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A COMPARISON OF THE COMPATIBILITY OF PITMAN'S
INITIAL TEACHING ALPHABET AND MALONE'S
SINGLE SOUND ALPHABET WITH
TRADITIONAL ORTHOGRAPHY

by

Laura Elizabeth Mattucks Williams

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of the requirements for the degree of
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A B S T R A C T

A COMPARISON OF THE COMPATIBILITY OF PITMAN'S INITIAL TEACHING ALPHABET AND MALONE'S SINGLE SOUND ALPHABET WITH TRADITIONAL ORTHOGRAPHY

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This study was designed to investigate the relative compatibility of Pitman's Initial Teaching Alphabet (ITA) and Malone's Single Sound Alphabet (Unifon) with traditional English orthography (TO) by comparing the scores of children who have learned to read TO on tests printed in ITA, Unifon and TO and to analyze the words which appear least compatible, when printed in either simplified beginning reading orthography, to uncover the basis for miscues subjects made in trying to read them. The approach of studying transfer from TO to the beginning reading orthographies, rather than from ITA and Unifon to TO, is based on the assumption that factors which influence reading transfer in one direction will also influence transfer in the other.

The 80 fourth grade subjects from the Cherry Hill Schools of Inkster, Michigan, had never been exposed to ITA or Unifon before. Their oral responses to items on the Rolf Word Recognition Test printed in TO, ITA and Unifon were taped, transcribed phonemically and scored for number of correct responses, refusals, times prompted and corrections

attempted. Mean scores in each simplified orthography were compared to identify which showed greater evidence of transfer from TO. Correlation coefficients between scores in TO and ITA and TO and Unifon were compared to determine in which simplified orthography reading was more highly related to TO reading.

Low transfer words in ITA and Unifon were compared with their TO spellings with respect to word length, total word shape and upper half configuration to locate elements confusing to TO trained readers. Responses to low transfer words were studied to locate letters which interfere with compatibility of the simplified orthographies with TO. The techniques used were those of analyzing phonemic responses to dominant letters for extent of grapheme-phoneme correspondence and checking miscues for syllable and stress agreement with the correct response.

The most important conclusions were:

1. TO trained readers are able to transfer from TO to reading in either ITA or Unifon, but the transfer is not complete in either case.
2. ITA is more compatible than Unifon with traditional English orthography, when the following are considered to be evidence of compatibility: TO trained readers with no previous instruction in ITA or Unifon have more success in reading ITA than Unifon; the correlation between reading in ITA and TO tends to be higher than that between Unifon and TO for TO trained readers; TO trained readers tend to make fewer refusals, need

to be prompted less often, and attempt fewer corrections, when reading ITA than when reading Unifon; and fewer ITA than Unifon letters are identified as elements of confusion to TO readers.

3. Four categories of letters are sources of miscues, when TO trained readers read in ITA or Unifon: a. Letters which are identical or similar to TO letters calling for phonemic responses other than those called for by a simplified orthography. b. Letters which are very different in shape from those used in TO to represent the same phonemic pattern. c. Single letters standing for phonemes which are usually represented by grapheme patterns of more than one letter in TO. d. Letters standing for phonemes which have more than one TO representation.

4. Letters which are sources of confusion, when TO readers read the simplified orthographies are: ITA--- h, o, e, o and æ; Unifon--- C, S, Q, Θ, W, I, D, Q, G, Q, Λ and †.

5. Discrepancy in upper half of word configuration between ITA and TO spellings is an element of confusion in the majority of low transfer ITA words.

6. When TO trained readers read low transfer words in ITA or Unifon, their miscues tend to contain the same number of syllables as the stimulus words.

7. If a miscue in a two syllable low transfer ITA or Unifon word agrees with the correct response with respect to number of syllables, it also tends to agree with respect to the syllable which is stressed.

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CHAPTER I

STATEMENT OF THE PROBLEM

Purpose

The reading and writing of English has long been plagued by difficulties arising from the fact that we attempt to spell the words of the language in the twenty-six character Roman alphabet, while we use approximately forty different phonemes in speech. An additional handicap has accrued from the effects of what John R. Malone (1962,p.435) refers to as "a series of orthographic accidents from the time of the King James Bible." While the effects of such mistakes can probably be seen in some inconsistencies of the English spelling system, the basic reason for grapheme-phoneme irregularities lies in the fact that modern English uses a spelling system which was devised for an earlier age. Wardhaugh (1969,p.105) points out the English vowel system, in particular, has changed phonologically as a result of the Great Vowel Shift and that "the original spelling system was probably never designed to be a phonemic one."

Today a renewed effort appears to be underway to attack the problem of the inconsistencies of traditional English orthography, particularly as they affect the beginning reader of English as he starts the long trek toward literacy. These efforts have taken the form of the development of simplified and regularized orthographies to be used as vehicles for

beginning reading materials. Two such orthographies are the Initial Teaching Alphabet (ITA) developed by Pitman (Harrison, 1964) and the New Single Sound Alphabet (Unifon) designed by Malone (1962). This study was designed to investigate the relative compatibility of these two systems with traditional English orthography (TO) by comparing the scores of children who have learned to read in conventional orthography on tests printed in these two simplified systems and TO and, further, to analyze the words which appear to be least compatible, when printed in either ITA or Unifon, to uncover the basis for miscues which TO trained readers make in trying to read them.

Factors Influencing the Movement for Simplified Orthographies

The movement to simplify the spelling of English and even to use a simplified spelling system in materials presented to beginning readers is not peculiar to the present period. Harrison (1964) cites experiments in this direction in Great Britain and America in the latter half of the nineteenth century. He attributes the high interest in the United States in experiments with consistent spelling to the influx of non-English speaking immigrant families into the country and the attendant problems of educating their children. Today, it appears that the movement has taken its cue from the unrest created by protestors against present day teaching of reading. Proponents of simplified and regularized writing systems argue that once a child has experienced success and attained a

degree of skill in reading in a medium which has phonic consistency, the transition to reading in traditional orthography can be made easily and efficiently.

There are several aspects of the present movement which demand serious attention of educators. The first is the extent of the research attempts being made to assess the orthographies as vehicles for beginning reading and to determine the nature of the difficulties encountered by children in transferring from the consistent systems to traditional orthography. This is especially true of the investigations into the use of the Initial Teaching Alphabet, or ITA, as it is called more informally. This system is receiving fairly extensive trial both in England, where it originated, and in the United States. A dialogue in the Phi Delta Kappan (Dolmatch, 1966 and Gillooly, 1966) between detractors and proponents of the system would indicate there is some disparity in the quality of the studies being reported.

Another factor which is influencing the acceptance of the principle of simplified orthographies for beginning reading instruction is the ready availability of the reports of studies of the new media in professional journals, plus the rather one-sided claims of success in their use in the newspapers and magazines read by the lay public. True, in many cases there has been little, if any, real evaluation of the programs on which the latter type of report is based. However, emotional tone sometimes has more effect on public acceptance of an idea than logic. Educators have been most sensitive

to the criticisms of reading programs and are often pushed into acceptance of change by a public anxious to grasp at any suggestion which offers a panacea for a problem. Admittedly, there is also the segment of the society which maintains that the old ways are best and that experiments of this nature cast children in the role of guinea pigs. These opposing points of view serve as stimulants to articles pro and con and keep the issue alive with the public.

A third factor which may be contributing to the vitality of the movement is the argument that spelling reform is in the national interest of English speaking countries and the scientific interest of the world community. Malone (1962) and Harrison (1964) call attention to the prestige English has gained as the language of science internationally and its growing influence in literature and other areas of human endeavor. They insist that the simplification of our orthography is imperative to the extension of communication. They warn that the inconsistent and complicated orthography of present-day English may cause us to lag in areas of information storage and retrieval. Malone (1962) points out that Russia and other European countries can use phonemic typewriters like that patented by the Radio Corporation of America with ease, because of the relative consistency of their languages in terms of having one letter per sound. He views the English lack of this consistency as a distinct disadvantage in a computerized civilization. The alphabet which he designed, Single Sound or Unifon (commercial name

under which beginning reading materials are marketed), is constructed with the demands of the computer in mind.

The Design of the Orthographies

The designers of the new orthographies have attempted to make them compatible with TO (traditional orthography) in order to increase speed and ease of transfer from the initial reading medium to the traditional. Should the idea of simplified orthographies become widely accepted as systems used for beginning reading materials or, ultimately, as the vehicles for wide spelling reform in English, the compatibility of the new media with TO would become central to the problem of the selection of the medium most feasible for the education of both children and adults. It is in this area of the comparative compatibility of simplified orthographies with TO, that this investigation may contribute information.

Questions Raised in This Study

The following questions were posed in this study of the relative compatibility of ITA and Unifon with traditional orthography:

1. If TO trained readers, who have had fairly extensive experience with most graphemic representations of English, are asked to read aloud materials printed in ITA and Unifon, in which orthography will their responses be most like those made, when they read the same material in traditional orthography?

2. Will a study of the phonemic responses made by these readers to low transfer words yield information on elements in ITA and Unifon which may be the basis for such miscues, when that study is directed toward the analysis of responses to the following cues which research has shown are of special value in word recognition for fluent readers of traditional English print ?

- a. Dominant letters (initial and final letters and ascending and descending letters)
- b. Letters which give clues to the morphemic structure of the word (stressed vowel, in root word and graphemes representing the affixes)

3. Will a comparison of the following physical properties of low transfer words printed in ITA and Unifon with the same properties in their TO counterparts yield differences which may account for the miscues made by the TO trained readers in reading these words?

