RECOGNITION OF VOWEL SOUNDS AS A FUNCTION OF PHONEME-GRAPHEME CONTEXT

by

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ABSTRACT

The effects on vowel recognition of long vs. short vowel sounds presented in isolation as opposed to within the context of beginning and ending phonograms were investigated. Subjects were 90 first- and 90 second-grade pupils who were classified as high, average, or low with respect to reading ability. The Gates-MacGinitie Reading Test, 1978, Canadian edition, was used to designate reading ability.

The experimental task was comprised of a Vowel-Discrimination Test designed for the study. It contained 14 subtests which corresponded to the treatment conditions in the experiment. For every item on each of the 14 tests, subjects were required to listen to the examiner pronounce either a long or a short vowel sound. The auditory presentation was varied so that the vowel sound was pronounced in isolation, in a beginning phonogram (for example, pa) or in an ending phonogram such as (ap). Following the auditory presentation of the vowel sound, each subject was required to select the vowel that had been pronounced from an array of five vowel letters that was graphically presented on a response sheet. This graphic presentation was varied to include vowel letters printed in isolation or imbedded in a beginning or ending phonogram. An example of a response item for each of these variations follows: a-e-i-o-u (Isolation; ep ap op ip up (Ending Phonogram); and pu pe pa po pi (Beginning Phonogram).

The performance of each subject on the Vowel Discrimination Test was determined by calculating the proportion of items correct for each of the 14 test conditions.

The following results were found for the short vowel tests. (1) The main effect of grade level was not significant. (2) Performance was superior when short vowel sounds were pronounced in isolation as opposed to in a phonogram, either beginning or ending. (3) When short vowel sounds were pronounced in beginning vs. ending phonograms, recognition performance was better under the ending phonogram condition for grade-two subjects only. (4) Given that a short vowel sound was pronounced in an ending phonogram, recognition performance was better when vowel letters were graphically presented in isolation. However, this enhanced performance was restricted to grade-two subjects. Grade-one subjects performed equally well under both conditions. (5) When a short vowel sound was pronounced in a beginning phonogram, recognition performance was better if the graphic presentation was a vowel letter printed in isolation. (6) Given that a short vowel sound was pronounced in isolation, enhanced recognition performance, when vowel letters were also printed in isolation, was restricted to grade-one subjects of average and low reading ability.

Analysis of the long vowel data revealed the following findings. (1) The main effect of grade level was not significant. However, the main effect of ability level was significant. The effect for ability level was attributable almost entirely to the difference among grade-one students. (2) Subjects performed better when long vowels were pronounced in beginning vs. ending phonograms. (3) When long vowel sounds were pronounced in isolation, recognition performance was better when the

vowel letters were graphically presented in isolation as contrasted with beginning and ending phonograms.

The following conclusions may be drawn from these findings. (1) Long vowel sounds are more easily recognized than short vowel sounds. Therefore, long vowel instruction should perhaps precede short vowel instruction. (2) The phonogram is not the easiest unit in which to recognize vowel sounds. Recognition performance was usually better when the vowel sounds were pronounced in isolation rather than in beginning or ending phonograms.

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CHAPTER I

INTRODUCTION AND REVIEW OF THE LITERATURE

Phonics

In reading education there has never been a subject that has generated more controversy among professionals and laymen than has the subject of phonics. The controversy over the role of phonics in reading instruction has been reflected by reams of professional journal articles and popular periodical coverage. The differences of opinion have to do with the importance of teaching phonics. Some authors contend that reading difficulties (even the decline of educational standards) are due to a failure to teach phonics or to teach "enough" or the "right kind" of phonics.

Harris and Sipay (1975) define phonics as "the study of the relationship of phonemes to the printed or written symbols that represent them (letters and letter strings, called graphemes) and their use in discovering the pronunciation of printed and written words. Phonics is therefore, the part of phonology and phonetics that is most involved in reading instruction" (p. 61).

Phonics is sometimes referred to as a "method" of reading instruction. It has frequently been cited as the "best method" of teaching reading. A good example of this attitude is found in the book Why Johnny Can't Read. Flesch (1955) states that "as soon as you switch to

the common-sense method of teaching sounds of letters, you can give them a little primer and then proceed immediately to anything from the Reader's Digest to Treasure Island" (p. 14).

Most reading specialists and researchers are less enthusiastic in their assessments of the importance of phonics in reading instruction. It is generally agreed that phonics is only one of many means that a reader employs to decode words. Some writers have cautioned that phonics should not be considered a "method" of teaching reading, but rather, phonics should be perceived as one of several cues available to the reader as an aid to word recognition (e.g., Artley, 1977).

Some of the controversies that educators have attempted to resolve have had to do with whether or not phonics should be taught, when to teach it, how much should be taught, what instructional sequences ought to be followed and what method of instruction should be employed.

Numerous volumes have been written in an attempt to answer these questions. The research that has been conducted in an effort to resolve the issues is considerable. The experimental findings, however, have been often contradictory and inconclusive (Spache, 1976). The phonics-teaching practices that are discussed in reading methodology texts are diverse, conflicting, and sometimes lacking empirical validation. Authors of instructional reading programs and workbooks vary widely in terms of their approaches to phonics instruction. This lack of consistency is particularly evident in the diversity of practices recommended for teaching vowel sounds.

Teaching Vowel Sounds

Vowel sounds have long been considered to be the most difficult aspect of phonics to master. This difficulty is usually attributed to the wide variety of spellings used to represent these sounds in the English language. Authors of reading texts and journal articles often cite examples of the complexities and inconsistencies of vowel sounds. Horn (1954) demonstrated the variability of these sounds by pointing out that there are at least 22 different ways to represent graphically the short "i" sound in English. Anderson (1964) suggested that there are at least 300 different graphic representations of approximately 17 vowel phonemes.

Teachers have sought new techniques to diminish the difficulty that this aspect of English orthography poses during beginning reading instruction. The most commonly used practices appear to be based on conventional wisdoms or time honored traditions. Few of the proposed practices or published instructional programs appear to be soundly supported by research findings. Thus, many of the instructional methods and materials suggested for teaching vowel sounds may be of questionable value.

The proposals for teaching vowel sounds are numerous and varied. Each advocate of the various techniques claims that his preferred method lessens the difficulty of vowel learning. Some of these approaches include: (1) color coding the vowels (Gattegno, 1962); (2) regulating the reading vocabulary in an effort to introduce only one vowel sound at a time--e.g., Nan has a tan fan (Bloomfield & Barnhart, 1961); (3) altering the orthography to establish a one-to-one phoneme-grapheme correspondence (Downing, 1965); (4) teaching vowels only within the

context of the ending phonogram (Durrell & Murphy, 1972; Wylie & Durrell, 1971); (5) teaching rules and/or mnemonic devices regarding the pronunciation of vowel sounds (Ingham, 1969); (6) diacritical marking systems (Fry, 1961). The research findings as to the relative effectiveness of these programs are not clear. Thus, one phonic instructional system has not been shown to have a distinct advantage over the others (Harris & Sipay, 1976).

Many educators have relied on the teaching of rules in an attempt to help pupils sort out the variable pronunciations of vowel sounds. These rules have been emphasized in the belief that they facilitate word recognition by providing students with a systematic approach to decoding vowels. The effectiveness of such an approach to vowel learning continues to be unquestionably accepted by many teachers as well as by the publishers of a wide variety of phonics workbooks. Common teaching practices continue to reveal a reliance on rule learning as an important part of vowel instruction, especially during the primary grades. A few of the most frequently taught rules include the following time honoured examples:

1. When two vowels go walking the first does the talking and has the long sound.
2. "E" at the end makes the first vowel say its name.
3. When a single vowel is in the middle of a one-syllable word, the vowel has the short sound.

