

CONSEQUENCES APPLIED TO THE RESPONSES OF RETARDED
AND NONRETARDED CHILDREN ON THE TEST OF AUDITORY
COMPREHENSION OF LANGUAGE

by

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B.S., University of Tennessee, 1971

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

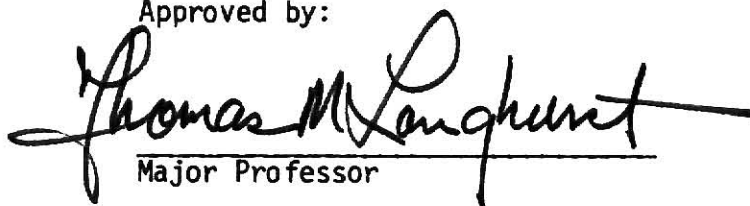
MASTER OF ARTS

Department of Speech

KANSAS STATE UNIVERSITY
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1977

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ACKNOWLEDGEMENTS

I wish to express my appreciation to all of those who have shared with me their knowledge and helped me to attain the goal of my Master's Degree. I thank my parents for providing me their guidance and love. For the initial motivation and encouragement to apply to graduate school, and for her friendship, I thank Jan Firling. To Doug Guess and Bill Keogh I am grateful for the many intellectually stimulating discussions that helped provide me with a sense of the importance and need of research as well as their encouragement and help.

A special thanks to Richard Maxfield for lending his statistical expertise. To Dr. Thomas Longhurst for his advising guidance throughout my graduate career and serving as committee chairman, I extend a grateful thank you. In addition, I wish to extend my thanks to the other members of my committee, Dr. Gary Neiman, Dr. Bruce C. Flanagan, Dr. Norma D. Bunton, and Dr. Doug Guess for reserving time to serve on my Master's committee.

Finally, I thank my husband Jerry and my son, Evan, for being with me and loving me.

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CHAPTER I

INTRODUCTION

In recent years the use of standardized tests has become quite popular with educators, researchers, and other professionals for a variety of reasons. Within the educational setting tests have been used to assess students' performance for placement decisions, for accountability of educators, for evaluating learning, and as a basis to determine the students' abilities or disabilities. Tests have been used in all academic levels from preschool to post-graduate and for both handicapped and non-handicapped populations.

This increased use of tests has produced considerable controversy over the interpretation of test scores. Specifically, it has been questioned whether test scores reflect the child's representative level of performance. Under some circumstances the test scores may be a reflection of the child's optimal level of performance on the skill or knowledge being tested.

It is held that students usually score below their maximum potential in test situations because of subtle conditions which may influence their maximal performance. The variables which may interfere with the student's performance include his health, disposition or preparedness to take the test, as well as the environmental conditions such as, rapport with the tester and motivational conditions, specifically the use of reinforcers.

Several investigators (Ayllon & Kelly, 1972; Bergan, McManis, & Melchert, 1971; Edlund, 1972; Hurlock, 1925; Smeets & Striefel, 1975;

Zigler & Butterfield, 1968) have reported that when responses were reinforced, test performance was higher than previous nonreinforced performance. Zigler (1970) found that when using the two different motivational conditions, praise and primary reinforcers, I.Q. test scores were increased by as much as 10 points. Other investigators have used a variety of subjects and motivational conditions to support the same general findings (Bergan, McManis, & Melchert, 1971; Edlund, 1972; Zigler & Butterfield, 1968). That is, when responses were reinforced or when subjects were prevented from making many errors, test performance was higher. These authors agree that reinforcement itself constitutes a motivational condition for the subjects. In addition, many studies have attempted to identify the effects of particular types of reinforcers. The use of praise was investigated by Bergan, McManis, and Melchert, 1971; Tiber and Kennedy, 1964; Roth and McManis, 1972. Tokens and candy were also used under the two conditions, reinforcement versus no reinforcement (Ayllon & Kelly, 1972; Edlund, 1972; Tiber & Kennedy, 1964), and have been shown to increase the behaviors being studied.