- a. Length of the word in number of letters
- b. General shape of the word
- c. Pattern of the upper half of the word

For purposes of this study low transfer words were defined as those words falling in the lowest 25 per cent of the distribution of Unifon and ITA word scores and the upper 50 per cent of the distribution of TO word scores. A miscue was defined as an utterance in response to the printed stimulus word other than that intended by the representation of the word in the orthography, or as Goodman

has stated it, miscues are "unexpected responses to printed material to be read " (Y.Goodman,1967).

Assumptions

The investigation was based on these assumptions. First, the more alike two orthographies are, the more alike will be the responses made by readers to stimulus words printed in the two orthographies. If degree of compatibility of one stimulus with another is defined as the degree to which one stimulus can be substituted for another and still elicit the same response without previous transfer training, then the degree to which TO trained readers can give a satisfactory English pronunciation to words printed in a simplified orthography the first time they attempt to read in the latter can be accepted as evidence of degree of compatibility of that orthography with traditional.

The second assumption was that TO trained readers will continue to use the same sorts of cues in reading or attacking words printed in unfamiliar orthographies that they would use, if they were reading the same words printed in TO. Readers will apply to the new task skills and information which have helped them respond successfully in previous reading situations using traditionally printed materials. Therefore, a comparison of the unexpected phonemic responses made by these readers to the cues which previous research has posited as those most important to reading success in TO should yield elements, such as letters or combinations of letters, which

caused the readers to respond the way they would in reading TO, even though that was not the way the designers of the simplified orthographies intended that they should respond. These miscues, then, would be caused by confusions arising from the interactions of the readers with the printed material. Letters or combinations of letters in the positions receiving the dominant attention of TO trained readers, which elicit responses other than those called for by the simplified orthography, might be the basis for lack of compatibility between the simplified orthography and TO.

The third assumption was that, when the general physical properties of a word printed in a simplified orthography differ greatly from the TO version, TO trained readers may respond to the word in a way which differs from that expected in the simplified orthography. A study of low transfer words with respect to differences in number of letters, general shape and upper half of the line of print might yield information on the importance of these differences.

Limitations

It is recognized that simplified orthographies are used to train beginning readers of English and that the transfer is made from ITA or Unifon to TO rather than from TO to ITA or Unifon. It cannot be taken for granted that the transfer problems faced by readers are identical in both directions. However, the difficulty of controlling the environment of beginning readers who are being introduced to

English reading in these simplified orthographies is such that it seems plausible to study the TO readers' responses to the new orthographies as a means of locating specific sources of confusion limiting the compatibility of the orthographies with TO. After all, the final goal which the designers of ITA and Unifon purport to have is that of efficient reading performance in traditional orthography. The environment of TO is ever encroaching on children who are being taught to read in the simplified orthographies through television, signs, and packaging labels, as well as books and periodicals. Perhaps the situation for these readers is something like that encountered by children learning languages in a bilingual home. Also, students, who learn a foreign language in school, probably learn it more easily, if there had been a speaker of the language in their early environment, or if they are in contact with a speaker of that language while they are learning it. The exposure to both orthographies acts as a readiness experience which facilitates later transfer from one to the other. The transfer is probably more difficult, therefore, when TO trained readers read ITA or Unifon "cold" than it is for those transferring from these orthographies to TO, because of the dual exposure of the latter group. Studying the performance of the TO trained readers in reading materials printed in these orthographies will, it is hoped, throw light on sources of confusion in transferring from one orthography to another and on the relative value of ITA and Unifon as media for teaching beginning reading. Insofar as

one is more compatible with traditional print to which the readers must finally transfer, it may be the better vehicle to serve as beginner's skates for reading.

A second limitation, which will be noted in the design of the study, is that of confining the stimulus materials to isolated words. This restriction limits the cues to the grapheme representations, eliminating the context clues which aid the reader in word recognition in reading paragraphs and sentences. The limitation was deliberate, because it focuses the study on the orthographic printing itself as the source of stimulus. This restriction of stimulus materials to isolated words probably increases the difficulty of the task for the reader.

CHAPTER II

SUMMARY OF RELATED LITERATURE

The literature related to this investigation falls into the following categories: Description of the design of ITA and Unifon, studies of transfer made by ITA trained readers to traditional orthography, studies of transfer from traditional orthography to ITA, and studies in reading relating to perceptual cues in word recognition.

The Design of Unifon and ITA

Unifon. The two orthographies which were the concern of this research have been designed to meet the problem of compatibility in different ways. The New Single Sound Alphabet is used in materials for beginning readers put out under the label, Unifon. This forty-letter system has based the symbols on the capital letters of the present system. The characters have been altered or added to in cases where TO uses one symbol for several sounds. In addition, the designer has made the letters of uniform height and almost uniform width in order to simplify their use in computer printing. Table 1 presents the letters of this system and key words which illustrate the grapheme-phoneme correspondence of the orthography. As can be seen, it relies on a single letter to represent each of forty phonemes of the language.

There are no recommendations for transliteration of

TABLE 1
LETTERS AND KEY WORDS OF
THE UNIFON ALPHABET

Consonants		Vowels	
Letters	Key Words ^a	Letters	Key Words ^a
B	<u>b</u> ow	Δ	ate
D	<u>d</u> ip	I	he
F	<u>f</u> ast	Δ	bite
G	<u>g</u> oat	O	old
H	<u>h</u> at	O	due
J	<u>j</u> aw	Λ	all
K	<u>k</u> iss	A	at
L	<u>l</u> ow	E	hen
M	<u>m</u> usic	3	her
N	<u>n</u> o	+	bit
P	<u>p</u> ipe	O	lot
R	<u>r</u> un	U	up
C	<u>c</u> ell, <u>s</u> ay	o	look
T	<u>t</u> able	o	out
V	<u>v</u> est	g	boy
W	<u>w</u> ing	u	you
Y	<u>y</u> es		
Z	<u>z</u> ebra		
o	<u>ch</u> air		
i	<u>th</u> ere		
e	<u>th</u> irst		
s	<u>s</u> ure		
Σ	<u>a</u> zure		
h	<u>k</u> ing		

^a The source is Wright, 1964, Back Cover.

English words into Unifon, except that of using the grapheme appropriate to the phoneme. The teacher's guide (Ratz, 1954) to the commercial materials suggests that the teacher not be too concerned if the children fail to spell according to the key words, if they hear or use different phonemes in them. However, considerable time for learning to identify the sounds which correspond to the graphemes and learning to write the letters is suggested at the beginning of instruction. The Thorndike-Barnhart Junior Dictionary is suggested as a source of help in transliteration. The Unifon series of reading materials includes flash cards, puzzles, and tactual cards as aids to learning the letters of the system, as well as initial, intermediate and transitional readers. The latter include readers which aid the child in transition from Unifon to the TO capital system and Unifon to the TO lower case system. This last provision points up the fact that children learning to read initially in Unifon must not only transfer into the capitals of the regular orthography on which Unifon is based, but also must shift into the mixed system of capitals and lower case letters in which the majority of the symbols are lower case. This latter system is, of course, the most prevalent one in printed materials which English readers use.

ITA. The Initial Teaching Alphabet, ITA, was designed by Sir James Pitman and represents the culmination of an effort in the field of simplification of English spelling begun by his grandfather, Sir Isaac Pitman, who devoted sixty or more years to developing systems of simplified spelling and to

working toward acceptance of spelling reform in Great Britain and the United States. Sir James Pitman's alphabet has been designed as an initial teaching medium not as a permanent one, hence its title, Initial Teaching Alphabet. It is referred to as an augmented Roman alphabet and its symbols are based on the lower case letters of traditional orthography. The system retains twenty-four letters of the conventional alphabet and adds twenty new ones. It omits q and x, since the phonemes which they represent can be represented by other letters which have been retained. Table 2 presents the letters of ITA and the key words illustrating the phonemes for which they stand.

COMPARISON OF THE ITA AND UNIFON SYSTEMS

Some of the spelling inconsistencies of TO are still present in ITA, because the designer felt that removal of all of them would make the transition to TO more difficult. Examples of these include the use of c and k to represent /k/, as they do in TO, and their retention as a cluster, when they appear as a cluster in TO.

Other sounds also are represented by two graphemes. The phoneme /z/ has two representations as seen in zebra (zæbra) and daisy (dæsy). The traditional z is retained in words which represent /z/ in this manner in TO and the s is used where TO uses an z for this phoneme. The /a/ in father and box is represented by a and o. The use of ue and ow for /yuw/ and /uw/ attempts to distinguish between occasions where the so-called "long" u (ū) is preceded by the phoneme /y/

TABLE 2
LETTERS AND KEY WORDS OF
THE ITA ALPHABET

Consonants		Vowels	
Letters	Key Words ^a	Letters	Key Words ^a
b	<u>b</u> ed	æ	f <u>a</u> ce
c	<u>c</u> at	æ	key
d	<u>d</u> og	ie	fly
f	<u>f</u> ee <u>t</u>	œ	ov <u>e</u> r
g	<u>g</u> leg	ue	us <u>e</u>
h	<u>h</u> at	ɑ	f <u>a</u> ther
j	<u>j</u> ug	au	ball
k	<u>k</u> ey	a	cap
l	<u>l</u> etter	e	egg
m	<u>m</u> an	i	mil <u>k</u>
n	<u>n</u> est	o	box
p	<u>p</u> en	u	up
r	<u>r</u> girl	ω	book
r	<u>r</u> ed	ω	sp <u>oo</u> n
s	<u>s</u> poon	ou	out
t	<u>t</u> ree	oi	oil
v	<u>v</u> oice		
w	<u>w</u> indow		
y	<u>y</u> es		
z	<u>z</u> ebra		
s	<u>s</u> da <u>is</u> y		
wh	<u>w</u> hen		
ch	<u>ch</u> air		
th	<u>th</u> ree		
th	<u>th</u> e		
jh	<u>sh</u> op		
3	tele <u>vis</u> ion		
q	ring		

^a The source is Rolf, 1968, p.3

and when it is not. An example of their use might be found in beauty, /byúwtiy/, and booty, /búwtiy/, which are written in ITA as buety and böty respectively.

