7-27-1976

The Effects Of Perceptual Conditioning Upon Decoding And Encoding Abilities Of Children With Low Achievement

James D. Hall

This thesis, directed and approved by the candidate's committee, has been accepted by the Graduate Committee of The University of New Mexico in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

THE EFFECTS OF PERCEPTUAL CONDITIONING
UPON DECODING AND ENCODING
ABILITIES OF CHILDREN WITH LOW ACHIEVEMENT

Title

James D. Hall

Candidate

Special Education

Department

Bernard Sprolsky

Dean

July 27, 1976

Date

Committee

Billy L. Watson

Chairman

Richard C. McDonald

James L. Trusty

THE EFFECTS OF PERCEPTUAL CONDITIONING UPON DECODING AND ENCODING ABILITIES OF CHILDREN WITH LOW ACHIEVEMENT

BY

JAMES D. HALL

B.S., Southwest Texas State University, 1974

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

Master of Arts

in the Graduate School of
The University of New Mexico
Albuquerque, New Mexico

July, 1976

ACKNOWLEDGEMENTS

This writer gratefully acknowledges the guidance and many valuable suggestions of Dr. Billy Watson, Dr. Richard McDowell, and Dr. James Everett.

This writer also acknowledges the assistance of his wife, Nancy, during the preparation of this thesis.

THE EFFECTS OF PERCEPTUAL CONDITIONING UPON DECODING AND ENCODING ABILITIES OF CHILDREN WITH LOW ACHIEVEMENT

BY

James D. Hall

ABSTRACT OF THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

Master of Arts

in the Graduate School of
The University of New Mexico
Albuquerque, New Mexico

July, 1976

THE EFFECTS OF PERCEPTUAL CONDITIONING UPON DECODING AND ENCODING ABILITIES OF CHILDREN WITH LOW ACHIEVEMENT

James D. Hall
Department of Special Education
The University of New Mexico, 1976

The purpose of this study was to investigate the effects of two decoding training procedures upon the decoding and encoding abilities of third grade children with low achievement. The methods studied were Perceptual Conditioning (Glass, 1971a) and Perceptual Conditioning with an added spelling step.

An experimental group of 24 third graders, who pretested at or below the 3.8 grade level on the Diagnostic Reading Scales word lists, were randomly assigned to one of two experimental groups or to a control group. Each group had eight subjects. A pretest-posttest control group design was used in the investigation.

Pretest-posttest instruments included the word recognition lists of the Diagnostic Reading Scales and a written spelling test consisting of the words on the spelling supplementary test of the Gates-McKillop Reading Diagnostic Tests.

Subjects were instructed fifteen minutes daily for twenty consecutive school days. Subjects in the first experimental group were instructed through Perceptual Conditioning. Subjects in the second experimental group were instructed through

Perceptual Conditioning with an added spelling step. Subjects in the control group were instructed through an instructional games format.

Pretest and posttest comparisons between the experimental and control groups were made using the Mann-Whitney U test. No significant differences existed between the two groups at the time of pretesting. All groups were likewise found to score similarly on the posttests. Between-group comparison of gain scores revealed that the second experimental group made spelling test gains which were, at the .025 level of significance for a one-tailed test, significantly greater than gains made by either of the other two groups. Within the control and experimental groups, pretest-posttest comparisons were made using the Wilcoxon matched-pairs signed-ranks test. All comparisons made within the control and experimental groups yielded Wilcoxon T's significant at or beyond the .025 level for a one-tailed test.

These results suggest that low achieving students trained by use of Perceptual Conditioning with the added spelling step would make greater gains in spelling ability than would similar students trained by use of either Perceptual Conditioning or educational reading games. That any one of the three training procedures should result in significantly greater gains in decoding ability is not suggested.

TABLE OF CONTENTS

PAGE

LIST OF TABLES

INTRODUCTION

The purpose of this study was to investigate the effects of two training procedures, Perceptual Conditioning (Glass, 1971a) and Perceptual Conditioning with an added spelling step. These two procedures were investigated in order to discover their effects upon the decoding (word recognition) and encoding (spelling) abilities of third grade low achievers.

Perceptual Conditioning is a procedure developed to train decoding ability. Decoding as defined here refers to the ability to produce the sound or word indicated from a printed word or group of letters. Reading is a complex task involving the ability to decode written words, the ability to obtain meaning from what is decoded, and the ability to react and utilize these meanings for personal growth. Decoding is only one element of the reading process. Decoding may be defined as the process of changing visual symbols into auditory patterns (Robeck and Wilson, 1974). It is simultaneously the least important aspect of reading and the most critical prerequisite skill to reading. Unless a person learns to decode effectively, he will never be able to learn to read. Until he is able to decode, the reader will not have the opportunity to respond to the meaning of words (Glass, 1971a).

Glass (1971a) suggested several guiding principles for the teaching of decoding. His hypothesis for decoding include:

1. Decoding should be taught separately from reading....

2. Teach youngsters to decode only with words whose meanings are already known. Then meaning is made irrelevant to the instructional session....

3. It would be advantageous to teach decoding in a way that only decoding skills come into play....

4. Syllabication is not used for decoding. It should not be part of a decoding program....

5. Successful decoders do not apply prescribed principles nor do they utilize a conscious reasoning process. Thus, the teaching of decoding does not necessitate the use of rules and principles....

6. Words are initially seen as wholes and then as composed of parts (letter clusters) which combine to form the correct sound....