Many of the above studies were undertaken using performance on various intelligence tests as the dependent variable (Ayllon & Kelly, 1972; Roth & McManis, 1972; Smeets & Striefel, 1975; Zigler, 1970). In the Roth and McManis study (1972) retarded adults were given the Block Design Subtest of the Wechsler Adult Intelligence Scale. The subjects received reinforcement immediately after every correct response. Edlund (1972) used the Stanford-Binet Scale Form M with

five to seven-year-old children. Correct responses were also reinforced immediately. The Metropolitan Readiness Test was used by Ayllon and Kelly (1972) when they studied the effects of reinforcement for two student populations. Smeets and Striefel (1975) analyzed which of four types of reinforcement contingencies enhanced performance on the Raven Progressive Matrices. Furthermore, their investigation showed that the immediacy of reinforcement upon correct test responses increased performance to a significant degree. Thus, for test performance to reflect a maximum level of performance, they concluded, reinforcement should be used contingently in a standardized test situation.

The above investigators have shown the value of using reinforcement with various intelligence tests to produce a higher level of output and enhancement of scores with the use of contingent reinforcement. However, as McReynolds (1970) and Powell and McReynolds (1969) have reflected, there has been a paucity of published research to show the efficacy of using reinforcers in the area of speech and language assessment. Also, investigations have not been undertaken using contingencies with both a retarded population and a non-retarded articulatory deficient population. It has been demonstrated that mentally retarded children have a high incidence of speech and language disorders (Bartel, 1970; Keane, 1972; Spradlin, 1963), particularly in language developmental skills. It has also been shown that children with numerous misarticulations show syntax performance deficits for their age (Marquardt & Saxman, 1972). The Test of Auditory Comprehension of Language (TACL), (Carrow, 1972) is currently a popular assessment tool which has been shown to be

an effective and appropriate diagnostic instrument to provide useful information with the retarded child (Bartel, Bryan, and Keehn, 1973) and with non-retarded articulatory deficient children (Marquardt & Saxman, 1972). The TACL has gained approval with speech and language clinicians due to its testing of many language comprehension structures, including vocabulary, morphology, and syntax. The use of reinforcers during administration of the TACL with the above mentioned two groups of children, however, has never been investigated.

The purpose of the present study was to investigate the possibilities that contingent use of positive reinforcement and consequences can enhance the performance of articulatory deficient children and retarded children on the TACL. An additional question posed was whether reinforcement of the responses of the retarded children would improve their scores (as a group) to a greater degree than those scores of an articulatory deficient, non-retarded group.

CHAPTER II

METHODSetting

The Test for Auditory Comprehension of Language (Carrow, 1972) was administered in a one-to-one situation. The test booklet was placed on a table with the illustrations facing the student and the written stimuli facing the examiner. Each subject was seated facing the examiner. The room in which the testing was administered met the requirements of the author of the test; the testing environment was quiet, free from outside disturbances and visual distractions, and well lighted.

Subjects

The subjects were 40 students from public elementary schools. Half of the subjects were enrolled in educable mentally handicapped level I classes. These students had chronological ages ranging from six years to ten years, and an IQ range of 55 to 80. The other twenty students were articulatory deficient children, having either substitutions, omissions, or distortions of sounds in their speech. They had chronological ages ranging from 4 years, 6 months to 6 years, 11 months, and were enrolled in regular classes.

Procedure

The subjects were divided into four groups of ten students each. A test-retest approach was utilized with a ~~three~~ month interval.

All subjects were given the TACL under two test conditions. Condition I consisted of standard testing procedures as outlined in

the test material. The child was read the instructions,

"We are going to look at some pictures. I would like for you to listen carefully. I am going to say a word and I want you to point to the picture that matches what I said."

The examiner did not elaborate on the pictures of the test items or encourage or discourage the student with any facial expressions or remarks. Further instructions dictate the examiner to speak clearly and distinctly, and not to repeat any stimulus unless it was misstated.