Unifon, too, tried to solve this problem with two symbols. Beauty and booty in that system would be written BWTTI and BÖTTI respectively. Both systems represent a reduction of symbols for these sounds over that used in TO. Witness view, few, youth, bugle, beautiful, you, queue for words involving /yuw/ and flew, flu, pursue, boot, through, etc. for words involving /uw/.

Another concession to compatibility in the ITA system is the retention of double consonants in words in which they are doubled in TO. For the most part, the unstressed vowel remains the same as in the TO spellings, as ITA makes no attempt to regularize spellings of the schwa, /ə/, and barred i, /ɪ/, which are often found in unstressed syllables in utterances of native speakers of English.

Unifon, on the other hand, uses U to represent the schwa except where it is followed by /r/. In these cases Unifon uses ɜ. ITA recognizes this influence of the /r/ on vowels preceding it, but uses an augmented r (ṛ) to represent it and retains the same spelling of the preceding vowel as that used in TO.

Among the most important changes in ITA is that connected with vowels such as those in mate, meet, mite, moat and mute. These are represented by letters which connect the traditional a, e, i, o, and u to an e. The "long" e is further altered

to ϵ . The /ɔ / sound of ball, saw, and trough of English speakers is represented by a and u connected with one another and the diphthongs of boy and bow are represented by connected ai and au respectively. The traditionally confusing oo of TO is represented by u , when it stands for /u/ as in book and, as noted before, by uw when it stands for the phoneme /uw/ as in spoon.

Unifon, too, changes these vowel graphemes from their usual capital forms, but relies almost entirely on the addition of vertical or horizontal marks to alter the basic letter shape. In addition the "short" i /i/ changes drastically, becoming ɪ , while the "long" i /ay/ becomes ai .

In addition to these augmented vowels, several consonants have been combined or altered in ITA. The fricatives /s̥/, /th/ and /dh/ and the affricate /tʃ/, traditionally represented by the digraphs sh, th, and ch, have been altered primarily by moving them closer together. However, in the case of sh, and ch and the th which stands for the voiceless dental fricative, the first letter has been extended below the base line and becomes a descender. New letters have been created for the velar nasal /ŋ/ and the voiced fricative /z̥/. They are ɳ and ʒ which are apparent adaptations of the ng, and z and g usually found in TO notation for these phonemes.

Unifon solves these problems by having S stand for /s̥/, ɬ and ɸ for the voiced and voiceless dental fricatives, and a reversed C, ɕ , for /tʃ/. The representation of /ŋ/ is ɳ , and /z̥/ becomes ʒ , while the traditional z is altered to ʒ

for /z/.

A definite attempt has been made to make the upper half of a word printed in ITA conform in configuration to the upper half of the same word printed in TO (Harrison, 1964). The research bases for this attempt was Huey's (1908) finding that the upper half of the word pattern has higher cue value than the lower half in the case of fluent readers of English. Because of this, words such as catch retain a t before the h and words such as ledge retain a d before the g, even though the h and g meet the phonemic requirements of the transliterations.

It appears that in the design of both orthographies an attempt has been made to utilize TO symbols. Unifon, in general, applies the letters to spelling in a purely phonemic manner, while ITA makes several concessions to inconsistencies in conventional spelling and to the attempt to keep the upper portion of the line of print similar to its appearance in TO. No statistics appear to be available for the extent to which words in Unifon are unchanged from their counterparts in the capital letter forms of TO, but Harrison (1964,p.114) reports the following estimates of the final results of the application of ITA to the spelling of English:

...Almost half of our traditional spellings do not change in any basic way and more than a quarter do not change at all. The following estimates are generally accepted--

- (a) Words unchanged--26.5 per cent, e.g. and, not,did, went, given and fitted.
- (b) Words with minor modifications--23.75 per cent, e.g., riĥ, ȳr, bȳn, gȳd, iz, and ſat.

- (c) Words changed but still familiar in form and presenting no change of moment--10.5 per cent, e.g., hav, littl, mor, tiem . (Very often the only change is the omission of a final unsounded e.)
- (d) Words radically changed--39.25 per cent, e.g., aut (ought) cof (cough) thro (through) wuns (once) dun (done) hoel (whole)

Transfer from ITA to TO

No matter how carefully an orthography is designed to be compatible with another, the true test of the developer's success lies in the response of the reader who is making the transfer from one system to the other. In the case of ITA there is some research evidence to support the advocates' contention that such transfer from ITA to To is made fairly smoothly. There is a dearth of research regarding Unifon.

INITIAL INVESTIGATIONS IN ENGLAND AND THE UNITED STATES

The Downing Research. The research in England where ITA originated has been under the direction of John Downing, Head of the Reading Research Unit at the University of London. While research continues, two experiments have been reported rather fully (Downing, 1965, 1967). The purpose of the investigations has been to discover whether or not there are advantages in the areas of reading, writing and spelling of English to be gained by using materials printed in ITA for beginning instruction in these areas, and, of course, to note the effects of transfer to traditional orthography on the reading achievement of ITA trained readers.

The first experiment used a sample of approximately 1,800 four and five year-old children in volunteer

experimental and control schools. These children were matched as nearly as possible for age, sex, social class and intelligence. The experiment was conducted under field conditions in which everyday activities of the classroom were allowed, so long as reading, writing and spelling were presented using the ITA medium for the experimental and the TO medium for the control groups. Both used the same basal series, Janet and John, printed in orthographies appropriate to the groups by James Nisbet Company. The results of the group which started in 1961, consisting of 413 experimental and 687 control subjects, are summarized here. The reading results were measured by the Schonell Graded Word Reading Test and the Neale Analysis of Reading Ability. (See Appendix D for test sources.)

When the Schonell test was administered in ITA to the experimental group and in TO to the control group after one year of instruction, the ITA subjects read ITA significantly better than the TO subjects read TO, this despite the fact that the experimental subjects tended to be in groups with disparities in age, class size and school types which favored the control groups. Eighteen months after the beginning of the experiment a subsample of each group was administered the Neale test in TO. The results favored the ITA trained readers at the 5 per cent level in reading rate and accuracy and at the 1 per cent level in comprehension (Mazurkiewicz, 1966).

During the transfer stage from ITA to TO an ITA subsample was tested, first by the Neale instrument and later by the Schonell. Both results showed a regression in TO achievement

as compared with the ITA achievement on the same tests given a month earlier. Slightly over 50 per cent of the children had transferred to TO. When special study was directed to the Schonell test results of 135 subjects who had been reading in TO for four months, it was found that even these superior students could read fewer words in TO than they could read in ITA half a term earlier. Later, Downing (1967) indicated this regression was temporary.

Criticisms of lack of control of variables and of some aspects of the design led to another experiment begun in 1963. The results were essentially the same despite the change in experimental plan. This time an experimental and a control group of children, aged four and five, were set up in each of sixteen cooperating schools. The pupils were assigned at random and the same teacher taught reading to both the ITA and TO groups, though not at the same time. The basal reader and the testing instruments were the same and the teaching methods and time for reading were controlled. The groups proved similar in age, sex, intelligence, vocabulary achievement and social status as indicated by occupations of the fathers. The criticism directed at the Hawthorne effect of publicity and meetings of the ITA group in the first experiment was met by attempting to control these factors. The results of a questionnaire to which the teachers responded favorably to ITA caused the researchers concern. A factor which favored the control group in this experiment, just as it did in the first experiment, was that there was a greater

abundance of reading material other than the basal reader available to the TO trained readers. Despite the fact that ITA had been freed of copyright restriction, it took a great deal of persuasion to get publishers to print ITA versions of their books and time to transliterate them into ITA once the publishers had been sold on the idea.

An especially interesting aspect of the report of the first experiment relates directly to this present study. Downing (1967) listed the first 50 words of the Schonell Graded Word Reading Test together with the frequency of errors made by the 135 superior pupils who had been reading in TO for four months. In the discussion of the words he notes that with respect to their ITA counterparts the most missed TO words often contain significant differences in configuration and sometimes a stimulus symbol very similar to one in ITA, but which requires a different phonemic response from the one ITA requires. On one occasion Downing made the comment regarding a confusion involving the TO symbol s, "It is perhaps also important that this difficulty occurs near the beginning of the word " (Downing, 1967, p.36).

The Mazurkiewicz Research. In 1963 an experiment was begun in the Bethelhem, Pennsylvania, school system in cooperation with Lehigh University. It has been directed by Albert J. Mazurkiewicz. First grade pupils were assigned to classes on the basis of the Lee Clark Reading Readiness Test. Despite attempts to equalize the groups with regard to social class background, the ITA group contained a larger portion of

pupils from lower socio-economic families. There appeared to be no significant difference between the 454 pupil ITA group and the 875 pupil TO group in comparisons of age, IQ, reading readiness and personality.