Many investigators have attempted to assess the value of rules such as these in teaching the pronunciation of vowel sounds. Much of the research has focused on determining the reliability of such rules when they are applied to the reading vocabulary encountered in basal

reading textbooks. The most frequently cited studies are those of Bailey (1967), Clymer (1963), and Emans (1965). These authors investigated the utility of phonic rules commonly found in basal reading series. They tested the reliability of the rules as they were applied to the vocabulary taught in several commonly used reading texts at both the primary and the intermediate grade levels. Each of a total of 45 rules was assessed in the combined studies of these authors. Of these 45 rules, 24 related specifically to vowel sounds. Only 8 of the 24 vowel rules were found to be reliable so much as 75% of the time. Clymer (1963) arbitrarily determined that a rule can be considered useful if it is applicable to 75% of the words that are used in an instructional program.

The results of studies of this nature illustrate the lack of agreement that can exist between research findings and commonly accepted teaching practices. It should also be noted that the results of several studies which were conducted to assess teachers' knowledge of phonic rules revealed that many teachers, themselves, do not know the rules that are frequently taught to students (Aaron, 1960; Farinella, 1960; Gagnon, 1960; Ramsey, 1962; Schubert, 1959).

The Role of the Phonogram in Reading Instruction

Educators are not in agreement regarding the role of the phonogram (or syllable) in reading instruction. Groff (1981) reviewed the issues involved in the controversy over the usefulness of the phonogram. He noted that some proponents of syllable or phonogram learning such as Jones (1970) and Rozin and Gleitman (1977) contend that the syllable should be the initial unit of reading instruction. These authors suggest that the difficulty of learning to read can be eased for beginning readers if

the syllable-phoneme correspondences are introduced and developed prior to the teaching of the individual grapheme-phoneme correspondences.

The rationale for the initial teaching of syllables or phonograms is based on the a priori notion that the instructional sequence for "decoding" or "segmenting" written language should approximate the order in which children learn to segment spoken language. The results of several studies that were conducted to assess the ability of young children to segment oral language suggest that young children find the syllable segmentation of oral language to be a much easier task than phoneme segmentation (Fox & Routh, 1975; Liberman et al., 1974; Rozin & Gleitman, 1977).

In the study of Liberman et al., four, five, or six year old children were instructed to repeat a word pronounced by the examiner. The children were then asked to tap out the number of segments in each word. Results indicated that at each age level phoneme segmentation was the more difficult task. Test items were more easily segmented into syllables than phonemes.

Many educators do not agree with the syllable advocates' conceptualization of beginning reading instruction. They contend that the evidence is not sufficiently strong to support the teaching of phonograms either as the initial unit of reading instruction or as an aid to word recognition (Canney & Schreiner, 1976, 1977; Durkin, 1976; Goodman, 1973; Harris & Sipay, 1979; Smith, 1978). Thus, the issue as to the usefulness of the phonogram in teaching reading is by no means resolved. The findings of the studies which were conducted to assess its usefulness are not always in agreement. This may be due to the wide variety of subjects, tasks, and procedures which were used in the

various investigations.

For example, Hoisington (1969) investigated the effectiveness of vocabulary teaching, which emphasized syllable instruction, on the reading performance of sixth-grade students. Results indicated that vocabulary and spelling performance was not enhanced, as measured by the Metropolitan Achievement Test. However, there was a significant difference in reading ability between the control group and the experimental group on the reading comprehension subtest. Subjects in the experimental group performed better on the comprehension subtest than those students who received no systematic vocabulary teaching which emphasized syllabication.

Murai (1975) investigated the effectiveness of the syllable versus the phoneme as an initial unit of phonic instruction. Subjects were 32 children ranging in age from four to six years. Results indicated that there was no difference in performance on a transfer word-recognition task between subjects who were trained in the recognition of syllables and those who received training in individual letter phonemes. On the basis of his results Murai suggested that teachers should be cautious about favoring one instructional unit over another, e.g., syllable training versus phonemes in isolation.

Canney and Schreiner (1976, 1977) assessed the effectiveness of phonogram training on 108 second-grade pupils of high, average, and low reading ability. Results indicated that phonogram training did not significantly improve the word attack skills or reading comprehension of the subjects.

Attempts to demonstrate the effectiveness of phonogram learning on general word recognition ability or reading comprehension have not

yielded results that are conclusive. Despite the lack of agreement over the role of the phonogram in reading instruction it continues to be a commonly accepted instructional unit. The advisability of teaching phonograms is not unchallenged. Durkin (1976) cites the concerns of many educators regarding the use of the ending phonogram as a unit of instruction. These concerns are:

1. Improper eye movements may be cultivated by encouraging students to orient to the ends of words.
2. Training in ending phonograms may have little transfer to word recognition, especially with regard to multi-syllable words.
3. Rhyming phonograms are infrequent in multisyllabic words.
4. Certain children may not be able to focus on the sound that is being studied when it is presented in a larger unit such as a whole word or a phonogram. They may require more isolated and explicit identification of the sound that is being studied.

Teaching Vowels in Phonograms

Wylie and Durrell (1971) attempted to validate the usefulness of the ending phonogram as a means of facilitating vowel learning in beginning reading instruction. On the basis of their investigation, they concluded that the phonogram is the best unit of instruction for teaching beginning readers vowel sounds. These authors assessed the ability of grade-one students to identify vowel sounds as a function of whether the examiner pronounced the vowel in isolation or whether he pronounced it in a short vowel phonogram.

Two-hundred and thirty first-grade children of average reading ability were assessed in the month of May on a 32-item test. The experimental procedure required that the students be presented with a 35-item test sheet comprised of short vowel phonograms. Each test item printed on this sheet consisted of five phonograms in which only the vowel varied. For example, consider the following two items:

1. ack ick ock eck uck
2. ed id ud od ad

Subjects were required to identify whole phonograms by being told, for example, to "circle the one that says ock." (The entire phonogram was pronounced.) The ability to identify vowel sounds in isolation was assessed by using the same test sheet the following day. This time, however, the examiner instructed the children to look at the array of phonograms and to "circle the one that has an 'o' in it." (The short sound of the letter "o" was pronounced in isolation.) The mean score for identifying the vowel sound pronounced in a whole phonogram was significantly higher than that for identifying vowel sounds pronounced in isolation. On the basis of these results, Wylie and Durrell concluded that vowel sounds should not be isolated for instructional purposes and that these sounds should be taught within the context of the ending phonogram. Further, the authors concluded that the ending phonogram is the preferred instructional unit for teaching vowel sounds as it "stabilizes" the vowel sound. That is, the letters which follow a vowel determine the pronunciation that the vowel should have.

The General Problem

The recommendations of Wylie and Durrell should perhaps be viewed cautiously. There are several methodological considerations which limit the instructional implications of these data. First, because of the procedure used to select subjects, the findings can be generalized only to grade-one students of average reading ability. Second, although short vowels only were assessed on this experimental task, the authors generalized the findings to the teaching of all vowel sounds. Third,

the design of the experimental task was such that only the auditory presentation of the vowel sound was varied. That is, short vowel sounds were pronounced by the examiner in isolation and within the framework of a short vowel phonogram. However, the ability of the subjects to identify the sound that was pronounced was always assessed by requiring students to find the sound in an ending phonogram. Thus, subjects were never visually presented with vowels in isolation. That is, the response mode was not varied to include vowels written in isolation as well as vowels imbedded in phonograms. (E.g., a-e-i-o-u, as well as ack-eck-ick-ock-uck.) Fourth, vowel sounds were not presented in beginning phonograms so as to allow an assessment regarding the accuracy of vowel recognition in the ending phonogram as well as the beginning phonogram.

The present study was a partial replication of and an extension of the work of Wylie and Durrell (1971). The basic experimental task was the same. Subjects were required to identify the vowel sound that the examiner pronounced by circling the correct vowel letter from an array of letters printed on a response sheet. However, the response mode was varied to include vowels printed in isolation as well as vowels imbedded in beginning and ending phonograms. This is a major extension of the Wylie and Durrell experimental procedure. The study is more expansive in that subjects were classified with respect to <u>two</u> grade levels (first and second) and <u>three</u> levels of reading ability (high, average, and low). The effects of presenting vowel sounds in isolation as opposed to presenting them within the context of a phonogram were investigated for both <u>beginning</u> phonograms (e.g., ba) and <u>ending</u> phonograms (e.g., ab) and <u>long</u> vowel sounds as well as <u>short</u> vowel sounds.