7. Correct visual and auditory clustering is very important to the decoding process....

8. The correct mental set can cause the decoder to see and respond to the appropriate letter-sound structures (Glass, 1971a, pp. 81-90).

In his first hypothesis, Glass (1971a) suggested that the teaching of decoding should be considered instructionally separate from the teaching of reading. Learning to decode is a different and less complex task than learning to read. In decoding the desired response is always the same. Only one sound is sought in response to a word stimulus. The correct sound is the same regardless of who is making the response or in what situation the response is made. In contrast to decoding, reading is a creative, interpretive process. Individual responses to reading experiences are greatly affected by each individual reader's life experiences, intelligence, and other factors. Good reading instruction taps and extends individual differences and does not aim at making reading a homogenous experience (Betts, 1956).

The teaching of decoding on the other hand, emphasizes homogeneity of response. Because of this homogeneity of response, decoding, much more than reading, is vulnerable to the effects of simple conditioning or habit formation. Decoding is not reading and should be taught differently from reading.

In his second hypothesis, Glass (1971a) suggested that decoding should be taught in such a manner that word meaning becomes irrelevant to the learning situation. Knowing the meaning of words is not essential to the ability to decode those words. Felsten (1973) reported that students who were learning English as a second language were able to make significant gains in decoding ability through the use of Perceptual Conditioning even though they knew the meanings of very few of the words that they were able to decode. She suggested that English-as-a-second-language students should be taught to decode English words at the same time that they are being taught to communicate orally in English. Since comprehension of word meaning is not essential to the development of decoding ability, Glass (1971a) suggested that the teaching of word meaning be separate from decoding training. He recommended that in order to minimize the influence of word comprehension on decoding training, students should be taught to decode only with words whose meanings are already known.

In his third hypothesis, Glass (1971a) suggested that decoding be taught through procedures which call only decoding skills into play. The use of picture and context clues is an important reading skill; however, this skill should not be

allowed to supplant decoding skill. Decoding should be taught out of context of a phrase or sentence and without the aid of picture clues.

In his fourth hypothesis, Glass (1971a) suggested that syllabication is not used for decoding and should not be part of a decoding program. Although syllabication may be used for other tasks, decoding does not require syllabication. Glass (1971a) reported that most people typically identify syllables after the sounds within a word are known. He reported that his studies (Burton and Glass, 1968) indicated that children rarely, if ever, syllabicate by the use of rules or principles. They merely sound out the syllables where the breaks seem appropriate. Spache and Baggett (1965) reported that the ability to syllabicate words is not dependent upon knowledge of rules. They found that teachers of reading tend to have little knowledge of syllabication rules and that the correlation between knowledge of rules and ability to syllabicate is only $r = .256$. "If knowledge of syllabication rules does not markedly influence success in applying phonics principles or in actual syllabication, of what value are such rules" (Spache and Baggett, 1965, p. 99)?

In his fifth hypothesis, Glass (1971a) suggested that successful decoders do not apply principles or rules during decoding. Decoding is not a conscious reasoning process. It is less dependent upon knowledge of principles and more dependent upon instant responses to words or parts of words.

In his sixth hypothesis, Glass (1971a) suggested that words are initially seen as wholes and then as composed of parts

(letter clusters) which combine to form the correct sound. That letter clusters are a perceptually important unit to decoding is supported by two studies. Gibson, Pick, Osser, and Hammond (1962) found that adequate readers could more accurately decode pseudo-words constructed according to the rules of spelling-to-sound invariances than words not so constructed. Perceptual processes appeared to be facilitated by the spelling-to-sound correspondence found in letter clusters. They concluded that "while reading is based on discrimination and identification of visual forms such as letters, it becomes, in the skilled reader, a process of perceiving 'super-form', and that these tend to be constituted (organized) by their relation to auditory-vocal temporal patterns" (p. 564). Gibson, Osser, and Pick (1963), in a study of first and third grade reading, concluded that "a child in the early stages of reading skill typically reads in short units but has already generalized certain consistent predictions of grapheme-phoneme correspondence, so that the units which fit these simple 'rules' are more easily read" (p. 146). They suggested that "this generalizing process undoubtedly promotes reading efficiency and could be facilitated by presenting material in such a way as to enhance the regularities and speed up their incorporation" (p. 146).

In his seventh hypothesis, Glass (1971a) suggested that correct visual and auditory clustering is essential to the decoding process. The decoder must be able to extract from a word the letter clusters representing sound-to-symbol correspondence. Numerous persons have examined the system of letter by letter

spelling of English and have discovered a predominant lack of grapheme-phoneme correspondence (Lerner, 1971). This inconsistency has been avoided by various approaches to teaching reading, such as linguistic approaches, modified alphabet approaches, and rebus approaches. Glass (1971a) found a high level of spelling-sound consistency by examining vowel-consonant clusters found in the basal readers of the first three grades. He found that fewer than 100 vowel clusters are included five or more times in the vocabulary. Consistent identification of these clusters will enable the reader to correctly identify the vowel sounds in over 90% of the new vocabulary introduced in the first three grade level basal readers.