Inservice training of teachers emphasizing the experience and language arts approach, as well as the fundamentals of the ITA orthography, preceded the instruction. However, teachers in the project were free to use teaching methods they preferred. Teachers continued to meet informally to work on materials in the ITA medium, because this problem plagued this project just as it had the English experiments.

When TO versions of The California Reading Test were administered to both the experimental and control groups at the end of the first year, a significant difference between ITA and TO trained readers was not noted. Only a small portion of the ITA subjects had made the formal transition to TO. Therefore, a look was taken at the scores of those children who were in the ITA transitional readers, and a significant difference was found favoring the ITA trained group. Variations in time of transition from ITA to TO materials ranged from informal transition by an estimated 5 to 8 per cent of the middle-to-upper socio-economic status children after the third or fourth month of ITA instruction to transition by slightly over one-fourth of the total ITA group by the middle of May.

The Bethlehem experiment was continued during 1964-65, when 15 classes were added to the study. Other changes

included attempts to make the amount of ITA materials more equal to those available in TO, to control for method of presentation of ITA and to counteract the Hawthorne effect by stressing that the TO classes were experimental also, as they were in competition with the ITA classes (Mazurkiewicz, 1965). This time there were 917 pupils in the ITA group and 462 in the control group. Comparisons in performance were based on a sample of these groups consisting of 164 pairs matched for IQ, sex, and socio-economic status. The reports of the final testing with a TO version of the Stanford Achievement Test at the end of 140 days of instruction were based on 118 pairs, 55 pairs of boys and 63 pairs of girls, as all the sample did not complete the project. Fifty-nine per cent of the ITA population had transferred to TO print. The results of the word reading subtest favored the ITA subjects with the difference being significant at the 1 per cent level, while no significant difference was found between the groups in paragraph meaning performance.

The conclusions drawn in the Bethlehem studies with reference to transfer from ITA to TO were that children make the transfer easily, if first allowed to develop confidence and efficiency in reading ITA, and that, when methodology is controlled, significantly better word reading skill in TO is developed by children trained in ITA. Paragraph meaning skill appears to show no significant difference between the groups.

Greater Cleveland Study. The Educational Research Council of Greater Cleveland launched a large scale study of ITA

beginning in the fall of 1964. The population included 2,343 subjects, of which 841 first graders and 458 kindergartners were in the ITA program and 1,044 first graders were in the TO program. The children attended 21 different schools in the Cleveland area. The study included two comparisons. The first was between ITA and TO first graders who were being taught to read for the first time beginning in the fall of 1964. The second was between two ITA groups. One of these had been exposed to ITA materials in 1963-64 as kindergartners. The other group was being exposed to reading ITA materials for the first time in the fall of 1964. A kindergarten pilot program had preceded the 1964 program. The subjective evaluations of this kindergarten experiment made by teachers had been highly favorable.

Performances on the Stanford Achievement Tests were used as measures of reading success. One form was administered after five months in appropriate versions, ITA and TO, to the ITA and TO groups. Attempts were made to control statistically such variables as intelligence, reading readiness, teacher experience and the amount of time spent on reading instruction. The comparisons showed that the ITA group tested in ITA significantly excelled the TO group tested in TO on all subtests: word reading, paragraph meaning, word study skills, vocabulary and spelling. The second testing in which the TO form of the Stanford Achievement Test was administered to both groups produced significant differences favoring the ITA group on the word reading subtest. Only 8 per cent of the ITA pupils had

transferred at the time to TO materials.

The ITA group was divided into subgroups according to the degree to which they had transferred into reading TO: complete, partial, none. In addition to adjusting the means for intelligence, reading readiness and teacher experience, the researchers adjusted them for reading achievement as measured by the Stanford Achievement Test printed in ITA three months before, because only those children who had done quite well had made the transfer at this time into TO. The results showed that the higher the degree of transfer the subjects had made, the higher the mean score on the second test. This appears to confirm the notion that transfer is not automatic and that the learning that takes place in the transition stage is important to success of ITA trained readers in the reading of TO.

The TO group was really experimental, too, because the subjects had been in five different reading programs. The purpose of this part of the experimental design was to find if the results would vary according to the reading program of the TO trained readers. A random sample of 75 pupils from each of the five TO programs was compared with a random sample of the ITA group, who had all been trained in the same basal reader program. The results supported the outcome of the comparison of the entire TO group with the entire ITA group. The TO program did not prove to be a significant factor.

The comparison of children who had started ITA in

kindergarten and continued it in first grade with those who started it in first grade favored the former group on all the language arts subtests of the Stanford Achievement Test except vocabulary.

UNITED STATES OFFICE OF EDUCATION SPONSORED STUDIES

The United States Office of Education has supported through grants five studies in which ITA was one of the beginning reading approaches studied. Among them was the Lehigh-Bethlehem study reported earlier. The remaining studies have been reported in their preliminary stages by Hahn (1965), Mountain (1966), Nemeth and Hayes (1965) and Tanyzer and Alpert (1965). The results of these studies, all of which involved a look at specific reading approaches in TO, as well as ITA, did not seem to favor ITA as consistently as the Downing, Mazurkiewicz and Greater Cleveland results. They all had in common the use of the Stanford Achievement Test in the traditional print as the evaluation instrument.

Hahn Study. Hahn using 1,000 subjects and 36 teachers in Oakland County, Michigan, compared three approaches to reading: a modified language arts using traditional orthography, a modified language arts program using ITA as the orthography and a basal reader program supplemented by phonics. The subtests used to measure performance were word reading, paragraph meaning, spelling and word recognition of the Stanford Achievement Test. The language arts approach in both TO and ITA proved significantly superior

to the basal reader program supplemented by phonics on the word reading subtest. On the spelling subtest children who were taught with either the TO language arts approach or the basal reader, phonic supplemented approach performed significantly better than those who were taught with the ITA language arts approach. The ITA language arts approach appeared to be significantly better for success on the word recognition test. Hahn reserved final judgment until the children trained in ITA had all transferred to TO. However, on the basis of the 80 per cent who had made the transfer at the time of testing, he stated, "...it would appear that the advantage of using ITA over TO in a language arts setting will not be significant "(Hahn, 1965,p.271). He did favor the language arts approach over the basal reader supplemented by phonics program.

Mountain Report. Mountain reported on an investigation involving ITA and the Sheldon basal reader program in TO and the Diacritical Marking System (DMS). The latter is a new system developed by Edward Bernard Fry of Rutgers, who was the project director for the experiment. Twenty-one first grade classes in New Brunswick, New Jersey, were used. The classes were assigned at random to each of the three reading programs. All had new materials which tended to control the Hawthorne effect. The TO and DMS materials were the same except that the diacritical markings were superimposed on the words. No significant overall reading achievement was found in favor of any of the methods. The investigators

used a number of standardized tests in addition to the Stanford Achievement Test with the same results. They concluded, "...the differences among the classes was much greater than the differences among methods " (Mountain, 1966, p.281).

Nemeth, Hayes Report. Nemeth and Hayes (1965) have given an interim report on a study conducted in the New Castle, Pennsylvania, area schools which attempted to compare the effectiveness of first grade reading approaches which utilized Scott, Foresman basal readers with the usual supplements of My Practice Pad, workbook sheets, and My Little Dictionary as one of four approaches to beginning reading. The second was basically like the first except that it used a phonics training program in addition. The third approach was one using the phonics oriented Lippincott Readers and the fourth was a program using an ITA reading series. The entire first grade population from 12 schools was assigned within attendance areas at random to the classes of first grade teachers who had volunteered to teach a particular reading program. The year-end results were tabulated on 365 children and 19 teachers. When educational level of parents was used, no significant differences were found between the means with respect to socio-economic level. The results based on scores of four subtests of the Stanford Achievement Test (word meaning, paragraph meaning, spelling and word recognition) were reported. No significant differences were reported between ITA and either Lippincott or

phonics supplemented Scott, Foresman on any of the measures. ITA was significantly superior to the regular Scott, Foresman in word recognition and word reading. However, both Lippincott and phonics supplemented Scott, Foresman results were significantly better than the regular Scott, Foresman program on all three measures. The Lippincott program seemed to be favored over the others, when all variables were considered.

Tanyzer, Alpert Report. Tanyzer and Alpert have made an initial report of an experiment designed to pit the Scott, Foresman, Lippincott, and Early-To-Read ITA series against one another as programs for beginning readers. Besides the question of which of the three is the best reading approach for beginners, the investigators were interested in the question of whether one approach favored one ability group, or one sex over another in effectiveness. The year-end results were based on 8 classes in each program in Nassau County, New York. Again the results were measured with the Stanford Achievement Test in TO. Not all the ITA children had made the transfer into traditional orthography at the end of 140 days of instruction. The children using the ITA and Lippincott series scored significantly higher on the word reading, paragraph meaning, and word recognition tests than those using the Scott, Foresman series. A significant difference in vocabulary favored the Lippincott group over both the ITA and Scott, Foresman groups. These results held true with respect to intelligence and sex, though girls

achieved higher mean scores than boys, when scores in all three treatments were compared.

Some of the studies discussed above have not been without their detractors and, to be fair to the researchers themselves, most of them have urged caution in the acceptance of the results for one weakness or another in the design and for incompleteness of data because experimental results were not all in at the time of reporting.