CHAPTER II

METHOD

Subjects

Subjects were selected from two elementary schools in the lower mainland of British Columbia. Each of these schools serves pupils from kindergarten to grade seven. The catchment areas from which the schools draw their pupils are comprised of people whose occupations represent a wide cross section of socioeconomic levels.

Materials

Gates-MacGinitie Reading Test, 1978, Canadian Edition, Levels A and B, Form 1. Each test at the Levels A and B is comprised of a Vocabulary subtest and a Comprehension subtest. The authors of the test describe the Vocabulary Test as a means of assessing decoding skills. It is comprised of 45 test items. Each of these items contains four printed words which are of similar configuration and a picture which illustrates only one of the words. The task is to select the one word that corresponds to the picture for each test item.

The Comprehension Test measures the ability to understand words and ideas within narrative prose. Each of the 40 test items consists of a passage accompanied by four pictures. The passages are arranged in ascending order of difficulty. The task is to select the picture that best illustrates the test passage or that answers a question about

the passage (MacGinitie, 1978). Three scores are usually calculated, one for each subtest and an overall score.

Vowel-Discrimination Test. The Vowel-Discrimination Test was designed for the purposes of the present study. It contained 14 subtests which correspond to the treatment conditions involved in the experiment. The test closely paralleled the instrument constructed by Wylie and Durrell (1971). Further, the method of administration used in the present study closely approximated the procedure used by Wylie and Durrell.

The test is an auditory-visual integration task. That is, for every item on the test, each subject was required to listen to the examiner pronounce a vowel sound. The vowel sound was either long or short. The auditory presentation was varied so that the vowel sound was pronounced either in isolation, in a beginning phonogram, or in an ending phonogram. For example, the short sound of the letter "a" was pronounced is isolation (a), in the beginning phonogram (ba), and in the ending phonogram (ab). Following the auditory presentation of the vowel sound, each subject was required to select the vowel that had been pronounced from an array of five vowel letters that was graphically presented on a response sheet. The manner in which the vowel letters were graphically represented was varied to include vowel letters printed in isolation or imbedded in a beginning or ending phonogram. An example of a response item for each of these variations follows: a-e-i-o-u (Isolation); ep ap op ip up (Ending Phonogram) and pu pe pa po pi (Beginning Phonogram).

For the purpose of this study, the manner of pronunciation of the vowel sound is referred to as the Input Mode (I). The graphic manner

of presentation of a vowel letter is termed the Response Mode (R). The numbers 1, 2, and 3 are used to designate the conditions under which the vowel was presented in each of the modes. Thus, I_1 refers to a vowel pronounced in an ending phonogram, I_2 to one that was pronounced in a beginning phonogram, and I_3 to one that was pronounced in isolation. Similarly, R_1 indicates that the vowel letter was graphically represented in an array of ending phonograms in which only the vowel letter was varied. In the case of R_2, the vowel was printed in an array of beginning phonograms in which only the vowel letter was varied. For R_3, the vowel letters were printed in isolation.

One of the major purposes of the present investigation was to contrast the effectiveness of presenting vowels in isolation, in beginning, and in ending phonograms. Only those short-vowel ending phonograms were selected whose consonant letters could be transposed to the initial position of a phonogram to form a beginning phonogram. Phonograms such as "ing" and "ock" were eliminated as being inappropriate. The letters "ng" and "ck" would not form a phonogram in the initial position of a word, e.g., "ngi" and "cko". Thus, the selection of short-vowel ending phonograms for use as test items was restricted to seven phonogram patterns. The following short-vowel ending phonograms represent the patterns that were used: ish; un; ep; om; ag; ud; and ib.

The Vowel Discrimination Test was comprised of 14 subtests each of which corresponded to a given combination of three levels of the Input Mode (isolation, ending, and beginning phonograms) with three corresponding levels of the Response Mode with two levels of type of vowel sound (long and short). A complete factorial arrangement of I×R for a given type of vowel sound would consist of nine conditions. However, two of

these nine conditions were excluded from the study. One of them was the condition for which the input mode was beginning phonogram and the response mode was ending phonogram. Under this condition the subjects would have been given a set of printed response alternatives such as "ap, ip, op, up, ep" and asked to select the one that corresponded most closely to the vowel sound that they heard in an auditory stimulus such as "pa". The other condition excluded was the one for which the input mode was an ending phonogram and the response mode was a beginning phonogram. Here the subjects would have been shown a set of alternatives such as "pa, pi, po, pu, pe" and asked to choose the one corresponding to an input item such as "ap."

These two conditions may be considered on a priori grounds to represent considerably more complex tasks than the other seven. It was felt that a substantial portion of the subjects might have difficulty ascertaining what they were being asked to do on these two tasks. If the subjects were confused or discouraged by them, their performance on the other tasks might be contaminated. To avoid this possibility, the combinations of I_1R_2 and I_2R_1 were excluded from the design. Presented in Tables 1 and 2 is a brief description of the 14 subtests as well as the number of items included in each of the subtests. A complete copy of the Vowel Discrimination Test is presented in Appendix A.

Design

The study may be conceptualized as a 2×3×2×3×3 incomplete factorial between-within-subject design. The between-subject factors are Grade level (one and two) and Reading ability (low, average, and high). The within-subject factors are Vowel sound (long and short), Input mode

TABLE 1

VOWEL DISCRIMINATION TEST

SHORT-VOWEL SUBTESTS

Test No.	No. of Items	I = Input Mode R = Response Mode
1	14	I = Ending Phonogram R = Ending Phonogram
2	14	I = Isolation R = Ending Phonogram
3	14	I = Ending Phonogram R = Isolation
4	5	I = Isolation R = Isolation
5	14	I = Beginning Phonogram R = Beginning Phonogram
6	14	I = Isolation R = Beginning Phonogram
7	14	I = Beginning Phonogram R = Isolation

TABLE 2

VOWEL DISCRIMINATION TEST

LONG-VOWEL SUBTESTS

Test No.	No. of Items	I = Input Mode R = Response Mode
8	14	I = Beginning Phonogram R = Beginning Phonogram
9	14	I = Isolation R = Beginning Phonogram
10	14	I = Beginning Phonogram R = Isolation
11	5	I = Isolation R = Isolation
12	8	I = Ending Phonogram R = Ending Phonogram
13	8	I = Isolation R = Ending Phonogram
14	8	I = Ending Phonogram R = Isolation

(beginning phonogram, ending phonogram, and isolation), and Response mode (beginning phonogram, ending phonogram, and isolation). The missing cells in the design correspond to I_1R_2 and I_2R_1 at each of the two levels of the Vowel sound variable.

The dependent variable in this investigation was the proportion of correct recognitions of vowel sounds under each of the 14 treatment levels. There were two independent variables, Response Mode and Input Mode. There were three classification variables, grade level, reading ability, and vowel type.

Procedure

Data were collected during the months of May and June, 1981. The Gates-MacGinitie Reading Test was administered to all students in grade one and grade two of the schools included in this study. Testing sessions for all subjects were conducted in the morning. The standard directions for administration were strictly adhered to. A total of 183 grade-one students, in seven classes, were tested during the first two weeks of May. One-hundred and seventy-six grade two students, in seven classes were assessed during the last two weeks of May.

The experimental task (Vowel Discrimination Test) was administered in classroom sessions during the afternoons of the first three weeks in June. To avoid boredom and fatigue on the part of the subjects, this task was administered in two sessions and on separate days. Each session was one hour long with a 20-minute rest period midway through the session. During this rest period the games "Doggy, Doggy, Where's Your Bone?" and "7 Up" were played. The short vowel subtests (1-7) were administered to all classes in session number one. The long vowel subtests (8-14)

were administered in session number two.