In his eighth hypothesis, Glass (1971a) said that the decoder can be made to see and respond to the correct letter-sound structures within a whole word by development of a correct mental set to respond. Several studies suggest that Glass's procedure for developing a correct mental set, Perceptual Conditioning, aids learners to decode more adequately. Glass and Cohn (1970) reported significant gains in decoding ability for students trained with Perceptual Conditioning. Fifteen minute training sessions twice daily for four months yielded an average of 9 months improvement for first graders, 20 months improvement for fourth graders, and an average of 12 months improvement for fifth graders. Glass (1971a) reported significant gains for two Perceptual Conditioning programs, one developmental and one remedial. The developmental program with first and fifth graders consisted of three training

sessions weekly for thirty weeks. Average gains were about two years. The remedial program consisted of an average of thirty-three training sessions during summer school for third through fifth graders. Hawes (1973) trained a group of low decoding ability third graders by use of Perceptual Conditioning. He found that subjects trained for fifteen minutes daily for twenty consecutive school days, gained an average of 1.5 grade levels in decoding ability as measured by the word recognition lists of the Spache Reading Diagnostic Scales (Spache, 1963). The children trained by use of Perceptual Conditioning made significantly greater gains in decoding ability than did controls receiving regular classroom instruction in reading.

Although the effect of Perceptual Conditioning upon decoding ability has been demonstrated by research, the effect of Perceptual Conditioning upon encoding ability remains undetermined. However, research does indicate that there exists a relationship between reading and spelling ability. Horn (1969) reported that correlations between reading and spelling abilities are positive and moderately high (r = .48, .51, .61, .63). Russell (1943) reported a correlation of r = .85 between word recognition ability and spelling ability at the second grade level. At the third grade level, Morrison and Perry (1959) found a correlation of r = .85 between reading and spelling achievement levels. From their review of the literature, Plessas and Pelly (1962) reported that poor spellers are often good readers and that poor readers are invariably poor spellers; however, not all poor spellers are poor readers.

Stauffer (1958) explained that the processes involved in reading are similar to those involved in spelling in that both are dependent upon visual, auditory, and kinesthetic imagery. While the skills and processes involved in reading and spelling are similar, the acquisition of these skills appeared to differ significantly. Plessas and Ladley (1963) reported a study in which third through eleventh grade students of poor reading ability received from 15 to 20 hours of "corrective reading" instruction. While significant gains in reading ability were produced, changes in spelling ability were found to be insignificant. Procedures employed in "corrective reading" instruction were undisclosed, and it is conceivable that other instructional procedures would have yielded gains in spelling skill.

While research does not indicate that spelling ability can be improved through reading training, a review of the literature does indicate a belief that styles of reading instruction which stress word analysis and the similarity of phonemic elements most nearly aid spelling ability. Figural (1964) stated that reading skills are readily transferred to spelling skills and that an understanding of word analysis "can bring about dramatic improvement in spelling" (p. 354). Increased spelling power can be brought about by instructional procedures which help students to group similar word elements, according to Strang, McCullough, and Thraxler (1967). Russell (1943) studied second graders who had been taught to read by instructional approaches which call attention to parts of words and to word families. These children were found to have greater spelling achievement

and to demonstrate a higher correlation between reading and spelling achievement and to demonstrate a higher correlation between reading and spelling abilities than children taught by other methods. Mason (1957) found that word discrimination tasks improved spelling ability. Sixth grade students who worked on work sheets requiring discrimination of similarities and differences in printed words during their regular spelling class, demonstrated a greater increase in spelling ability than did their classmates who attended the spelling lesson.

An examination of procedures involved in Perceptual Conditioning reveals that processes which appear most likely to improve spelling ability are essential elements of that procedure. Grouping of similar word elements is stressed, as is oral spelling of letter clusters. Letter clusters have highly consistent spelling-to-sound relationships. The skills developed through Perceptual Conditioning may transfer positively to spelling skills.

If improved spelling ability is a desired outcome of Perceptual Conditioning, then it may be efficacious to add to that procedure a component designed specifically to improve spelling ability. The component which requires the child to write the words containing the letter clusters should increase transfer for two reasons. First, a task which most nearly resembles the desired terminal behavior is most likely to result in transfer to that behavior. By adding the motor component of writing, the task becomes more similar to the desired behavior of written encoding. Second, the motor response involved in writing

supplies an additional mode of information input. The great improvement in spelling ability level as the result of the corrected test procedure (Horn, 1947) was partly attributed to use of multiple modalities in studying, according to Horn (1969). The identification of modality ability and of modality preference in children is quite illusive. Procedures involving multiple imagery modalities should be most fruitful. Fernald (1943) insists that "our methods of teaching must be such as to allow each child to develop the type of image that will be clear enough to give him all the details of the word he is attempting to learn" (p. 182).

The value of Perceptual Conditioning for improvement of decoding skill has been demonstrated by research. This study is in part designed to replicate the effect of Perceptual Conditioning upon decoding ability. This study is partially a replication of an earlier study cited (Hawes, 1973). In addition to the replication of the study of the effect of Perceptual Conditioning upon decoding ability of low achievement third graders, this study investigated the effect of Perceptual Conditioning with an added spelling step upon decoding and encoding abilities of low achievement third graders. The .05 level of significance was set for rejection of any hypothesis. The specific hypotheses investigated were:

1. Poor decoders who are trained with the Perceptual Conditioning technique will demonstrate significantly greater improvement in decoding ability than will students of like ability who are trained with educational reading games.

2. Children with poor decoding and encoding abilities who are trained through Perceptual Conditioning with an added spelling step will demonstrate significantly greater improvement in encoding ability than will students of similar ability who are trained with Perceptual Conditioning or with educational reading games.