Southgate (1965) expressed reservations about the English study with regard to the Hawthorne effect created by the experiment itself, as well as the attendant flood of visitors and publicity. She, also, felt that the final evaluation will have to be a long range one. Both Barrett (1967) and Gillooly (1967) questioned some aspects of the design of the Lehigh-Bethlehem research. Comparable effectiveness of teachers, control of methods, materials and time spent in instruction were cited as sources of weakness, as well as the method used to match the children who had made the transition from ITA to TO with TO trained counterparts. It is evident that, as with all research which takes place in a school setting, the control of all variables is difficult. Despite these drawbacks, the fact that ITA trained readers can transfer into TO is undeniable.

Transfer from TO to ITA

Naturally, one of the most difficult variables to control in any study relating to the effectiveness of the new

orthographies as media for beginning reading is that of the extent to which the ITA children are exposed to traditional orthography both outside of school and to a more limited extent in the school setting itself. This exposure to both worlds of print undoubtedly affects the transfer results. Dolmatch (1966,p.551) has remarked in reply to criticisms of ITA research that, "something might be learned", if TO trained readers were tested in ITA materials. This is an interesting suggestion and two studies have looked at this aspect of transfer.

McCracken Study. McCracken (1965, p. 101) made an attempt "to discover if children who had been taught only with traditional orthography could transfer to the reading of ITA automatically (without instruction), and if so, at what reading level or levels this transfer took place." The assumption was that, if ITA to TO transfer was so simple that it was almost automatic, the same phenomenon would hold true in observations of TO readers attempting ITA for the first time. McCracken had a secondary purpose of investigating the relationship between mental age, chronological age, grade level, and TO reading achievement with ability to transfer into ITA.

The subjects for the investigations were 149 pupils in first through sixth grades at the Washington State College Campus School and 24 pupils from a combined second and third grade at the Geneva School of the Bellingham Public Schools. Tests were administered to the children over a three-month

period beginning in February of 1965 in the following order: 1. The Standard Reading Inventory: Form A in TO, 2. Stanford Achievement Reading Tests in TO, 3. California Test of Mental Maturity, 4. Botel Reading Inventory in TO, 5. The Standard Reading Inventory: Form B in ITA, and 6. The Standard Reading Inventory: Form B, Vocabulary in Isolation in TO. The mean lapse of time between the administration of the TO and ITA versions of the Standard Reading Inventory was eight weeks and thus probably favored the ITA performance, because of the added maturity of the subjects.

The subjects were grouped for study in seven ways: Class placement and school, Standard Reading Inventory minimum instructional level, Standard Reading Inventory maximum instructional level, IQ as measured by the California Test of Mental Maturity, paragraph meaning scores on the Stanford Achievement Test and word meaning scores on the Stanford Achievement Test.

When the Standard Reading Inventory was transliterated into ITA, the investigator found that 80 per cent of the words were changed from their TO version by at least one letter.

The results indicated that transfer does occur without instruction, but that the performance in each grade in ITA was about one year below that of the achievement in TO. The largest differences were in the areas of speed of oral and

silent reading and the ability to read orally without error. The smallest differences were in comprehension, both silent and oral reading. The differences were greater at the lower levels than at the higher. The researcher concluded that an ITA reading level of at least second or third grade and/ or a mental age of 80 to 99 months is desirable for successful transfer. The word study made by the investigator indicated that monosyllabic words were more difficult than polysyllabic words. However, he does comment that this may be due to the fact that the test was begun at preprimer and primer levels, and that some words have more possibilities for confusion with words of the subject's vocabulary.

Rolf Study. Rolf (1968) investigated the compatibility of traditional orthography and ITA using 76 subjects, 38 boys and 38 girls, in each of Grades One through Six in the Maumee, Ohio, Public Schools. His purpose was to discover whether transfer was automatic and he studied such variables as age, sex, intelligence, socio-economic status and word structure. He constructed a word recognition test of 132 words taken from the Rinsland and Gates word lists and from words in the vocabulary of the Ginn and the Scott, Foresman basal reading series. They were divided into levels of difficulty and a cut-off limit was set when the subjects missed eight words out of two levels. The lists were so designed that each ITA character appeared at least once in every two levels. The tests were given in three word orders to minimize the effects of word order on transfer. All words

were the same in each level despite the different ordering among the words within the level. The ITA test was given first to minimize the memory effect from one test to the other.

Rolf found that transfer does occur without instruction, but that complete transfer is unlikely to occur at any level without instruction. The highest transfer occurs in words where the spelling is the same or nearly the same in both orthographies or in which the ITA version is similar to a phonemic spelling in TO. The lowest transfer occurs in words in which unfamiliar ITA characters suggest a different sound than was intended and in which the shape or structure of the ITA word suggests an incorrect TO word with a similar shape or structure. Words which are difficult in TO are also likely to be difficult in ITA. He suggests that the ʃ symbol in ITA, in particular, needs some redesigning. While intelligence is positively correlated with ITA scores in his study, that relationship does not account for the close relationship of performance in TO and ITA. Sex and socioeconomic status did not appear to be factors in the ability of TO trained readers to read in ITA.

Cues in Word Perception

Several sources, among them Anderson and Dearborn (1952), Russell and Fea (1963), and Tinker (1965), have summarized research on visual cues that children and adults use in reading words in traditional orthography. Among the many

suggested is the pattern or shape of the word, though there is some discussion as to whether this includes the general outline of the word or that, together with the internal patterning of the word. Vernon (1959) infers that the length of the word, its outline and the presence of dominant detail are all valuable stimuli to word recognition for children. Dominant letters which have been discussed as being of exceptional cue value are the first letter of the word, the final letter and letters which ascend above the middle half of the line of print or below the base line of print. All the mentioned sources refer to the 1908 study by Huey which showed that a line of print could be read more easily if the bottom half were eliminated than if the top half were eliminated. This is the finding on which the ITA designer based the effort to keep the top half of ITA words as similar as possible to the same words printed in TO. Vernon (1959) points out that the part of a word which is most important depends on the particular word. She concludes that the recognition of the root is the most important factor in word recognition. In words of Anglo-Saxon or Old English derivation the root is in the first syllable or the word is monosyllabic. Latin derivations often have the root morpheme in the middle position with prefixes and suffixes attached.

Tinker (1965,p.81) concludes that in the normal reading situation:

Apparently the process of perception begins with the visual appearance of the total word shape and then is completed with enough details, such as initial consonant

blend, a vowel or a syllable, or the final letter apprehended to achieve recognition of a word that fits the meaning of the verbal context in which it appears.

This process of perception in reading applies to familiar words. Unfamiliar words require analysis "...and the amount of analysis depends on the degree of familiarity "(Tinker, 1965, p.81). The amount of analysis, then, may vary from a cursory scrutiny to determine a dominant detail to a letter by letter analysis including the sounding out of the word before attempting to blend the parts together. Here, again, in normal reading the contextual clues are important in providing hunches for testing.

Most investigators of perception in word recognition have analyzed the errors in responses. Kenneth and Yetta Goodman (K. Goodman, 1965 and Y. Goodman, 1967), two recent researchers in the field, point out that analysis of errors yields information on cues which children use, and throws light on the process of word perception and recognition. They stress that reading responses are caused or cued, when the reader interacts with the printed page and that these cues include the printed material itself, the structure of the language and the experience of the reader himself. They have substituted the concept of miscue for the concept of error. They define miscues as "unexpected responses to the printed material to be read " (Goodman, Y., 1967, p 20). The phonemic recording of miscues is central to analysis of response in the work of these researchers.

SUMMARY

Apparently designers of both ITA and Unifon have attempted to relate their orthographies to the traditional writing system of English. However, ITA appears more pragmatic in that it blends phonemic regularity with concessions to traditional spellings. Its choice of the lower case letters as models may also make it more akin to the majority of materials printed in English.

It appears, too, from the foregoing discussion of ITA related studies that children can learn to read English with ITA as the beginning medium and can transfer with relative ease to conventional orthography. Help in the transfer stage is needed to facilitate this transition.

The McCracken and Rolf studies indicate that the transfer from reading TO materials to reading ITA materials is possible, also, though not automatic. In addition, Rolf identified some symbols which appear to cause confusion in ITA to TO transfer. Both researchers put forth the idea that the studying of transfer from TO to ITA is more controllable than studying ITA to TO and should reveal problems which may be found in helping children make the transfer from beginning reading in ITA to the ultimate task of reading in TO.

A summary of the research on visual cues in word perception brought out that successful readers of English use the general shape, length, and upper half of the configuration of a word as clues to the identity of the word. In addition

recognition of the root word and recognition of certain dominant letters are important in word recognition. The work of the Goodmans stressed the value of the study of miscues in children's reading to locate confusions arising from the interaction of children with the language and the printed page.

CHAPTER III

DESIGN AND PROCEDURES

Research Hypotheses

The present investigation was undertaken to discover the relative compatibility of ITA and Unifon with traditional orthography and to analyze the words which appear to be the least compatible when printed in either ITA or Unifon to uncover the basis for the miscues which TO trained readers make in trying to read them.

The method of collecting data to fulfill the first purpose was that of presenting fourth graders (40 boys and 40 girls), who had been trained to read in TO, isolated words printed in three orthographic media, ITA, Unifon and TO. The subjects' oral responses were recorded, using a tape recorder. They were transcribed phonemically and the resulting scores were summarized.