The order in which the tests were presented under each level of the dependent variable was counterbalanced to offset the effect of order of presentation. Thus, half the subjects in each grade level received the short-vowel test items in order 1-7. The other half of the subjects received the short-vowel test items in order 7-1. The long-vowel test items were counterbalanced in the same fashion. That is, half the subjects in each of the two grade levels received the long-vowel tasks by taking subtests 7-14 in that order. The other half were administered tests 14-7 in that order. The order of presentation of response alternatives was random. The directions for administering each of the tests and the administrative procedures were the same for all subjects. The examiner visited each classroom and informed the students that they were going to play some listening games. They were told that they were not going to listen to whole words, but rather to parts of words. They were also told that sometimes the examiner would pronounce one letter only and at other times several letters. Examples were given using the short sound of the letter "e" as well as the phonograms "eck" and "ent". Several practice items were placed on the blackboard using the following phonogram patterns:

eck	ick	ock	ack	uck
int	ant	ent	ont	unt

The short vowel sound of the letter "e" was pronounced in isolation as well as within the phonograms "eck" and "ent". Subjects were given practice identifying the correct items. Vowel letters presented in isolation were also printed on the blackboard. The phonograms "eck" and "ent" were again pronounced and children were given practice

identifying the letter that corresponded to the one that was pronounced in the input mode. Subjects were informed that the examiner would visit their classroom on several occasions and that many listening games would be played. Their task would be to "listen carefully" and find the letter or letters that the examiner pronounced.

During each testing session subjects were supplied with a booklet containing the test items for that session as well as a three × eight inch piece of colored construction paper. The purpose of this marker was to ensure that subjects were responding to a test item in the appropriate place on the response sheet.

The standard testing procedure for the Input Mode was as follows:

1. When vowels were pronounced in isolation the examiner (E) said, "Put your marker under line __ . Listen to what I say" (E pronounced either a long or short-vowel in isolation). "Look at line __ . Find the one that says ____ ." (for Response Mode Isolation) or "Find the one that has the sound ____ in it." (for Response Mode Phonograms).
2. When both Input Mode and Response Mode were phonogram presentations subjects were instructed in the following manner: "Put your marker under line __ . Listen to what I say. (E pronounces the phonogram) "Circle the one that says ____ ." (E pronounces the phonogram again). Similarly, under Response Mode-Isolation and Input Mode phonogram the examiner said, "Find the one that you hear in ____ ." (E pronounces phonogram).

Each input mode item was pronounced twice.

Tabulating Results

A score on the Vocabulary Test and the Comprehension Test was calculated for each subject to whom the Gates-MacGinitie test was administered. A total reading score was calculated. For the purposes of this study, each of the total reading scores was then translated to a percentile rank according to the norms in the test manual. The percentile rank was used to categorize subjects on the basis of reading ability. Ranges in reading ability were designated as follows: Good Readers (99th-68th percentiles); Average Readers (67th-34th percentiles); and Poor Readers (33rd-1st percentile).

The performance of each subject on the Vowel Discrimination Test was determined by calculating, for each subject, the proportion of items correct for each of the 14 test conditions. (Number correct divided by the number of items.) Scores were calculated in this manner because each of the 14 subtests did not contain the same number of items. An arbitrary decision was made to include only enough items, in each subtest, to reliably assess the experimental task. This was necessary due to the large number of subtests involved in the experimental condition. Caution was taken to avoid developing a measuring instrument that would be long and potentially fatiguing for participants in the study.

CHAPTER III

RESULTS

The results for long vowel performance and short vowel performance were analysed separately. Due to the lack of variance in some of the long vowel treatment conditions, an analysis of variance could not be conducted on the long vowel data. This lack of variance was due to the large number of subjects who achieved a perfect level of performance on some of the long vowel treatment conditions. Thus, an analysis of variance was performed on the short vowel data and a Chi Square analysis was conducted on the long vowel results.

Short Vowel Recognition Tasks

Presented in Table 3 are mean percent correct responses for the grade-one subjects under the various treatment levels. Shown in Table 4 are the corresponding measures for the grade-two subjects. The percentage of correct responses for each subject under each of the seven short vowel conditions was subjected to arc sine transformation before analysis of variance was applied. Shown in Table 5 is a summary of the analysis of variance.

TABLE 3

GRADE ONE MEAN PERCENT CORRECT FOR

SHORT-VOWEL DISCRIMINATION TESTS

Input Mode	I_1	I_3	II_1	II_3	II_2	II_3	II_2
Response Mode	R_1	R_1	R_3	R_3	R_2	R_2	R_3
Test No.	1	2	3	4	5	6	7
High Ability	95.00	97.14	97.61	98.66	95.00	98.09	93.09
Average Ability	91.66	95.23	92.85	97.33	91.42	94.76	93.33
Low Ability	78.09	79.52	77.38	86.66	78.57	81.42	79.28

TABLE 4

GRADE TWO MEAN PERCENT CORRECT FOR

SHORT-VOWEL DISCRIMINATION TEST

Input Mode	I_1	I_3	I_1	I_3	I_2	I_3	I_2
Response Mode	R_1	R_1	R_3	R_3	R_2	R_2	R_3
Test No.	1	2	3	4	5	6	7
High Ability	98.09	98.88	98.88	98.66	93.88	98.57	96.66
Average Ability	92.85	96.42	96.19	94.66	86.66	92.38	90.71
Low Ability	87.57	91.42	88.81	90.00	83.81	89.99	90.47

TABLE 5

SUMMARY OF ANALYSIS OF VARIANCE OF

SHORT-VOWEL RECOGNITION SCORES

Source	SS	df	MS	F	p
Between Subjects	124.79	179			
Grade Level	1.74	1	1.74	3.22	
Reading Ability	26.45	2	13.22	24.48	$< .001$
GXA	3.26	2	1.63	3.02	
Ss/GXA	93.34	174	.54		
Within Subjects	54.09	1080			
I_1 and I_2 vs. I_3	.70	1	.70	14.00	$< .001$
I_1 vs. I_2	.46	1	.46	6.57	$< .05$
R_1 vs. R_3/I_1	.50	1	.50	10.00	$< .001$
R_2 vs. R_3/I_2	.26	1	.26	5.20	$< .05$
R_1 and R_2 vs. R_3/I_3	1.06	1	1.06	35.33	$< .001$
R_1 vs. R_2/I_3	.05	1	.05	1.67	
I_1 and I_2 vs. I_3 X Ss	9.20	179			
I_1 and I_2 vs. I_3 X G	.03	1	.03	< 1	
I_1 and I_2 vs. I_3 X A	.15	2	.07	1.40	
I_1 and I_2 vs. I_3 X GXA	.03	2	.01	< 1	
I_1 and I_2 vs. I_3 X Ss/GXA	8.99	174	.05		
I_1 vs. I_2 X Ss	12.47	179			
I_1 vs. I_2 X G	.47	1	.47	6.71	$< .05$
I_1 vs. I_2 X A	.31	2	.15	2.14	
I_1 vs. I_2 X GXA	.17	2	.08	1.14	
I_1 vs. I_2 X Ss/GXA	11.52	174	.07		

TABLE 5 (continued)

Source	SS	df	MS	F	p
R_1 vs. R_3/I_1 X Ss	8.99	179			
R_1 vs. R_3/I_1 X G	.37	1	.37	7.40	$<.01$
R_1 vs. R_3/I_1 X A	.13	2	.06	1.20	
R_1 vs. R_3/I_1 X GXA	.04	2	.02	<1	
R_1 vs. R_3/I_1 X Ss/GXA	8.45	174	.05		
R_2 vs. R_3/I_2 X Ss	8.31	179			
R_2 vs. R_3/I_2 X G	.01	1	.01	<1	
R_2 vs. R_3/I_2 X A	.04	2	.02	<1	
R_2 vs. R_3/I_2 X GXA	.10	2	.05	1.00	
R_2 vs. R_3/I_2 X Ss/GXA	8.16	174	.05		
R_1 and R_2 vs. R_3/I_3 X Ss	6.74	179			
R_1 and R_2 vs. R_3/I_3 X G	.21	1	.21	7.00	$<.01$
R_1 and R_2 vs. R_3/I_3 X A	.29	2	.14	4.67	$<.05$
R_1 and R_2 vs. R_3/I_3 X GXA	.14	2	.07	2.33	
R_1 and R_2 vs. R_3/I_3 X Ss/GXA	6.10	174	.03		
R_1 vs. R_2/I_3 X Ss	5.35	179			
R_1 vs. R_2/I_3 X G	.13	1	.13	4.33	$<.05$
R_1 vs. R_2/I_3 X A	.09	2	.04	1.33	
R_1 vs. R_2/I_3 X GXA	.02	2	.01	<1	
R_1 vs. R_2/I_3 X Ss/GXA	5.11	174	.03		
Total	178.88	1259			

Effects of grade level and ability. The main effect of Grade level was not significant. Mean percent correct for grade one was 90.35, while for grade two it was 93.31. The main effect of Ability was significant beyond the .001 level. Mean percent correct for high, average, and low reading ability groups were 97.17, 93.55, and 84.77 respectively. The interaction between grade level and ability level was not significant.