METHOD

Subjects

Subjects for this study were selected from third grade classes at an elementary school in New Mexico. Subjects were referred to the investigator by their regular classroom teachers. Teachers referred students who were thought to be significantly below their peers in reading and spelling abilities. Each of the 30 children referred was administered the word recognition list of the Diagnostic Reading Scales developed by Spache (1963). The criteria for being considered below grade level for this study was a score at or below a grade level score of 3.8 on this measure. Of the 30 children tested, 25 scored from grade levels 1.0 to 3.8. Five of the children scored above the criteria level and were consequently eliminated from the sample. By randomly eliminating one of the children, a sample of 24 children, eight for each of two experimental groups and eight for the control group, was formed. This allowed for children of each treatment condition to be instructed in groups of identical size.

A description of the experimental groups and control group by sex, age, and cultural origin is found in Table 1. Grade level placement on the pretest measures and training session attendance records are given in Table 2.

Instruments

Pretest-posttest instruments included the word recognition

TABLE 1

Description of Experimental Groups and Control Group by Age, Cultural Origin, and Sex

	Group		
Descriptor	Experimental 1	Experimental 2	Control
Age			
Mean	9 yrs. 0 mo.	9 yrs. 1 mo.	8 yrs. 11.2 mos.
Standard Deviation	5.13 mos.	2.20 mos.	4.79 mos.
Cultural Origin			
Spanish surname	4	4	1
Native American	0	0	1
Other	4	4	6
Sex			
Males	6	2	5
Females	2	6	3

lists of the Diagnostic Reading Scales developed by Spache (1963) and a written spelling test consisting of the words on the spelling supplementary test of the Gates-McKillop Reading Diagnostic Tests (Gates and McKillop, 1962).

The word recognition lists from the Diagnostic Reading Scales were designed to test ability in word recognition and analysis. These skills correspond closely with the decoding skills described in this study. The reported "Kuder-Richardson Formula 21" coefficients of the word recognition lists are .96 for list one, .87 for list two, and .91 for list three (Spache, 1963). These coefficients were obtained by the test-retest method at intervals of from four to ten weeks. Concurrent validity with the California Reading Test (Tiegs and Clark, 1957) was reported to be .92 at the third grade level (Spache, 1963). This coefficient was calculated by the Pearson Product Moment procedure.

Training Procedures

Steps in the Perceptual Conditioning (Glass, 1971a) training procedure are as follows:

1. Individual words were exposed to the students. If the student did not recognize the word instantly, the investigator sounded the word. The children were instructed to look at the word at all times. They were told not to look away or at the instructor.

2. One whole word was exposed. Parts of words were never covered up to help in identifying letter clusters.

3. The investigator directed the students to examine the

words in a way that would encourage the development of auditory and visual sets. Two questions were used in directing the investigation of words: "What letters make (what) sounds?" "What sounds do (these) letters make?" For example, in the word smart, what letters make the /sm/ sound? What letters make the /art/ sound? What sound is made by /sm/? What sound is made by /art/? The investigator verbally reinforced correct responses on a fixed ratio of 1:1 by saying such things as "good" or "fine".

The procedure involved in training Perceptual Conditioning with the added spelling step was identical to the Perceptual Conditioning Procedure except for the additional spelling step. Approximately half of each training session was applied to Perceptual Conditioning. The remainder of the time was employed in spelling the words which had been studied during the Perceptual Conditioning step. Students were orally presented a word and asked to write it down. If a child was unable to successfully spell a word, the instructor prompted by asking the question, "What letters make (what) sounds?"

Stimulus material used for training Perceptual Conditioning and Perceptual Conditioning with the added spelling step, consisted of 10 sets of 3" by 5" cards with words printed on them. Each set of cards was comprised of from 10 to 15 words, one word per card. Each set of cards consisted of words containing a specific letter cluster. The 10 letter clusters used for training purposes consisted of the first, third, fifth, seventh, ninth, eleventh, thirteenth, fifteenth, seventeenth, and nineteenth most frequently occurring letter clusters according to Glass (1971a).

No word was used in training which occurred on either of the pretest-posttest instruments. A complete list of the words used in the training sessions is given in Appendix A.

The control group training consisted of reading instruction through educational reading games. Games were played according to the published instructions accompanying each game. Game procedures were matched as nearly as possible to the reading ability level of each participating child. Games employed included: Group Sounding Game (Dolch, 1945), Group Word Teaching Game (Dolch, 1944), Take (Dolch, 1953), African Safari Game (Wagner, Warren, and Williams, 1971a), and Sullivanland Game (Wagner, Warren, and Williams, 1971b).

Data Analysis

The Mann-Whitney U test (Popham, 1967) was used to compare pretest-posttest results between the experimental groups and the control group. The Wilcoxon matched-pairs signed-ranks test (Popham, 1967) was used to compare pretest-posttest differences within the control and experimental groups. It was decided prior to conducting the study the .05 level of significance would be used in considering any hypotheses.

Procedure

A pretest-posttest control group design was utilized in this investigation. Pretesting of all subjects was conducted on the two days prior to commencement of the training sessions. Posttesting was completed within three days of the conclusion of the training.

Subjects were randomly assigned to one of three groups, an experimental group (E1) which was trained through Perceptual Conditioning, an experimental group (E2) which was trained through Perceptual Conditioning with an added spelling step, and a control group (C) which was trained through an educational reading games format. Each group of eight subjects was subdivided into two groups of four members each. Each of the six subgroups was instructed by the investigator.