ITA is based on the lower case traditional writing system and the designer has taken pains to attempt to match the upper half configuration of the traditional printing of the word. Also, additional concessions have been made to achieve compatibility through the retention of certain spelling patterns. Unifon, on the other hand, is based on the upper case of traditional orthography and is more nearly consistent in maintaining the principle of one letter

to represent one phoneme in English. Malone, the designer of Unifon, has himself stated, "Unifon is both completely isomorphic and isophonic with interlingual characteristics built in. ITA on the other hand has a slightly higher transfer characteristic, but a somewhat more imperfect isomorphism and isophonality and (is) designed primarily for English use " (Malone, 1966, p.304).

Because of these factors which appear to weight the scale in favor of ITA, the following research hypotheses relating to evidence of orthographic compatibility were formulated:

1. If students in the fourth grade trained to read English in traditional orthography are asked to read aloud identical words printed in TO, ITA and Unifon, their oral responses will indicate they can read more words correctly (give an acceptable pronunciation of the words in English) in ITA than in Unifon.
2. The performances of these subjects in reading ITA and TO will be more closely related than their performances in reading Unifon and TO.

The second purpose, that related to the locating of elements in ITA and Unifon which interfere with the compatibility of these orthographies with TO, was served by the investigation of hypotheses related to research on word perception in the reading of traditional orthography. The first three concerned comparisons of length in number of letters, general word shape and upper half of word configuration of low

transfer ITA and Unifon words with their TO counterparts.

1. More than one-half the low transfer words will contain fewer letters, when compared with their TO spellings, than the majority of high transfer words do, when compared with their TO spellings.
2. When an outline is drawn around each low transfer ITA word and its TO counterpart, significant differences in shape will be apparent in more than one-half of the cases.
3. When the upper half of the ITA and TO versions of low transfer words are compared visually, significant differences in configuration pattern will be apparent in more than one-half the words.

The figure of one-half in the hypotheses stated above was an arbitrary one chosen for operational purposes.

The fourth hypothesis in this group arose out of the reports by Downing (1967) and Rolf (1968) of confusions between certain ITA and TO symbols. The method of locating confusing letters arose out of research on the cue value of letters in certain positions and letters which ascend above the middle portion or below the base line of print. The fourth hypothesis was:

4. Analysis of the miscues of low transfer words of the simplified orthographies will reveal letters in ITA or Unifon which differ radically in shape from the letters in their graphemic representations in TO, or which are identical or very similar in

shape to TO letters that usually call for different phonemic responses than the ones assigned to them in ITA or Unifon.

Procedures relating to this hypothesis consisted of analyses of the phonemic transcriptions of responses made by the subjects to the low transfer ITA and Unifon words. The object was to discover whether or not subjects responded correctly to certain types of graphemes. Responses to initial letters, final letters and letters in the stressed vowel position of low transfer words in both ITA and Unifon, as well as ascenders and descenders in low transfer ITA words were inspected for this correspondence.

In addition, the agreement between the low transfer miscues and stimulus word with respect to number of syllables was studied. Where there was considerable disagreement the possibility of confusion of vowels and consonants with one another was investigated. Stress agreement with the accepted response was checked in miscues of low transfer words of more than one syllable.

The Sample

Grade Level. The fourth grade level was chosen as the one which would contain children who would meet the following pre-set criteria for the population from which the sample would be drawn:

1. The members have acquired some skill in reading in traditional orthography.
2. The members have had an opportunity to become acquainted with vocabulary words which contain a variety of phonic and structural cues or patterns of traditional orthography.
3. The members have had no contact with either the Initial Teaching Alphabet or the Single Sound Alphabet.

In American schools most children have met the first two criteria by fourth grade. The third criterion was met by selection of the sample from a population pool of those who had had no contact with either ITA or Unifon.

SOURCE OF THE SAMPLE

Location. The subjects of this study were fourth grade students from three schools in the Cherry Hill School District of Michigan. The Cherry Hill District lies in Wayne County in southeastern Michigan approximately eight miles from Detroit. It is one of a number of suburban school districts of the Detroit Metropolitan area. It lies adjacent to Inkster and carries that post office designation.

General Description. It is largely a residential district and its inhabitants tend to work in the automobile and other manufacturing plants of the surrounding area, as well as in service occupations which serve the metropolitan population.

It is a fairly new community in the sense that the

housing is modern and there have been large single family developments in which the homes resemble one another in basic plan. One principal described it as "split-level suburbia." The majority of the homes in the area are well kept ranch or split level style. Of course, there are some exceptions. It is overwhelmingly Caucasian in its racial composition, while neighboring Inkster School District has a majority of Negro residents.

The Schools. There are 5 elementary schools, 1 junior high school and 1 high school. The enrollment for the 1967-68 school year during which the data for this investigation were gathered was 4,797, which gave it a rank of 95 in number of pupils among the 526, K-12 school districts in Michigan. The elementary school membership was 2,671. It ranked one-hundred-sixtieth among the districts in per pupil expenditures for instruction, spending \$414.85 per pupil in that important area. The average salary for its 181 classroom teachers that year was \$7,957, placing it one-hundred-thirty-third in the state. Its total operation millage rate was 24.9 for 1967-68.

The school buildings are modern and functional in design and appear well-equipped in terms of books, equipment, and supplies for the education of the children. The organization of the elementary schools is that of the self-contained classroom with specialists in art, music and physical education handling these special areas of the program. The system also provides remedial reading teachers and speech correc-

tionists. Special education of the educable retarded and the physically handicapped is offered.

The reading program in which the subjects chosen for this study took part centered around, first, the Ginn kindergarten readiness and first grade programs. Then the Scott, Foresman basal reader program was adopted and is now used in all grades. Therefore, these children had used Scott, Foresman in second, third and fourth grades. The instruction is typically done within a heterogeneous classroom in which there is homogeneous grouping for reading instruction and, where feasible, individual instruction for those who cannot profit from the small group instruction. In addition, there is remedial reading for those the classroom teacher and the reading specialists feel will profit from it. Some classes in ITA were being initiated in the first grade in some of the buildings in 1967-68. There were supplementary basal readers, as well as library books, available for all children. Each elementary school contained a small library which appeared to be used freely.

The investigator noted many projects in the social studies, science and language arts going on in the classrooms and the teachers appeared eager to exchange ideas with one another. One of the principals was engaged in a pupil self-concept study and had enlisted his staff in the project. The faculty appeared to be a fairly young one in keeping with the community and the buildings of the district. There was a certain liveliness about the schools. The administration,

teachers, and pupils cooperated fully with the study, making it possible to complete the testing within the one-month deadline which had been set at the beginning.

SELECTION OF THE SAMPLE

The sample of 80 subjects, 40 males and 40 females, was drawn from the fourth grade populations of the Avondale, Harrison and Titus Elementary Schools. This involved 8 classrooms. Titus had 3 fourth grades and Avondale had 2, while Harrison had 2 straight fourths and 1 combination fourth and fifth. Some fourth graders from the combination were drawn in the final sample. The Language Arts Consultant chose the fourth grades from these schools as being representative of the total school population. Also, except for the pupil self-concept study at Titus mentioned earlier, there were no special programs making extra demands on the pupils, teachers and administration of these schools at the time of the testing. The data had already been gathered on the self-concept study.

The sample was drawn finally from a population with the following limitations:

1. The members had been in the Cherry Hill School System for from at least first grade on. This limitation assured participation in similar reading programs.
2. The members had had no contact with either ITA or Unifon personally or through the participation of

any family member in the new programs which had just begun in some buildings. The first limitation, which controlled the reading program of the sample, also helped control this and principals checked the class lists for brothers and sisters who might be in an ITA first grade.

Even with such special care, one child was discovered who had visited a cousin in another city who was learning to read in ITA. She had read several books in this medium. When she read the ITA list perfectly, she was questioned and told the story. Naturally she was eliminated from the study. Fortunately 16 alternates had been chosen and tested, two of each sex for each testing pattern. Three alternates were used in all. One for this subject, one for a boy who had an eye operation in the middle of the testing program and another for a boy who was absent so frequently he could never be administered the second test in his pattern. In all 116 of the 205 pupils in the fourth grades met the criteria of length of membership and no contact with the simplified orthographies. It was this pool from which the final sample was drawn.

CHARACTERISTICS OF THE SAMPLE

Socio-Economic Background. Located as Cherry Hill is in the center of a ring of automobile manufacturing plants, it is not surprising that many of the parents are employed in the production and white collar jobs of this industry. Table 3 indicates the occupational status of the chief wage

TABLE 3

GROUPING OF FAMILIES OF SAMPLE BY THE OCCUPATIONAL STATUS OF THE CHIEF WAGE EARNER^a

Rating	Professionals		Proprietors and Managers		Business Men		Clerks and Kindred Workers		Manual Workers		Protective and Service Workers		Farmers		Unknown		Totals	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
1	2	2.50															2	2.50
2	3	3.75	3	3.75	4	5.00											10	12.50
3					1	1.25	4	5.00									5	6.25
4							6	7.50	4	5.00	6	7.50					16	20.00
5							6	7.50	25	31.25	2	2.50					33	41.25
6									6	7.50	6	7.50					12	15.00
7																		
8															2	2.50	2	2.50
Sum	5	6.25	3	3.75	5	6.25	16	20.00	35	43.75	14	17.50	0		2	2.50	80	100.00

^a Categorized and rated according to the Warner, Meeker, Eell's Revised Scale for Rating Occupations (Miller, 1964. pp.103-105)

earners in the families of the subjects categorized according to the Warner, Meeker, Eell's Revised Scale for Rating Occupations (Miller, 1964, pp.103-105). The largest percentage was employed as manual laborers. However, all these workers were in skilled or semi-skilled occupations rather than heavy manual labor. The Bureau of Labor statistics give a figure of 36.9 per cent for all manual workers for the year ending 1968 and this group contained about 9 per cent more in that general category. The second largest category of workers in the Cherry Hill sample, representing 20 per cent of the sample, was that of clerks and kindred workers. In the categories roughly corresponding to this in the national labor force there were 12.8 per cent. Another group in the Cherry Hill sample who exceeded the national average was the third largest occupation category of the sample group, the protective and service category. The Cherry Hill sample exceeded the national average by about 7 per cent in this occupation group. Cherry Hill representations in occupations were less than the national average in the categories of professional workers, the combined business categories of proprietors, managers and business men and farmers. In the first category, the professions, the national labor force had 12.8 per cent, while Cherry Hill had just over half, 6.25 per cent. In business occupations the national figure was 13.3 per cent and the Cherry Hill figure fell at 10 per cent. There were no farm workers in Cherry Hill as opposed to 11.5 per cent in the national labor force in 1968.