Condition II was identical, with the additional factor of a sugared colorful cereal being administered immediately following each correct response. This stimulus was selected after each subject's parents were asked if their child liked sweet cereal and had no physical problems associated with eating it. The examiner received parental permission for the students to receive and eat the cereal.

In the first test situation ten educably mentally handicapped (EMH) students and ten articulatory deficient students were administered the TACL under Condition II. Following a three month interval wait for the retest situation, the subjects were readministered the TACL under the opposite condition.

The second test situation consisted of the administration of the TACL to the other ten educably mentally handicapped students and the other ten articulatory deficient students under Condition I initially. Following a three month interval wait for the retest, the subjects were readministered the TACL under the opposite condition (Condition II).

CHAPTER III

RESULTS

The scores from the Test for Auditory Comprehension of Language (Carrow, 1971) were analyzed by 2 x 2 Analysis of Variance with one repeated measure. Separate analyses were performed for the non-reinforcement and reinforcement conditions, as well as for the non-reinforcement vs. reinforcement difference scores. These means are presented in Table 1. The dependent measure for all analyses was the students' scores on the TACL. The independent measures were the two groups, articulatory deficient vs. educably mentally handicapped, and whether the students received reinforcement in the initial test situation (trial 1) or in the retest situation (trial 2).

As can be seen in Table 1, there were no significant differences between the groups within the Reinforcement condition. The Trial Order main effect and Group x Trial Order interaction were also not significant.

There were significant differences ($F = .02$, $df = 1/36$, $p < .05$) between the two groups in the non-reinforcement condition. The educably mentally handicapped students produced lower scores than the articulatory deficient group of students when no reinforcement was given. There were no significant differences for Trial Order or Group x Trial Order interaction.

Finally, the mean difference scores for the articulatory deficient group and the educably mentally handicapped groups, for both trial 1 and trial 2 were computed. These mean scores were derived by subtracting the student's score when no reinforcement was given from the same student's score when reinforcement was given. These data are also presented in Table 1.

There were significant differences on these mean difference scores for the group and trial order main effects. The mean difference on the TACL when non-reinforcement and reinforcement conditions were compared was greater for the educably mentally handicapped students than the articulatory deficient students ($F = 7.01$, $df = 1/36$, $p < .05$). The second main effect on these difference scores was that when reinforcement was given on the retest (second trial) and hence, not on the first, the mean scores were higher than when reinforcement was given on the initial test situation (trial 1) and not on the second, ($F = 9.68$, $df = 1/36$, $p < .01$).

TABLE 1

Mean Scores and Differences for the Articulatory Deficient and Educably Mentally Handicapped Groups in the Two Trials of the No Reinforcement and Reinforcement Conditions.

Group	Condition				Difference		
	No Reinforcement		Reinforcement		No Reinforcement vs. Reinforcement		
	Trial 1	Trial 2	Trial 1	Trial 2	Trial 1	Trial 2	Mean
Artic. Deficient	84.7	82.0	86.7	91.2	2.0	9.2	5.6 ^A
Educable MR	74.8	73.9	83.1	87.5	8.2	13.6	10.9 ^B

Note: Column means sharing a common superscript are not significantly different.

CHAPTER IV

DISCUSSION

In general, the data supported the hypothesis that contingent use of positive reinforcement can enhance the performance of articulatory deficient children and retarded children on the Test of Auditory Comprehension of Language. There were no significant differences between the articulatory deficient group and the educable mentally handicapped group within the reinforcement condition. However, there were differences in actual scores; the scores of both groups improved with reinforcement, suggesting their performance was enhanced.

There were significant differences between the two groups in the non-reinforcement condition. The retarded students did poorer than the articulatory deficient students when no reinforcer was given. Perhaps this may be explained by discerning the importance of the use of reinforcement with the retarded students. Retarded students are given tangible reinforcers more often in their daily school activities than are articulatory deficient students. The presence and use of tangible reinforcers in the test setting might be a discriminative stimulus for attentiveness, test preparedness, and other subtle conditions, and thus the absence of the reinforcement may influence or cause the poorer test scores.