Each group was trained for 15 minutes daily on 20 consecutive school days. Of the 120 individual training sessions, six were conducted by a teacher other than the investigator. The use of an alternate instructor was made necessary by scheduling problems. No group received more than two training sessions from the alternate instructor. Average attendance rate was 18.88 sessions. Nine students missed no sessions, six students missed one, four students missed twice, two students missed three sessions, and two students missed four times.

RESULTS

The purpose of this study was to investigate the effects of decoding training procedure developed by Glass (1971a) on the decoding and encoding abilities of children with low decoding abilities. Additionally, a decoding training procedure was developed by the investigator to discover its effect on decoding and encoding abilities.

A pretest-posttest control group design was used in the investigation. The pretest-posttest instruments included the word recognition lists of the Diagnostic Reading Scales developed by Spache (1963), and a written spelling test composed of words on spelling supplementary test of the Gates-McKillop Reading Diagnostic Test (Gates and McKillop, 1962).

The hypotheses investigated were:

1. Poor decoders who are trained with the Perceptual Conditioning technique will demonstrate significantly greater improvement in decoding ability than will students of similar ability who are trained with educational reading games.

2. Children with poor decoding and encoding abilities who are trained through Perceptual Conditioning with an added spelling step will make significantly greater improvement in encoding ability than will students of similar ability who are trained with Perceptual Conditioning or with educational reading games.

Mean and standard deviations of pretest and posttest measures are given in Tables 2 and 3. Table 3 also gives the mean

and standard deviations of the differences or gains made by each group on the two measures.

Pretest Results

The Mann-Whitney U test (Popham, 1967) comparing the experimental group E1 and the control group on the word recognition lists of the Diagnostic Reading Scale pretest, resulted in a U of 31 which was not significant. A non-significant U of 24 resulted when the Mann-Whitney U test was similarly applied to compare the E2 group to the control group. A non-significant U of 26 resulted when the E1 group was compared to the E2 group.

The Mann-Whitney U test was similarly applied to compare pretest results on the spelling test. Comparison of C to E1 resulted in a U of 31, comparison of C to E2 resulted in a U of 29.5, and comparison of E1 to E2 resulted in a U of 30. None of these U's were found to be significant. A U must be less than 15 or greater than 49 in order to be significant at the .05 level for a one-tailed test, when comparing two groups of eight subjects each. These results indicate that the performance of all groups was similar on both pretest measures.

Posttest Results

Mann-Whitney U tests were calculated in order to compare the experimental groups and the control group on posttest results. Comparisons include posttest data on the test of decoding ability and of encoding ability, and pretest-posttest differences or gain scores on these two measures.

No group was found to differ significantly from any other

TABLE 2

Pretest Means, Standard Deviations[a], and Ranges On the Diagnostic Reading Scales and the Spelling Test; and Training Session Attendance Means

	Group		
	Experimental 1	Experimental 2	Control
Diagnostic Reading Scale Grade Level			
Mean	2.70(1.17)	2.93(0.79)	2.61(1.08)
Range	2.8	2.0	2.4
Spelling Test Raw Score			
Mean	7.25(4.30)	7.13(2.47)	7.25(3.0)
Range	13	8	8
Attendance			
Mean	19.25	18.70	18.70

[a] Number in parentheses represents standard deviation.

TABLE 3

Posttest Means, Standard Deviations[a], and Ranges On the Diagnostic Reading Scales and the Spelling Test; and Means, Standard Deviations, and Ranges Of Differences on Pretest-Posttest Measures

	Group		
	Experimental 1	Experimental 2	Control
Diagnostic Reading Scales Grade Level			
Mean	3.13(1.57)	3.81(1.08)	2.99(1.17)
Range	4.5	3.3	3.2
Differences on Diagnostic Reading Scale			
Mean	.61(.49)	.89(.43)	.38(,25)
Range	1.7	1.2	1.5
Spelling Test Raw Score			
Mean	8.38(5.24)	10.13(2.17)	8.38(7.74)
Range	14	5	10
Differences on Spelling Test			
Mean	1.13(1.55)	3.0(1.15)	1.13(3.18)
Range	5	4	8

[a] Number in parentheses represents standard deviation.

group on posttest comparisons of Diagnostic Reading Scale word recognition list scores. Comparison of C to E1 yielded a U of 32, comparison of C to E2 yielded a U of 27.5, and a comparison of E1 to E2 yielded a U of 32.5. None of these results are significant. To be significant at the .05 level for a one-tailed test comparing two groups of eight subjects each, a U must be less than 15 or greater than 49. All groups performed similarly on the posttest measure of decoding ability. This finding does not support hypothesis one.

No group was found to differ significantly from any other group on posttest comparisons of the spelling test scores. Comparison of C to E1 yielded a U of 30, comparison of C to E2 yielded a U of 22, and comparison of E1 to E2 yielded a U of 35.5. All groups performed similarly on the post spelling test. This finding does not support hypothesis two.

Pretest-posttest differences or gains in decoding ability were compared by use of the Mann-Whitney U. A non-significant U of 31 was calculated for comparison between C and E1 of decoding test gains. Comparison of C to E2 gains yielded a non-significant U of 18.5. Also non-significant was the U of 20 calculated by comparison of reading gains of E1 and E2. All groups produced relatively similar gains in reading test score. On the basis of these results, hypothesis one is rejected.