Table 4 presents the figures related to the educational status of the father or male guardian in the family. It will be noted that three-fourths of these men had at least finished high school and that 10 per cent had finished college. According to the 1960 census figures only 41 per cent of the adult population of Michigan had finished high school as compared to 46.3 per cent of the adult population of the nation. In the college graduate category the census figures for males twenty-five years of age or older were 8.4 per cent for Michigan and 9.7 per cent for the nation. In comparison with the 1960 census figures then, the per cent of high school graduates was a great deal higher for the Cherry Hill sample than for either Michigan or the nation. In the college graduate category the per cent is only slightly higher for Cherry Hill than for Michigan, and almost the same as the national total of college graduates. These comparisons of educational status with the 1960 census figures should be interpreted with caution, as the 1970 census will undoubtedly reveal an increased number of high school and college graduates.

Both the comparison of the occupational status of the wage earners and the educational status of the fathers of the subjects would support the conclusion that the majority of the children come from middle-class homes. The large group of manual workers, clerks and protective and service workers might weight the stratification in the direction of lower-middle class. However, this cannot be stated precisely, as the income of skilled and semi-skilled automobile plant

TABLE 4
SUMMARY OF EDUCATIONAL STATUS
OF FATHER OR MALE GUARDIAN OF THE SUBJECTS

Years of Formal Education Completed	Number	Per Cent of Sample
Less than 8	1	1.25
8	4	5.00
9	0	
10	7	8.75
11	7	8.75
12	44	55.00
13	4	5.00
14	4	5.00
15	1	1.25
16	7	8.75
More than 16	1	1.25
Totals	80	100.00

workers often exceeds that of the people categorized as business men, managers and even professionals, thus drawing people of higher educational and cultural levels into this work than are usually drawn into manual labor, as we often think of it. There is evidence, however, of a range of socioeconomic backgrounds among the subjects of the study which includes all educational levels and all occupation groups except those connected with farming.

Chronological Age. The subjects in the sample ranged in age from 110 to 126 months at the time of the first testing. Table 5 presents a summary of the mean chronological ages for the Grade Four Cherry Hill sample. While the boys tended to exceed the girls in age, the difference was not significant, as indicated by the *t* statistic in Table 6. The mean age for the total sample was just under 117 months.

Intelligence. The Cherry Hill Schools administered the Lorge Thorndike Intelligence Test, Form 1, to all fourth graders in mid-October of 1967. The information given in Table 7 is a summary of data derived from that testing by sex and for the total sample. Table 8 presents the difference between mean IQs of boys and girls in the sample. Again, the difference between means favoring girls was not significant. The mean IQ was 105.75 for the total group.

Reading Achievement. The Stanford Achievement Test: Intermediate I Battery, Form W, also had been administered to the fourth graders at Cherry Hill in October. Table 9 contains the data regarding the means and standard deviations

TABLE 5

MEAN CHRONOLOGICAL AGES FOR THE CHERRY
HILL SAMPLE BY SEX AND TOTAL SUBJECTS

Sex	N	Mean	SD
M	40	117.80	4.40
F	40	115.52	3.04
M+F	80	116.66	3.93

TABLE 6

COMPARISON OF MEAN CHRONOLOGICAL
AGES OF BOYS AND GIRLS FOR THE
CHERRY HILL SAMPLE

N	Boys		Girls		Diff	t
	Mean	SD	Mean	SD		
40	117.80	4.40	115.52	3.04	2.28	.09

TABLE 7

MEAN IQS AND STANDARD DEVIATIONS OF IQS
OF THE SAMPLE BY SEX AND TOTAL SUBJECTS^a

Sex	N	Mean	SD
M	40	102.90	11.84
F	40	108.60	11.53
M+F	80	105.75	11.56

a. IQ obtained by Lorge Thorndike
Intelligence Tests

TABLE 8

COMPARISON OF MEAN IQS OF BOYS AND GIRLS

N	Boys		Girls		Diff	t
	Mean	SD	Mean	SD		
40	102.90	11.84	108.60	11.53	5.70	.25

TABLE 9

MEANS OF SUBJECTS ON STANFORD ACHIEVEMENT
SUBTESTS: WORD MEANING, PARAGRAPH
MEANING, AND WORD STUDY

Sex	N	Word Meaning		Paragraph Meaning		Word Study	
		Mean	SD	Mean	SD	Mean	SD
M	40	37.33	9.03	38.05	9.83	36.53	15.17
F	40	41.13	10.73	40.65	12.11	44.63	16.95
M+F	80	39.23	10.10	39.35	11.11	40.58	16.59

TABLE 10

COMPARISON OF MEANS OF BOYS AND GIRLS ON THE
READING SUBTESTS OF THE STANFORD
ACHIEVEMENT TEST

Subtests	N	Boys		Girls		Diff	t
		Mean	SD	Mean	SD		
Word Meaning	40	37.33	9.03	41.13	10.73	3.80	.89
Paragraph Meaning	40	38.05	9.83	40.65	12.11	2.60	.28
Word Study	40	36.53	15.17	44.63	16.95	8.10	.99

of the grade scores obtained on the following reading subtests: Word Meaning, Paragraph Meaning, and Word Study Skills. While girls tended to excel boys in all subtests, the mean differences were not significant. Table 10 contains the results of the t test for the differences between means for the sexes. All mean scores fell within the limits of stanine 5 of the norms found in the test manual. The means for the total sample lie just below grade level. The fiftieth percentile, according to the norms of the battery, falls at a grade score of 41 on all subtests.

Testing Procedures

The Instrument. The word recognition test designed and used by Rolf (1968) was made available for this investigation. Rolf selected the words from the Reading Vocabulary for the Primary Grades by Arthur I. Gates (1935), A Basic Vocabulary for Elementary School Children by Henry D. Rinsland (1945) and from the vocabulary of the Ginn and Scott, Foresman basal reading series. There were 132 words in the list, which he divided according to the grade level indicated by the sources of the words into 6 levels with 22 words in each. In addition, he ordered the words in three ways within the difficulty levels, creating three forms of the test with respect to order. These he had printed in TO and ITA.

Some changes were made in the instrument for the purposes of this study. First, the list had to be transliterated into Unifon, in addition to the already available translitera-

tions in ITA and TO. Then two different words had to be included in the list to make it possible to use the ɹ, the character in Unifon which stands for /yuw/. Use was substituted for out in Level 1 and beauty for spanking in Level 4. Out and spanking contained symbols which were repeated several times in other words and they also were not among the low-transfer words in ITA in the Rolf study. Rolf's orders were retained, but given different numerical designations. The word list with the words printed in each of the three orthographies is given in Table 77 of Appendix A. The order of presentation for each form of the test is also indicated. The lack of data for the word strong is due to the fact that the page with this item was left out of a set of booklets when the spiral holders were attached. The omission was not discovered until the phonemic transcriptions of responses were being made after the testing sessions were ended. The word was then omitted from consideration.

Goodman (1965) and others (Tinker, 1965) have indicated that readers are influenced by the surrounding printed material on the page, in addition to being influenced by the word which is being read. This phenomenon was also noted in a pilot run which the investigator made on fourth grade pupils in Estabrook School in Ypsilanti, Michigan. Therefore, the words were copied photographically using high contrast film (Kodalith) and then printed on Ektalure paper (double weight) to make 3½ inch by 5 inch cards on which a single word was centered as shown in Plate I, Appendix A. The cards were

then bound by spiral holders into booklets with covers printed by diazo on Technisheen. The covers contained the information regarding the orthography and word order of the words. Separate booklets were made for each level in each word order and each orthography as designated by the testing pattern, which will be discussed later. A photographic copy of the covers of three booklets is shown in Plate II, of Appendix A . There is also a photograph of the manner in which the booklets were used in the testing situation in Plate III, Appendix A .

Since the local printers had no type of the style of the Unifon letters, a film template was made of the letters of that orthography and a photo-typesetting method was used to print the words. An attempt was made to keep the capital forms of Unifon and the ascenders in ITA and TO of uniform height. Plate I of Appendix A shows the size of type used in the test booklets.

Dialect Check. Before the ITA and Unifon transliterations were finalized, a dialect check was made on a sample of 5 children, 3 boys and 5 girls, drawn at random from the population of fourth graders eligible for the final sample of the study. The purpose of the check was to see whether or not certain phonemic contrasts were present in the speech of the population. While these children had all been in Michigan at least three years, a metropolitan area draws people from many parts of the country, and some idea of dialect consistency of the population was needed.