Effect of vowel sounds pronounced in Ending and Beginning Phonograms (combined) vs. Isolation. The effect of I_1 and I_2 combined vs. I_3 was significant beyond the .001 level. Performance was superior when vowel sounds were pronounced in isolation as opposed to in a phonogram. Mean percent correct for I_1 and I_2 combined was 90.34. Mean percent correct for the isolation condition was 93.32. None of the interactions involving I_1 and I_2 vs. I_3 was significant. That is, the ability of subjects to perform better when the vowel was pronounced in isolation vs. in a phonogram did not differ with variations in grade level or reading ability. The effect of I_1 vs. I_2 was significant at the .05 level. Mean percent correct for vowels pronounced in an ending phonogram was 91.27 compared to 89.30 for beginning phonograms. The interaction of I_1 vs. I_2 × Grade level was significant at the .05 level. The tendency of subjects to perform better under the ending phonogram condition was restricted to subjects in grade two. Performance of subjects in grade one did not vary according to the type of phonogram in which the vowel was pronounced. Mean percentage of correct responses for grade-one subjects was 88.77 for I_1 and 88.45 for I_2. Mean percent correct for grade two subjects was 93.77 for I_1 and 90.36 for I_2.

Effect of Response Mode presentation of vowel letters printed in Ending Phonograms vs. vowel letters printed in Isolation when the Input Mode is Ending Phonogram. The contrast of R_1 vs. R_3 within I_1 was significant at the .05 level in favor of R_3. This means that when a short vowel sound was pronounced in an ending phonogram, performance was better when the vowels were graphically presented in isolation than when they were presented in an ending phonogram. Mean percent correct for vowels printed in isolation (R_3) was 90.59 as compared to 88.21 for vowels imbedded in ending phonograms (R_1).

The interaction of R_1 vs. R_3 within I_1 by Grade level was significant at the .01 level. An analysis of the simple main effects for this interaction showed R_1 vs. R_3 differences to be significant only for grade two subjects. Mean percentage of correct responses for grade one subjects were 88.33 for R_1 and 88.57 for R_3. However, the corresponding measures for grade two subjects were 88.10 for vowels printed in ending phonograms (R_1) and 92.62 for vowels printed in isolation (R_3).

Effect of Response Mode presentation of vowel letters imbedded in Beginning Phonograms vs. printing vowel letters in Isolation when the Input Mode is Beginning Phonogram. The effect of R_2 vs. R_3 within I_2 was significant at the .05 level. Mean percentages of correct responses for R_2 vs. R_3 were 90.59 and 91.94. Thus, when the vowel sound was pronounced in a beginning phonogram recognition was better when the response mode was isolation than it was when the response mode was beginning phonogram. None of the interactions involving R_2 vs. R_3 within I_2 was significant.

Effect of the Response Mode presentation of vowels in Beginning and Ending Phonograms (combined) vs. Isolation when the Input Mode was vowel sounds pronounced in isolation. The effect of R_1 and R_2 (combined) vs. R_3 within I_3 was significant at the .001 level. Mean percent correct was 94.33 for vowel letters printed in isolation (R_3) and 92.81 for those in beginning and ending phonograms (R_1 and R_2). There were two significant interactions involving the factor R_1 and R_2 vs. R_3 within I_3. These were R_1 and R_2 vs. R_3 by Grade and R_1 and R_2 vs. R_3 within I_3 by Ability. The interaction with Grade was significant at the .01 level, while that with Ability was significant at the .05 level.

An analysis of the simple main effects for R_1 and R_2 vs. R_3 within I_3 by Grade indicated that the contrast among levels of R was significant for grade-one subjects only. That is, the superior recognition for vowels printed in isolation (R_3) as opposed to in a phonogram (R_1 and R_2) was not observed at the grade two level. The grade-one subjects' score for R_1 and R_2 combined was 91.03, while for R_3 it was 94.22. The corresponding measures for grade-two subjects were 94.06 and 94.45.

An analysis of the simple main effects for R_1 and R_2 vs. R_3 within I_3 by Ability indicates that the effect was significant for Average and Low-Ability subjects but not for High-Ability subjects. For High-Ability subjects mean percent correct for R_1 and R_2 combined was 98.15 and for R_3 it was 98.67. The corresponding measures for the Average and Low-Ability subjects were 94.70 vs. 96.00 and 85.59 vs. 88.33 respectively.

The effect of R_1 vs. R_2 within I_3 was not significant. However, the interaction of R_1 vs. R_2 within I_3 by Grade level was significant at

the .05 level. Mean percentage of correct responses for R_1 vs. R_2 at the grade one level were 90.63 and 91.43 respectively ($p > .05$). The corresponding measures were 95.56 and 93.65 at the grade two level ($p < .05$). Thus, the superior recognition of vowel sounds in an ending phonogram response mode (R_1) was limited to grade two subjects.

Long Vowel Recognition Tasks

Analysis of variance of the data for the long-vowel tasks was precluded by marked heterogeneity of variance. Consequently the analysis was conducted by subjecting the data to a series of orthogonal Chi Square tests that parallel the analysis of variance of the short-vowel data. Shown in Table 6 are mean percent correct responses for the grade one subjects under the various long-vowel treatment conditions. Presented in Table 7 are the corresponding measures for the grade-two subjects. A summary of the analysis is presented in Table 8. All of the values of Chi Square have been corrected for continuity.

Between-subject effects. Analysis of the between-subject effects, that is, Grade, Ability, and Grade by Ability were based upon the number of subjects who performed perfectly on all items of all the seven tasks as opposed to the number of subjects who gave at least one erroneous response. The main effect of Grade level was not significant. The main effect of Ability level was significant at the .01 level. The frequency of subjects who had perfect scores for all of the seven tasks was 12 for the low-ability group, 22 for the average-ability group and 30 for the high-ability group (n=60 for each group).

The interactive effects of G×A were significant ($p < .05$). Analysis of the simple main effects involved in this interaction revealed

TABLE 6

GRADE ONE MEAN PERCENT CORRECT FOR

LONG-VOWEL DISCRIMINATION TESTS

Input Mode	I_2	I_3	I_2	I_3	I_1	I_3	I_1
Response Mode	R_2	R_2	R_3	R_3	R_1	R_1	R_3
Test No.	8	9	10	11	12	13	14
High Ability	97.61	99.72	99.76	100	98.75	100	98.75
Average Ability	93.57	98.57	96.19	98	94.58	98.33	97.5
Low Ability	85.23	95.95	83.33	98.66	89.16	98.75	94.58

TABLE 7

GRADE TWO MEAN PERCENT CORRECT FOR

LONG-VOWEL DISCRIMINATION TEST

Input Mode	I_2	I_3	I_2	I_3	I_1	I_3	I_1
Response Mode	R_2	R_2	R_3	R_3	R_1	R_1	R_3
Test No.	8	9	10	11	12	13	14
High Ability	98.57	99.28	95.47	99.33	99.58	99.16	98.75
Average Ability	95.23	99.52	96.90	100	98.33	97.91	99.58
Low Ability	94.52	97.14	91.42	98.66	96.66	98.75	97.91