Comparison of spelling test gains between C and E1 yielded a non-significant U of 34.5. A U of 13 was yielded by comparison of spelling test gains between E1 and E2. This U is significant at the .025 level for a one-tailed test. A U of 3.5 was

calculated by a comparison of C to E2 spelling test gains. This U is significant at the .001 level for a one-tailed test. These results lend strong support to the hypothesis that Perceptual Conditioning with the added spelling step improves spelling ability significantly better than Perceptual Conditioning or educational reading games.

Within group pretest-posttest differences were evaluated by use of the Wilcoxon matched-pairs signed-ranks test (Popham, 1967). Reading test score differences for the control group yielded a T of 1.0. This score is significant at the .01 level for a one-tailed test. The E1 group reading gains yielded a T of 1.0 which is significant at the .01 level for a one-tailed test. The reading gains for the E2 group resulted in a T of 0 which is significant at the .005 level for a one-tailed test. All groups made significant gains in decoding ability. The more highly significant gains made by the E2 group suggests that the added spelling component may have facilitated reading achievement.

Spelling gains were likewise evaluated by use of the Wilcoxon matched-pairs signed-ranks test. Control group spelling gains yielded a T of 3.0 which is significant at the .025 level for a one-tailed test. E1 spelling gains yielded a T of 2.0 which falls at the .01 level of significance for a one-tailed test. Spelling gains made by the E2 group yielded a T of 0 which is significant at the .005 level for a one-tailed test.

In summary, all groups were found to have made significant gains in both decoding and encoding abilities. Spelling gains

made by the E2 group were significantly greater than gains made by either of the other two groups, although all groups were found to have performed similarly on posttest measures.

DISCUSSION

The purpose of this study was to investigate the effects of two decoding training procedures, Perceptual Conditioning and Perceptual Conditioning with an added spelling step, upon the decoding and encoding abilities of low achievement students. Specifically, this study tested the hypotheses that:

1. Poor decoders who are trained with the Perceptual Conditioning technique will demonstrate significantly greater improvement in decoding ability than will students of similar ability who are trained with educational reading games.

2. Children with poor decoding and encoding abilities who are trained through Perceptual Conditioning with an added spelling step will make significantly greater improvement in encoding ability than will students of similar ability who are trained with Perceptual Conditioning or with educational reading games.

Two conclusions can be drawn from the results. First, the significantly high Mann-Whitney U tests, comparing E2 with C and E2 with E1, indicate that the subjects receiving training through Perceptual Conditioning with an added motor component made significantly greater gains in encoding ability than did groups receiving other treatments. The second hypothesis was not rejected.

The second conclusion is that Perceptual Conditioning was not found to improve decoding ability significantly better than

educational reading games. Mann-Whitney U scores comparing group differences on pretest and posttest measures and scores comparing decoding gains lead to the rejection of the first hypothesis.

An additional finding is that each of the three treatment conditions tested yielded significant improvement in both decoding and encoding abilities.

Implications

The results of this study clearly suggest that each of the three training procedures investigated, Perceptual Conditioning, Perceptual Conditioning with an added spelling step, and educational reading games, are useful in teaching decoding and encoding to third grade students with below average reading ability. That one of these three procedures is clearly superior to any other in its usefulness in training decoding is not suggested. Although decoding gains for E1 and E2 appear to be greater and more consistent than those made by C, no trend of significantly greater gains may be inferred from this data.

The findings of this study concur with previous studies (Glass and Cohn, 1970; Glass, 1971b; Hawes, 1973) that demonstrate significant gains in decoding ability through the Perceptual Conditioning procedure. The average of 1.5 grade levels improvement reported by Hawes is somewhat higher than the average of .61 grade levels improvement reported by this study.

One contributing factor to the rejection of hypothesis one is the suprisingly large gain in decoding ability made by the control group. These gains may be partially accounted for in

terms of the control group members' attitude toward the training program. In the school where this investigation was conducted, movement of students between classrooms for instruction is not greatly unusual. The students involved in this project became quickly accustomed to having a special training session every day with the investigator. The newness of the situation, and the excitement of the students quickly waned. However, the control group, playing games during instructional time, seemed to feel that they were doing something very special. They appeared to demonstrate greater enthusiasm for the project than did members of E1 or E2. Conceivably, this more enthusiastic attitude could have been partially responsible for the greater than expected results.

Another implication of the study is that the E2 training condition is a more efficacious procedure for training encoding than either of the other two procedures tested. The use of Perceptual Conditioning with the added spelling step yielded significantly greater gains in encoding ability and at least as great gains in decoding ability as the other two procedures. This greater effect on encoding may be accounted for in several ways. First, children were given spelling practice in a manner which most nearly resembled the spelling test situation. Second, the use of the writing step brought into use an additional modality of sensory input. Third, the use of the extra spelling step tended to add interest to the training session by giving variety to each daily session, providing each child with direct personal feedback from the instructor, and by providing a tangible demonstration of their success.

The finding that spelling skill was improved by E1 and C training conditions, but was best improved by the E2 training, concurs with the work of Stauffer (1958), Figural (1964), Russell (1943), and others who found that decoding instruction which emphasizes word analysis and the similarity of phonemic elements most nearly aid spelling ability.