An interesting finding was the effect reinforcement made on the mean difference scores. There were significant differences on the mean difference scores for the group and trial order main effects. When reinforcement was given in the retest condition (trial 2) the mean scores were more improved than when reinforcement was given on the first trial. This finding seems to suggest that reinforcement makes more difference when it

is preceded by no reinforcement; all scores were improved, though perhaps not significantly when reinforcement was given. Since students did better in the initial test situation (trial 1) than in the retest situation (trial 2) when reinforcement occurred in the initial testing it might be assumed that a minimal practice effect occurred. Perhaps a combination of the benefits of practice and reinforcement is the best explanation. Further research designed which would involve successive tests-retests (with and without using reinforcement) could investigate the possibility that at some point the scores would begin to plateau, hence, providing a more definitive answer.

The results of this study, obtained from two populations typically limited in linguistic skills, demonstrates that the use of reinforcement procedures applied to test performance on the Test of Auditory Comprehension of Language can improve performance on the test. Suggestions following from these data for those who may use the Test of Auditory Comprehension of Language results are clear: Either the performance of the retarded student in taking the test should be enhanced or the resulting test score must not be assumed to be a representative sample of the student's comprehension of the type of linguistic structures that this test is designed to evaluate.

In assessing these data, however, a number of precautions should be made. There may be limitations in the sample presented and in the measurements and other procedures which have been used in this study. Specifically, a pretest of consequences to determine an effective reinforcer could be used, a larger sample population, or a different research design are possible changes. It is obvious that investigations of this

sort gain from efforts of replication and further scrutinization, perhaps incorporating the above suggestions.

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APPENDIX 1

Raw Scores

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First Condition, Reinforced Retarded Group Scores	First Condition, Non-Reinforced Retarded Group Scores	Second Condition, Reinforced Retarded Group Scores	Second Condition, Non-Reinforced Retarded Group Scores
94	86	87	72
77	67	95	83
77	66	94	71
81	70	87	65
87	72	90	83
68	58	83	76
78	80	94	76
92	92	95	89
89	89	60	49
88	68	90	75
First Condition, Reinforced Articulatory Deficient Group Scores	First Condition, Non-Reinforced Articulatory Deficient Group Scores	Second Condition, Reinforced Articulatory Deficient Group Scores	Second Condition, Non-Reinforced Articulatory Deficient Group Scores
90	90	91	90
65	59	89	74
88	87	91	85
90	90	97	92
91	87	92	78
88	87	98	83
93	96	85	83
97	96	90	63
74	69	92	88
89	86	87	84

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ABSTRACT

The purpose of this study was to investigate the possibilities that contingent use of positive reinforcement could enhance the performance of articulatory deficient children and retarded children on the Test of Auditory Comprehension of Language (TACL), (Carrow, 1972). An additional question posed was whether reinforcement of responses of the retarded children would improve their scores to a greater degree than those scores of an articulatory deficient group.

Data were obtained from forty students from public elementary schools, half retarded and half normal with articulation deficits. A test-retest approach was utilized with a three month interval. All subjects were given the TACL under two conditions; with contingent reinforcement and without reinforcement. Scores that had been recorded for both the test and the retest situations with and without reinforcement, were analyzed by a 2 by 2 Analysis of Variance with one repeated measure. Separate analyses were performed for the non-reinforcement and reinforcement conditions.

The data gathered supported the hypothesis that contingent use of positive reinforcement can enhance the performance of articulatory deficient children and retarded children on the Test of Auditory Comprehension of Language. There were no significant differences between the two groups' scores in the non-reinforcement condition. It was concluded that the performance of students taking the Test of Auditory Comprehension of Language may be enhanced by administration of reinforcement contingent on test responses.