TABLE 8

SUMMARY OF CHI SQUARE ANALYSIS OF

LONG-VOWEL RECOGNITION SCORES

Effect	X^2	df	p
Between Subjects			
Grade	.60	1	
Ability	10.53	2	$<.01$
Grade X Ability	13.79	5	$<.05$
Ability within Grade 1	12.93	2	$<.01$
Ability within Grade 2	.86	2	
Within Subjects			
I_1 and I_2 vs. I_3	65.25	1	$<.001$
I_1 and I_2 vs. I_3 X G	3.68	1	
I_1 and I_2 vs. I_3 X A	3.01	2	
I_1 and I_2 vs. I_3 X GXA	3.94	5	
I_1 vs. I_2	22.23	1	$<.001$
I_1 vs. I_2 X G	.04	1	
I_1 vs. I_2 X A	.03	2	
I_1 vs. I_2 X GXA	1.73	5	

TABLE 8 (continued)

Effect	X^2	df	p
R_1 vs. R_3/I_1	1.22	1	
R_1 vs. R_3/I_1 X G	.00	1	
R_1 vs. R_3/I_1 X A	2.14	2	
R_1 vs. R_3/I_1 X GXA	2.17	5	
R_2 vs. R_3/I_2	.54	1	
R_2 vs. R_3/I_2 X G	3.57	1	
R_1 vs. R_3/I_2 X A	1.26	2	
R_2 vs. R_3/I_2 X GXA	7.44	5	
R_1 and R_2 vs. R_3/I_3	19.12	1	$<.001$
R_1 and R_2 vs. R_3/I_3 X G	.00	1	
R_1 and R_2 vs. R_3/I_3 X A	.05	2	
R_1 and R_2 vs. R_3/I_3 X GXA	1.24	5	
R_1 vs. R_2/I_3	3.36	1	
R_1 vs. R_2/I_3 X G	.34	1	
R_1 vs. R_2/I_3 X A	2.30	2	
R_1 vs. R_2/I_3 X GXA	2.62	5	

that the effect for ability level was attributable almost entirely to the difference among ability levels for grade-one students. The number of subjects with perfect scores on all seven tasks for low, average, and high groups in grade one were 3, 9, and 17. The corresponding frequencies for the grade two subjects were 9, 13, and 13 (n=30 for each group).

Within-subject effects. The analysis of within-subject effects on performance on the long-vowel recognition tasks was based upon the percentage of correct responses for each subject in each of the six G×A groups under each of the seven I×R conditions. For a contrast between, say, conditions A and B, the number of subjects who performed better under A than under B and the number whose performance under B was better than that under A were tabulated. The calculation of Chi square for the contrast was based upon these frequencies, with ties being excluded. For example, consider the contrast between I_1 and I_2 vs. I_3. Fourteen subjects performed better under the beginning or ending phonogram conditions, while 102 subjects performed better under the isolation condition. There were 64 cases of ties. The resulting value of X^2 is 65.25; $p < .001$.

Long vowels pronounced in Beginning vs. Ending Phonograms. The effect of I_1 vs. I_2 was significant at the .001 level. Twenty-nine subjects performed better when the input mode was ending phonogram, while 79 subjects performed better when the input mode was beginning phonogram. There were 72 ties.

Vowels printed in Beginning and Ending Phonograms (combined) vs. Isolation when the Input Mode was Isolation. The effect of R_1 and R_2 vs. R_3 within I_3 was significant at the .001 level. Six of the subjects performed better when the response mode was R_1 and R_2 while 35 of the subjects performed better when the response mode was R_3. However, when the input mode was isolation, 139 of the subjects showed no difference between the two conditions.

CHAPTER IV

DISCUSSION

The present study was conducted to investigate the effects on vowel recognition performance of variations in each of two presentation modes. These modes were an auditory input mode and a visual response mode. The effects of these variations were studied for both long- and short-vowel sounds and for three levels of reading ability (high, average, and low) within each of two grade levels (one and two). In the input mode, the vowel sounds were pronounced in isolation, in beginning phonograms and in ending phonograms. In the response mode, the graphic presentation of vowel letters was varied in a corresponding manner. That is, the vowel letters were printed in isolation as well as in beginning and ending phonograms.

The study addressed several questions. They were: (1) Does vowel recognition performance differ as a function of grade level placement? (2) Does recognition performance differ for varying levels of Reading Ability? (3) Does recognition performance differ for long vs. short vowel sounds? (4) Does recognition performance vary as a function of whether the vowel is pronounced in a phonogram or in isolation? (5) Does recognition performance differ for vowels pronounced in beginning vs. ending phonograms? (6) Does vowel recognition performance vary when the response mode presentation is the graphic representation

of a vowel imbedded in a phonogram vs. a vowel printed in isolation? (7) Does vowel recognition differ when the response mode presentation is a vowel letter printed in beginning vs. ending phonograms?

The results of the study indicated that the main effect of grade level was not significant for either long or short vowels. However, the main effect of reading ability was significant for both long and short vowel recognition tasks. This finding may confirm the need to determine phonics programming on the basis of reading achievement level and not according to grade placement. This might suggest that vowel sounds could be introduced quite early in the grade-one program. Many reading programs, however, emphasize vowel learning in the second-year program. Such an emphasis may be warranted even though the present findings indicate that grade one students, of the lowest reading ability, recognize vowel sounds with a high degree of accuracy. The mean percent correct for low-ability grade one subjects was 84.77. One interpretation of this finding may be that it takes several years of practice at the easy recognition level, before students are able to generate vowel sounds.

There was no interaction of Grade level by Reading ability on the short vowel tasks. However, there was such an intereaction on the long vowel tasks. That is, significant performance differences on the long vowel tasks were observed only in low-ability grade one subjects. Such a finding may be interpreted to reflect the relative ease of long vowel recognition as compared to short vowel recognition. The superior recognition performance on the long vowel tasks does not corroborate a finding of Wylie and Durrell (1971). These authors, however, used a procedure which was quite different from the one used in the present

study. Also, their population sample was restricted to grade one subjects of average reading ability.

This better long vowel recognition performance casts doubt on the advisability of teaching short vowel sounds first. This common teaching practice is based on the a priori notion that the rules for short vowel sound application are more reliable than those governing the application of long vowel sounds. Attempts to validate this assumption have been unsuccessful (Clymer, 1963).

Another major finding of the study was that vowel recognition performance was better when the vowel sounds were pronounced in isolation as compared to in a phonogram (I_1 and I_2 vs. I_3). The effect was observed across levels of both Grade and Ability and for long as well as short vowel sounds. This better recognition performance under the isolation mode is, once more, not in accord with the findings of Wylie and Durrell (1971). The specific source of this discrepancy is not immediately apparent. However, one source may be the type of phonics training that their subjects received as part of the grade-one reading program. Although the type of phonics training was not a factor in the analysis of the Wylie and Durrell results, the description of their subjects revealed that all of them read the Scott Foresman basal readers. However, only half of these subjects received the phonics instruction which accompanies the Scott Foresman series, whereas the other half received Speech to Print phonics training. It should be noted that Speech to Print is a phonics program which provides direct practice in the identification of vowel sounds in ending phonograms. Thus, it may be that the task which was easier for Wylie and Durrell's subjects was a reflection of the manner in which half of them had been instructed.

Ginn 720 and the Bookmark basal series were the instructional texts used by subjects in the present study. Type of reading program was also not a factor in the study. However, it should be noted that the instructional teaching practices suggested in the Teachers' Manuals, which accompany Bookmark and Ginn 720, emphasize presenting ending phonogram patterns. However, the phonogram teaching practices suggested in these manuals more closely resemble the techniques used in the Scott Foresman series. They do not parallel the experimental testing procedures used in this present study and in the Wylie and Durrell study, to the high degree that the Speech to Print phonics program does.

The contrast between ending and beginning phonograms resulted in ambiguous findings. These were that recognition performance was better when vowel sounds were pronounced in ending phonograms only in the short vowel condition. In the long vowel condition, recognition performance was better when vowel sounds were pronounced in beginning phonograms. Furthermore, the interaction of I_1 vs. I_2 by Grade under the short vowel condition showed the superior ending phonogram performance to be restricted to grade-two subjects.

This superior performance of grade-two subjects in the short vowel ending phonogram condition may be viewed as a by-product of the benefits which accrue from "practice" at a familiar task. That is, conventional teaching practices tend to emphasize ending phonogram phonics instruction to a much greater degree than beginning phonogram instruction.