Limitations

This study was not controlled for variables related to the subjects' socioeconomic status, sex, intelligence, or learning disabilities. Although subjects were randomly assigned to treatment conditions, more girls were assigned to the E2 treatment condition than to either of the other two groups. It appears, however, that the girls' gain scores are evenly distributed among the total population, suggesting that sex distribution had only minimal effect on the results of the investigation. Anecdotal data collected from the subjects' teachers suggest that variables such as age and learning disabilities may have been operative factors related to levels of gains made.

Concluding Comments

The results of this research project suggest that Perceptual Conditioning is a useful procedure for training decoding, but it is not suggested that this procedure is more efficacious than use of educational reading games. Perceptual Conditioning with an added spelling step was found to yield the most significant gains in encoding ability of any procedure tested.

The Perceptual Conditioning procedure is a useful technique,

but it has some disadvantages. The technique is an extremely repetitive process which can be experienced as boring by both students and teachers. It should be employed within a creative milieu which provides for student motivation without violating the conditioning effect of the procedure. Perceptual Conditioning performance may be maintained by external contingencies. Perceptual Conditioning could be employed in an integrated language arts program, in which the letter clusters studied could be reinforced in decoding and encoding study as well as in reading and writing study.

Further research should be conducted to clarify the effects of Perceptual Conditioning and its relationship to decoding and encoding abilities. Research could be conducted to investigate:

1. The effects of Perceptual Conditioning when used with diagnosed learning disabled children.

2. The relationship of age, grade placement, or reading ability level to efficacy of Perceptual Conditioning.

3. The relationships of individual differences, such as language dominance or cultural background, to Perceptual Conditioning.

4. The relationship of length of Perceptual Conditioning training to decoding ability gains.

APPENDIX A

List of words used in

"Perceptual Conditioning"

Training Sessions

ing	ed	ar	or	ai
using	moved	jar	born	mailbox
sting	turned	arms	horn	gaily
bring	gazed	mark	for	daisy
taking	seemed	large	torch	maid
baking	refused	far	sort	grain
rolling	belonged	dark	forty	nails
flying	blazed	hardly	corn	wait
wishing	tired	yard	thorn	explain
frying	paused	march	coral	raise
driving	pulled	smart	decorations	paid
sitting	surprised	part	porch	waist
drifting	rescued	sharp	fort	chain
humming	loved	star	forgot	pail
pulling	rolled	bark	storm	train

ow	oo	oo	oa	ay
row	smooth	cook	oak	lay
lowest	spoon	hood	coax	way
snowball	booth	wool	goat	Monday
blow	choose	book	boat	play
slowly	droops	cooking	loan	say
owns	roof	soot	moat	pay
low	loop	cookies	cocoa	playing
grow	moon	brook	throat	spraying
pillow	pool	shook	toasty	holiday
know	cool	nook	float	maybe
blown	goose	took	toad	stay
bowl	school	hook	soap	sway
grown	food	stood	load	gray
thrown	zoo			
	spool			

APPENDIX B

Individual Pretest and Posttest Data

On the Diagnostic Reading Scales and

The Spelling Test.

INDIVIDUAL RAW SCORES AND GRADE LEVEL

PLACEMENT ON THE DIAGNOSTIC READING SCALES

Group					
Experimental 1		Experimental 2		Control	
Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
89	128	87	118	76	90
3.8	5.5	3.8	5.5	3.8	4.5
72	95	70	100	71	74
3.8	4.5	3.8	4.5	3.8	3.8
73	95	69	79	66	74
3.8	4.5	3.3	4.5	3.3	3.8
68	74	65	75	54	71
3.3	3.8	3.3	3.8	3.3	3.8
61	65	59	75	37	56
2.8	3.3	2.8	3.8	2.3	3.8
26	37	55	71	29	34
1.8	2.3	2.8	3.8	1.8	2.3
11	15	30	37	14	19
1.3	1.6	1.8	2.3	1.6	1.6
3	2	28	36	2	5
1.0	1.0	1.8	2.3	1.4	1.3

INDIVIDUAL SPELLING TEST RAW SCORES

Group					
Experimental 1		Experimental 2		Control	
Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
14	15	11	13	12	14
10	14	9	13	11	8
10	11	9	11	8	10
8	10	7	11	8	8
7	9	6	8	5	13
6	5	6	8	5	5
2	2	6	8	5	5
1	1	3	9	4	4

APPENDIX C

Informed Parental Consent Form

Dear Parents:

I am a graduate student at the University of New Mexico, and I am currently working on my Master's thesis. I request your consent for the participation of your child in a study which will measure the usefulness of two instructional methods for teaching reading and spelling.

Every child in the study will be tested to measure his reading and spelling ability. The tests to be used are parts of the Diagnostic Reading Scale and parts of the Gates-McKillop Reading Diagnostic Tests. These are both commonly used tests of reading and spelling achievement. The children will be taken out of the regular classroom for testing. Total testing time should be between five and fifteen minutes. Results of the tests will be assigned a code number. Anyone examining test results will see only the code number and not the child's name.

After the children are tested, children will receive instruction in reading and/or spelling. Children will be instructed by me in groups of three children of their own age and ability level. Instruction will be for fifteen minutes on twenty consecutive school days. Children will be instructed in one of three manners: 1) flash card instruction in which the students will be directed to identify parts of words; 2) flash card instruction in which children will be directed to identify parts of words and will be asked to write words; 3) reading and spelling instruction introduced through an interesting educational games format. At the end of twenty days, children will be retested on the same tests previously given, so that improvement in reading can be seen.

