844.000	49			
POSTTEST 2					
Between Categories	18733.300	1	18733.300	6.293	.016*
Within Categories	142881.679	48	2976.701		
Total	161614.980	49			

Category 1 = C Group, N = 24; Category 2 = E Group, N = 26

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TABLE IV: ANALYSIS OF VARIANCE: THE NUMBER OF STRUCTURES TAUGHT

Source of Variance	Sum of Squares	df	Mean Square	F	P
PRETEST I					
Between Categories	.037	1	.037	.018	.893
Within Categories	97.342	48	2.028		
Total	97.380	49			
POSTTEST I					
Between Categories	6.548	1	6.548	1.541	.220
Within Categories	203.872	48	4.247		
Total	210.420	49			
PRETEST 2					
Between Categories	2.371	1	2.371	.335	.566
Within Categories	339.949	48	7.082		
Total	342.320	49			
POSTTEST 2					
Between Categories	205.157	1	205.157	19.584	.0005***
Within Categories	502.843	48	10.476		
Total	708.000	49			

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TABLE V: THE NUMBER OF MULTI-CLAUSE AND SINGLE-CLAUSE T-UNITS

	PRETEST 1		POSTTEST 1		PRETEST 2		POSTTEST 2	
	Total	Mean	Total	Mean	Total	Mean	Total	Mean
E Group Multi-Clause	34	1.3	84	3.2**	40	1.5	97	3.7***
C Group Multi-Clause	41	1.7	79	3.3**	33	1.3	43	1.8
E Group Single-Clause	241	9.3	468	18.0***	303	11.7	367	14.1
C Group Single-Clause	236	9.8	334	13.9*	256	10.7	282	11.2

* Indicates that the gain between pretest and posttest is significant at the .05 level of confidence.

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*** Indicates that the gain between pretest and posttest is significant at the .001 level of confidence.

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TABLE VI: THE NUMBER OF WORDS IN MULTI-CLAUSE AND SINGLE-CLAUSE T-UNITS

	PRETEST 1		POSTTEST 1		PRETEST 2		POSTTEST 2	
	Total	Mean	Total	Mean	Total	Mean	Total	Mean
E Group Multi-Clause	339	13.0	882	33.9**	529	20.3	1218	46.8**
C Group Multi-Clause	461	19.2	803	33.4*	438	18.3	581	24.2
E Group Single-Clause	1531	58.9	2955	113.7***	2322	89.3	2931	112.7*
C Group Single-Clause	1536	64.0	2079	86.6*	1904	79.3	2318	96.6

* Indicates that the gain between pretest and posttest is significant at the .05 level of confidence.

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TABLE VII: LENGTH OF SINGLE-CLAUSE, MULTI-CLAUSE, AND ALL T-UNITS AND THE SUBORDINATION RATIO

Group	Subordination Ratio		Length of T-units		Length of Multi-Clause T-units		Length of Single Clause T-units	
	C Group	E Group	C Group	E Group	C Group	E Group	C Group	E Grou
Pretest I	26.3	23.7	7.0	6.9	11.2	10.0	6.5	6.4
Posttest I	31.5	26.5	7.1	7.1	10.2	10.5	6.2	6.3
Pretest II	21.2	20.3	8.2	8.7	13.3	13.2	7.4	7.7
Posttest II	23.4	34.5	8.6	9.0	13.5	12.6	8.2	8.0
Hunt's Fourth Graders	22.2		8.6		13.6		7.2	

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TABLE VIII: ANALYSIS OF VARIANCE: THE NUMBER OF MULTI-CLAUSE T-UNITS

Source of Variance	Sum of Squares	df	Mean Square	F	P
PRETEST 1					
Between Categories	2.003	1	2.003	.956	.333
Within Categories	100.497	48	2.093		
Total	102.500	49			
POSTTEST 1					
Between Categories	.046	1	.046	.006	.935
Within Categories	325.573	48	6.782		
Total	325.620	49			
PRETEST 2					
Between Categories	.333	1	.333	.163	.688
Within Categories	98.086	48	2.043		
Total	98.420	49			
POSTTEST 2					
Between Categories	46.926	1	46.926	7.957	.007**
Within Categories	283.073	48	5.897		
Total	330.000	49			

Category 1 = C Group, N = 24; Category 2 = E Group, N = 26

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TABLE IX: ANALYSIS OF VARIANCE: THE NUMBER OF SINGLE CLAUSE T-UNITS

Source of Variance	Sum of Squares	df	Mean Square	F	P
PRETEST 1					
Between Categories	3.971	1	3.971	.155	.695
Within Categories	1226.449	48	25.551		
Total	1230.419	49			
POSTTEST 1					
Between Categories	208.087	1	208.087	3.838	.056
Within Categories	2601.833	48	54.205		
Total	2809.920	49			
PRETEST 2					
Between Categories	12.162	1	12.162	.468	.497
Within Categories	1247.217	48	25.984		
Total	1259.380	49			
POSTTEST 2					
Between Categories	69.826	1	69.826	2.916	.094
Within Categories	1149.153	48	23.941		
Total	1218.980	49			

Category 1 = C Group, N = 24; Category 2 = E Group, N = 26.

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