The validity of this interpretation appears to be doubtful as performance was better in the corresponding long vowel contrasts when the input mode was beginning phonogram. It should be noted though, that 72 out of 180 subjects performed equally well under both beginning

and ending phonograms conditions in the long vowel tasks.

Another major finding was that recognition performance was better for short vowel sounds when the response mode presentation was vowel letters printed in isolation. There were, however, several interactions which limit the generality of this finding. The performance of subjects in R_1 vs. R_3/I_1 revealed that when short vowel sounds were pronounced in an ending phonogram, the better recognition in the isolation response mode was restricted to grade-two subjects. The grade-one subjects performed equally well when the vowel was printed in isolation and when it was printed in an ending phonogram. On the other hand, when vowel sounds were pronounced in isolation, the better recognition in the response mode isolation was observed only for low ability grade one subjects.

This finding may indicate that once a subject can recognize a vowel sound pronounced in isolation, it does not matter whether the response mode is vowel printed in isolation or in a phonogram. Such results do not support the claims that the ending phonogram facilitates vowel recognition. On the contrary, in the present study the overall tendency was for superior recognition in the isolation response mode.

Another major finding involved the contrast of beginning vs. ending phonograms in the response mode. Performance of grade-one subjects did not vary as a function of beginning vs. ending phonogram presentation. Again, this casts doubt on the utility of the ending phonogram for vowel recognition. The only subjects whose recognition performance was better under the ending phonogram response mode condition were those in grade two. Once more, this finding may reflect the tendency, in most reading programs, to focus on ending phonogram

instruction. Grade-two subjects would have more practice recognizing the ending vs. the beginning phonogram. Furthermore, the lack of variation in grade-one performance may indicate that the beginning phonogram is actually the easier mode of graphic presentation. The grade-one subjects did as well in the beginning phonogram condition as they did in the ending phonogram condition. This is an interesting finding in view of the traditional lack of emphasis placed on beginning phonogram instruction.

Variations in response mode presentation did not affect long vowel recognition performance to the degree that was observed under the short vowel conditions. Thus, it appears that when teaching long vowel sounds recognition performance is not enhanced as a function of graphic presentation. Once more, this may be interpreted to reflect the relative ease of long vowel sound recognition.

One exception to this finding was observed however, in the contrast involving the pronunciation of long vowels in isolation. When long vowel sounds were pronounced in isolation, recognition performance was better when the vowels were graphically represented in isolation. Again, this does not support the suggestion that the ending phonogram enhances vowel recognition.

The findings of the present study do not support claims that the phonogram is the easiest unit in which to recognize vowel sounds. Such claims are somewhat contradictory to the general learning principle that instruction should proceed from simple to complex. Within such a framework, it makes more sense to isolate the phonemic sound and its graphic counterpart at the onset of vowel instruction, This would allow students to focus on the salient features of the instructional unit under

consideration. Critics of the phonogram, as a unit of instruction, have suggested that the phonogram makes it more difficult to focus on individual phonemic elements. Such a criticism may be warranted.

On the basis of the present findings, vowel teaching would proceed from vowels presented in isolation to vowels presented in phonograms. However, it appears to make more sense to present ending phonograms within the context of rhyming word families. This would make phonic instruction more meaningful as the phonogram would be presented in a whole word context and not in isolation. The isolation of the letter and the sound should be restricted to the initial practice of the vowel sounds. Once this has been mastered, practice should be in more meaningful contexts. Such an approach would be less feasible with beginning phonograms. It is likely that beginning phonogram practice would have to take place outside the context of a whole word.

Suggestions for Further Research

The findings of the present study are limited to statements regarding the manner in which vowel sounds are recognized. There can be no statements made regarding the ease of vowel learning. A further area of study would contrast the ease of learning vowel sounds under the various presentation modes.

CHAPTER V

CONCLUSIONS

The following conclusions may be drawn from the findings of this study:

1. The teaching of vowel sounds should perhaps be instructionally designated on the basis of reading ability and not grade level. It is a common practice to concentrate on vowel instruction in second and third year reading programs. However, vowel instruction can be emphasized during the initial stages of reading instruction if the focus is on recognition tasks as opposed to decoding tasks.
2. Long vowel sounds are more easily recognized than short vowel sounds. Therefore, long vowel instruction should perhaps precede short vowel instruction.
3. Recognition performance was better when the vowel sounds were pronounced in isolation rather than in a phonogram, either beginning or ending. This finding was true for both long and short vowel sounds. Thus, the phonogram is not the easiest unit in which to recognize vowel sounds.
4. Recognition of short vowel sounds was better when the response mode presentation was isolation. This preference was not observed in the long vowel contrasts to the same degree. That is, in the long vowel condition, performance was better when vowel letters were

graphically represented in isolation only when the vowel sound was pronounced in isolation. There were no significant differences in the long vowel conditions when vowels were printed in either beginning or ending phonograms. This lack of variance may be attributable to the ease of the long vowel recognition task as compared with short vowels.

5. Contrasts involving ending phonogram pronunciation vs. beginning phonogram pronunciation revealed that recognition performance was better in the short vowel conditions when the input mode was ending phonogram. On the other hand, long vowel recognition performance was superior when the input mode was the beginning phonogram.
6. In the response mode, contrasts involving type of phonogram presentation revealed that recognition performance was better for short vowels printed in ending phonograms. There was no performance difference for long vowel recognition as a function of beginning or ending phonogram response presentation. Again, this may be due to the ease with which most subjects performed the long vowel tasks.
7. The instructional implications of these findings may reflect on the manner in which vowel teaching should be sequenced. The following suggested sequence is based on the findings of the present study:
   (a) Long vowel instruction should precede short vowel instruction.
   (b) Vowels should be presented in the input mode in the following manner: isolation, ending phonogram, and then beginning phonogram for short vowel instruction. Isolation, beginning phonogram, and ending phonogram for long vowel instruction.

(c) Vowels should be presented in the response modes in a corresponding sequential manner. However, the sequencing of response mode variations are not as crucial for long vowel sounds as they are for short vowel sounds.

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APPENDIX

A

Test 1

1.	ush	esh	ish	ash	osh
2.	in	un	an	en	on
3.	ep	up	op	ip	ap
4.	em	um	am	im	om
5.	eg	ag	og	ig	ug
6.	od	ed	id	ud	ad
7.	ub	ib	ab	eb	ob
8.	od	ad	id	ud	ed
9.	ish	ush	esh	ash	osh
10.	ug	ig	og	eg	ag
11.	em	im	om	am	um
12.	ep	up	ap	op	ip
13.	un	in	en	an	on
14.	ib	ab	eb	ob	ub

Input Mode: Short vowel pronounced in ending phonogram
Response Mode: Ending phonogram
Underlined item indicates correct response

Test 2

1.	ob	ab	eb	ub	ib
2.	id	od	ud	ad	ed
3.	ag	og	ug	ig	eg
4.	um	em	im	am	om
5.	ep	up	ip	ap	op
6.	on	un	en	an	in
7.	ish	ush	ash	osh	esh
8.	ib	ub	ob	eb	ab
9.	en	an	on	in	un
10.	up	op	ep	ap	ip
11.	am	om	im	em	um
12.	eg	ug	og	ig	ag
13.	osh	esh	ash	ush	ish
14.	od	ad	id	ud	ed

Input Mode: Short vowel pronounced in isolation
Response Mode: Ending phonogram
Underlined item indicates correct response

Test 3

1.	a	<u>i</u>	o	u	e	(ib)
2.	e	o	a	i	<u>u</u>	(ud)
3.	<u>a</u>	o	e	i	u	(ag)
4.	i	<u>o</u>	a	u	e	(om)
5.	a	<u>e</u>	u	o	i	(ep)
6.	a	<u>u</u>	e	i	o	(un)
7.	o	a	e	<u>i</u>	u	(ish)
8.	i	u	e	<u>a</u>	o	(ab)
9.	<u>e</u>	o	a	i	u	(en)
10.	e	i	<u>o</u>	a	u	(op)
11.	<u>u</u>	o	i	e	a	(um)
12.	i	<u>o</u>	a	e	u	(og)
13.	<u>a</u>	e	o	u	i	(ash)
14.	o	a	u	<u>e</u>	i	(ed)