If you have any questions regarding this project, please feel free to contact James D. Hall at 268-6537. Additionally, I am available at Elementary School from 8:00 to 9:00 a.m. on April 7,8,or 9 or by appointment.

Your response to this request will be most appreciated. Please read and complete the following consent form, indicating your permission for your child to participate in the study. I will be happy to share with any interested parent the final results of this study. Thank you.

Yours truly,

James D. Hall

James D. Hall

NOTE: In order to maintain the privacy of the subjects, the name of the elementary school was deleted.

CONSENT FORM

I understand that all information will be held in the strictest confidence. I understand that the participation in the study is voluntary and that my refusal will in no way cause my child to be discriminated against. I understand that this study has been approved by the Albuquerque Public Schools.

I, _____ (name of parent), hereby (give, do not give) permission for my child, _____ (name of child), to be included in the study to be conducted by James D. Hall.

Signed, _____ (name of parent or guardian)

Date, _____

I would like to receive an abstract of this study. (yes/no)

REFERENCES

Betts, E. A. Phonics: Practical considerations based on research. Elementary English, 1956, 33, 357-371.

Burton, E., and Glass, G. G. Students' conception of their decoding skill. Unpublished paper presented at the Education Research Conference, 1968.

Dolch, E. Group Word Teaching Game. Champaign, Illinois: Garrard Publishing Company, 1944.

Dolch, E. Group Sounding Game. Champaign, Illinois: Garrard Publishing Company, 1945.

Dolch, E. Take. Champaign, Illinois: Garrard Publishing Company, 1953.

Felsten, E. Non-English speaking children and learning to read. English Record, 1973, 3, 93-97.

Fernald, G. M. Remedial Techniques in Basic School Subjects. New York: McGraw-Hill, 1943.

Gates, A., and McKillop, A. S. Gates-McKillop Reading Diagnostic Tests. New York: Teacher's College Press, 1962.

Gibson, E. J., Osser, H., and Pick, A. A study of the development of grapheme-phoneme correspondence. Journal of Verbal Learning and Verbal Behavior, 1963, 2, 142-146.

Gibson, E. J., Pick, A., Osser, H., and Hammond, M. The role of grapheme-phoneme correspondence in perception of words. American Journal of Psychology, 1962, 75, 554-570.

Glass, G. G. Perceptual Conditioning for decoding: Rationale and method. In B. Bateman, (Ed.), Learning Disabilities, Vol. 4, Reading. Seattle: Special Child Publications, 1971a.

Glass, G. G. Decoding only? -- The effectiveness of two programs (one developmental, one remedial) designed specifically to teach decoding utilizing a decoding-only strategy. 1971b. (ERIC Document Reproduction Service No. ED 052 903)

Glass, G. G., and Cohn, M. L. The effect of Perceptual Conditioning upon the decoding ability of elementary school pupils utilizing trained para-professionals as the primary instructors. 1970. (ERIC Document Reproduction Service No. ED 042 574)

Hawes, E. G. The Effects of Perceptual Conditioning on the Ability to Learn New Words Among Children with Low Reading Ability. Education Specialist Thesis, University of New Mexico, 1973.

Horn, T. D. The effect of the correct test on learning to spell. The Elementary School Journal, 47(5), 277-285.

Horn, T. D. Spelling. In R. E. Ebel (Ed.) Encyclopedia of Educational Research. Toronto: Macmillan Co., 1969.

Lerner, J. W. Children With Learning Disabilities. Boston: Houghton Mifflin Company, 1971.

Mason, G. D. Word discrimination and spelling. Journal of Educational Research. 1957, 50(8), 617-627.

Morrison, I. E., and Perry, I. F. Spelling and reading relationships with incidence of retardation and acceleration. Journal of Educational Research, 1959, 52(6), 222-227.

Plessas, G. P., and Ladley, D. M. Spelling ability and poor reading . Elementary School Journal, 1963, 63(7), 404-408.

Plessas, G. P., and Pelly, W. T. The spelling plight of poor readers. Elementary English, 1962, 39(5), 463-465.

Popham, W. J. Educational Statistics Uses and Interpretations. New York: Harper and Row, Publishers, 1967.

Robeck, M. C., and Wilson, J. Psychology of Reading: Fundamentals of Instruction. New York: John Wiley & Sons Inc., 1974.

Russell, D. H. A diagnostic study of spelling readiness. Journal of Educational Research, 1943, 37(4), 276-283.

Spache, G. D. Diagnostic Reading Scales. Monterrey, California: McGraw-Hill, Inc., 1963.

Spache, G. D., and Baggett, M. What do teachers know about syllabication rules? The Reading Teacher, 1965, 19(2), 96-99.

Strang, McCullough, and Thraxler The Improvement of Reading. New York: Macmillan, 1967.

Stauffer, R. G. The relationships between reading and spelling. Education, 1958, 79(4), 206-210.

Tiegs, E. W., and Clark, W. W. California Reading Test. (1957 ed.). Monterrey, Ca.: California Test Bureau, 1957.

Wagner, F. P., Warren, E., and Williams, M. African Safari Game, Palo Alto, California: Behavioral Research Laboratories, 1971a.

Wagner, F. P., Warren, E., and Williams, M. Sullivanland Game, Palo Alto, California: Behavioral Research Laboratories, 1971b.