Input Mode: Short vowel pronounced in ending phonogram
Response Mode: Ending phonogram
Underlined item indicates correct response
Items in parenthesis indicate input mode stimulus item

Test 4

1.	o	a	<u>u</u>	e	i
2.	e	u	<u>o</u>	a	i
3.	o	a	e	<u>i</u>	u
4.	u	o	a	i	<u>e</u>
5.	i	u	o	<u>a</u>	e

Input Mode: Short vowel pronounced in isolation
Response Mode: Isolation
Underlined item indicates correct response

Test 5

1.	bu	<u>bi</u>	be	ba	bo
2.	do	de	da	di	<u>du</u>
3.	gi	<u>ga</u>	go	ge	gu
4.	me	mu	ma	mi	<u>mo</u>
5.	pi	<u>pe</u>	po	pu	pa
6.	ni	<u>nu</u>	ne	no	na
7.	shu	she	sha	<u>shi</u>	sho
8.	bo	be	bi	bu	<u>ba</u>
9.	ni	nu	<u>ne</u>	na	no
10.	pu	pi	<u>po</u>	pe	pa
11.	<u>mu</u>	mi	mo	ma	me
12.	ge	gu	ga	<u>go</u>	gi
13.	shu	she	shi	<u>sha</u>	sho
14.	di	du	da	do	<u>de</u>

Input Mode: Short vowel pronounced in beginning phonogram
Response Mode: Beginning phonogram
Underlined item indicates correct response

Test 6

1.	be	bu	bo	ba	<u>bi</u>
2.	<u>du</u>	do	da	di	de
3.	<u>ga</u>	ge	gi	go	gu
4.	<u>mo</u>	mu	mi	ma	me
5.	pa	pi	pu	<u>pe</u>	po
6.	<u>nu</u>	na	ni	no	ne
7.	she	<u>shi</u>	sha	sho	shu
8.	bu	bo	bi	<u>ba</u>	be
9.	<u>ne</u>	no	na	ni	nu
10.	pe	<u>po</u>	pa	pi	pu
11.	mi	<u>mu</u>	me	ma	mo
12.	<u>go</u>	ga	ge	gi	gu
13.	<u>sha</u>	shu	she	shi	sho
14.	da	<u>de</u>	du	do	di

Input Mode: Short vowel pronounced in isolation
Response Mode: Beginning phonogram
Underlined item indicates correct response

Test 7

1.	a	<u>i</u>	o	u	e	(bi)
2.	e	o	a	i	<u>u</u>	(du)
3.	<u>a</u>	o	e	i	u	(ga)
4.	i	<u>o</u>	a	u	e	(mo)
5.	a	<u>e</u>	u	o	i	(pe)
6.	a	<u>u</u>	e	i	o	(nu)
7.	o	a	e	<u>i</u>	u	(shi)
8.	i	u	e	<u>a</u>	o	(ba)
9.	<u>e</u>	o	a	i	u	(ne)
10.	e	i	<u>o</u>	a	u	(po)
11.	<u>u</u>	o	i	e	a	(mu)
12.	i	<u>o</u>	a	e	u	(go)
13.	<u>a</u>	e	o	u	i	(sha)
14.	o	a	u	<u>e</u>	i	(de)

Input Mode: Short vowel pronounced in beginning phonogram
Response Mode: Isolation
Item in parenthesis indicate input mode
Underlined item indicates correct response

Test 8

1.	bo	<u>bi</u>	bu	be	ba
2.	de	<u>du</u>	do	de	da
3.	ge	gu	go	gi	<u>ga</u>
4.	mu	mi	<u>mo</u>	ma	me
5.	<u>pe</u>	pi	pa	po	pu
6.	ne	no	ni	na	<u>nu</u>
7.	<u>shi</u>	sha	sho	shu	she
8.	bu	<u>ba</u>	bi	be	bo
9.	<u>ne</u>	nu	na	no	ni
10.	pu	pi	<u>po</u>	pa	pe
11.	<u>mu</u>	mi	mo	me	ma
12.	gi	gu	ge	ga	<u>go</u>
13.	sho	<u>sha</u>	shi	shu	she
14.	du	<u>de</u>	da	di	do

Input Mode: Long vowel pronounced in beginning phonogram
Response Mode: Beginning Phonogram
Underlined item indicates correct response

Test 9

1.	bo	bi	be	bu	ba
2.	du	de	da	do	di
3.	gu	ge	go	ga	gi
4.	me	mu	mo	ma	mi
5.	pu	po	pa	pe	pi
6.	no	ne	ni	na	nu
7.	she	shu	sha	sho	shi
8.	bu	ba	bi	be	bo
9.	ni	ne	na	no	nu
10.	pi	pu	po	pa	pe
11.	me	ma	mo	mi	mu
12.	gu	go	ge	ga	gi
13.	sha	sho	shi	she	shu
14.	de	du	do	di	da

Input Mode: Long vowel pronounced in isolation
Response Mode: Beginning Phonogram
Underlined item indicates correct response

Test 10

1.	a	<u>i</u>	o	u	e	(bi)
2.	e	o	a	i	<u>u</u>	(du)
3.	<u>a</u>	o	e	i	u	(ga)
4.	i	<u>o</u>	a	u	e	(mo)
5.	a	<u>e</u>	u	o	i	(pe)
6.	a	<u>u</u>	e	i	o	(nu)
7.	o	a	e	<u>i</u>	u	(shi)
8.	i	u	e	<u>a</u>	o	(ba)
9.	<u>e</u>	o	a	i	u	(ne)
10.	e	i	<u>o</u>	a	u	(po)
11.	<u>u</u>	o	i	e	a	(mu)
12.	i	<u>o</u>	a	e	u	(go)
13.	<u>a</u>	e	o	u	i	(sha)
14.	o	a	u	<u>e</u>	i	(de)

Input Mode: Long vowel pronounced in beginning phonogram
Response Mode: Isolation
Items in parenthesis indicate input stimulus
Underlined item indicates correct response

Test 11

1.	o	a	u	e	<u>i</u>
2.	<u>e</u>	u	o	a	i
3.	o	<u>a</u>	e	i	u
4.	<u>u</u>	o	a	i	e
5.	i	u	<u>o</u>	a	e

Input Mode: Long vowel pronounced in isolation
Response Mode: Isolation
Underlined item indicates correct response

Test 12

1.	ile	ele	ole	<u>ale</u>	ule
2.	ime	ome	ame	<u>eme</u>	ume
3.	<u>ote</u>	ite	ete	ate	ute
4.	ade	ede	ide	ode	<u>ude</u>
5.	one	<u>ine</u>	ene	une	ane
6.	eke	oke	uke	ike	ake
7.	epe	upe	ope	ape	<u>ipe</u>
8.	ebe	abe	obe	<u>ube</u>	ibe

Input Mode: Long vowel pronounced in ending phonogram
Response Mode: Ending phonogram
Underlined item indicates correct response

Test 13

1.	ile	ele	ule	<u>ale</u>	ole
2.	ume	ome	ame	<u>eme</u>	ime
3.	ate	ete	ite	ute	<u>ote</u>
4.	ode	<u>ude</u>	ede	ide	ade
5.	une	ene	<u>ine</u>	one	ane
6.	ike	oke	eke	uke	<u>ake</u>
7.	<u>ipe</u>	ope	ape	epe	upe
8.	<u>ube</u>	ebe	obe	ibe	abe

Input Mode: Long vowel pronounced in isolation
Response Mode: Long vowel ending phonogram
Underlined item indicates correct response

Test 14

1.	a	e	i	u	o	(ale)
2.	e	i	u	a	o	(eme)
3.	u	e	a	i	o	(ote)
4.	o	a	e	u	i	(ude)
5.	i	u	e	a	o	(ine)
6.	u	i	o	e	a	(ake)
7.	u	i	o	a	e	(ipe)
8.	a	i	e	u	o	(ube)

Input Mode: Long vowel pronounced in ending phonogram
Response Mode: Isolation
Items in parenthesis indicate input stimulus item
Underlined item indicates the correct response