The contrasts under consideration were:

1. /i/, /e/ and /æ/ in the environment of /n/ and /m/.

In some dialects words such as pin, pen, and pan are pronounced as if the vowel were the same in all three.

2. /ey/, /e/, and /æ/ as the stressed vowel in the environment of /r/.

In some dialects these are differentiated in such words as Mary, merry and marry and in others they tend to be the same with /e/ being the phoneme common to all three words.

3. /yuw/ and /uw/

Both ITA and Unifon have different symbols for these phonemic expressions. Both can be found in such words as tune and new in dialects of native speakers of English.

4. /uw/ and /u/

Speakers vary in their use of these phonemes in words such as roof and hoop.

5. /a/ and /ɔ/

Some native speakers of English have no contrast between these vowels in words such as tot and taught.

6. /hw/ and /w/

Some English dialects lack the /h/ before the /w/ in words such as when and what.

The items of the instrument designed to check the dialect sample are located in Appendix B . It consisted of 20

sentences typed double-space in pica size on 3" by 5" cards. The subjects were asked to read the sentences aloud into the microphone of a tape recorder. Then, the underlined portions of words which contained the possibilities of responses related to the contrasts under study were transcribed phonemically. The summary of this analysis is given in Table 11 .

It will be noted that the contrast between /i/, /e/ and /æ/ preceding /n/ or /m/ was present in the speech of all the subjects. All of the subjects used /e/ in words such as Mary, merry, and marry. All five used /uw/ rather than /yuw/ in words such as dew, tune, and etc. The cases of /u/ and /uw/ were somewhat less clear-cut with only Subjects 2 and 5 being consistent in their use of /uw/, while the others varied, using /uw/ for hoof and hoot, and usually /u/ in soot. Subject 1, also, used /u/ in roof, root, and hoop. Subject 1, again varying from the others, showed no contrast between /a/ and /ɔ/, using /ɔ/ in all the environments checked. Child 4 used /a/ in all the environments checked except in the case of /k - t/, where there was a contrast distinguishing between the words cot and caught. With regard to the problem of /w/ and /hw/, Subject 2 omitted the /h/ before the /w/ even in words where other children in this region tend to pronounce it. The others used the expected contrasts in which and witch and whet and wet, but pronounced whale and wail the same way with an initial /h/ preceding the /w/.

Due to the dialect check, two words were spelled

TABLE 11

INCIDENCE OF SELECTED PHONEMIC CONTRASTS IN A
DIALECT SAMPLE OF THE CHERRY HILL POPULATION

Contrasts Studied	TO Spelling	Phonemic Response to Underlined Graphemes by Subjects				
		1	2	3	4	5
/i/, /e/, /æ/	pin	/i/	/i/	/i/	/i/	/i/
	p <u>e</u> n	/e/	/e/	/e/	/e/	/e/
	pa <u>n</u>	/æ/	/æ/	/æ/	/æ/	/æ/
	Jim	/i/	/i/	/i/	/i/	/i/
	g <u>e</u> m	/e/	/e/	/e/	/e/	/e/
	ja <u>m</u>	/æ/	/æ/	/æ/	/æ/	/æ/
/ey/, /e/, /æ/	M <u>a</u> ry	/e/	/e/	/e/	/e/	/e/
	m <u>e</u> rry	/e/	/e/	/e/	/e/	/e/
	ma <u>r</u> ry	/e/	/e/	/e/	/e/	/e/
	f <u>a</u> iry	/e/	/e/	/e/	/e/	/e/
	f <u>e</u> rry	/e/	/e/	/e/	/e/	/e/
	H <u>a</u> rry	/e/	/e/	/e/	/e/	/e/
/yuw/, /uw/	do	/uw/	/uw/	/uw/	/uw/	/uw/
	d <u>e</u> w	/uw/	/uw/	/uw/	/uw/	/uw/
	d <u>u</u> ne	/uw/	/uw/	/uw/	/uw/	/uw/
	t <u>u</u> ne	/uw/	/uw/	/uw/	/uw/	/uw/
	l <u>u</u> te	/uw/	/uw/	/uw/	/uw/	/uw/
	s <u>u</u> it	/uw/	/uw/	/uw/	/uw/	/uw/
/uw/, /u/	so <u>o</u> t	/u/	/uw/	/u/	/u/	/uw/
	ro <u>o</u> t	/u/	/uw/	/uw/	/uw/	/uw/
	ro <u>o</u> f	/u/	/uw/	/uw/	/uw/	/uw/
	ho <u>o</u> f	/uw/	/uw/	/uw/	/uw/	/uw/
	ho <u>o</u> p	/u/	/uw/	/uw/	/uw/	/uw/
	ho <u>o</u> t	/uw/	/uw/	/uw/	/uw/	/uw/
/a/, /ɔ/	Don	/ɔ/	/ɔ/	/a/	/a/	/a/
	d <u>a</u> wn	/ɔ/	/a/	/a/	/a/	/a/
	o <u>o</u> d	/ɔ/	/a/	/a/	/a/	/a/
	<u>a</u> wed	/ɔ/	/ɔ/	/ɔ/	/a/	/ɔ/

TABLE 11--Continued

Contrasts Studied	TO Spelling	Phonemic Response to Underlined Graphemes by Subjects				
		1	2	3	4	5
/a/, /ɔ/	<u>tot</u>	/ɔ/	/a/	/a/	/a/	/a/
	<u>taught</u>	/ɔ/	/ɔ/	/ɔ/	/a/	/ɔ/
	<u>cot</u>	/ɔ/	/a/	/a/	/a/	/a/
	<u>caught</u>	/ɔ/	/ɔ/	/ɔ/	/ɔ/	/ɔ/
/hw/, /w/	<u>which</u>	/hw/	/w/	/hw/	/hw/	/hw/
	<u>witch</u>	/w/	/w/	/w/	/w/	/w/
	<u>whet</u>	/hw/	/w/	/hw/	/hw/	/hw/
	<u>wet</u>	/w/	/w/	/w/	/w/	/w/
	<u>whale</u>	/hw/	/w/	/hw/	/hw/	/hw/
	<u>wail</u>	/hw/	/w/	/hw/	/hw/	/hw/

differently in the final ITA transliteration than they had been in the Rolf version. These words were new and suit, spelled in his version nue and suet. In these spellings the vowel stands for the phonemic expression /yuw/. Since all the subjects in the sample used /uw/ rather than /yuw/, the spelling was changed to nu and sut, so the vowel would stand for /uw/. While no other changes were made in the spellings of the words, the dialect check served to point up the difficulties of printing materials in these simplified orthographies which will fit the phonemic patterns of all readers' speech.

Test Administration. The plan for administering the tests called for three sittings. Each subject was tested in all three orthographies, thereby serving as his own control. In order to reduce the possible effects of remembering words printed in the familiar traditional orthography, that orthography was presented last. In order to reduce the advantage which might result from presenting one simplified orthography before or after the other, half the children were given ITA first and Unifon second and half were given Unifon first and ITA second. As has been discussed, there were three word orders of the instrument. Word Order 1 was printed only in TO, as that was the last to be administered. Word Orders 2 and 3 were printed in both ITA and Unifon. Half the children presented each simplified orthography in the first sitting were given Word Order 2 and the other half were given Word Order 3. The same procedure held true for

children presented each experimental orthography in the second sitting. Figures 1 and 2 present the descriptions of the forms of the test and the patterns for order of presentation of the forms. As may be seen, no subject received an order or an orthography more than once. Testing patterns were ordered at random, and as the subjects were chosen at random from the population pool, they were placed consecutively in a testing pattern. Since boys and girls were chosen in separate selections, the resulting design was an equal number of boys and an equal number of girls in each pattern group. Alternates, chosen at random, were assigned testing patterns in the same way.

The investigator and her husband, whose field of specialization is tests and measurements, administered all the tests. The directions, which are found in Appendix A, were read to the subject. The child was allowed to hold the booklet himself in the position most comfortable to him. Because the design called for a phonemic transcription of the responses, they were recorded using Norelco Carry-Corders '150' equipped with both batteries and the attachment for AC operation. The examiner held the microphone so the subject was free to turn the pages of the booklet.

Stopwatches were used to determine when approximately eight to ten seconds had elapsed before a response was made to a word. When this happened, the subject was urged to respond or go on to the next word. The word was never pronounced for the child. This was a departure from the

<u>Test Form</u>	<u>Description of the Form</u>
A ₁ O ₁	Traditional Orthography (TO) in Word Order 1
A ₂ O ₂	Initial Teaching Alphabet (ITA) in Word Order 2
A ₂ O ₃	Initial Teaching Alphabet (ITA) in Word Order 3
A ₃ O ₂	Single Sound Alphabet (Unifon) in Word Order 2
A ₃ O ₃	Single Sound Alphabet (Unifon) in Word Order 3

Figure 1.-- The Five Forms of the Word Recognition Test

<u>Pattern Designation</u>	N	<u>Order of Presentation of Test Forms</u>		
		<u>Sittings:</u>		
		<u>First</u>	<u>Second</u>	<u>Third</u>
I	20	A ₂ O ₂	A ₃ O ₃	A ₁ O ₁
II	20	A ₃ O ₂	A ₂ O ₃	A ₁ O ₁
III	20	A ₂ O ₃	A ₃ O ₂	A ₁ O ₁
IV	20	A ₃ O ₃	A ₂ O ₂	A ₁ O ₁

Figure 2.--Patterns for the Order of Presentation of the Forms of the Word Recognition Tests.

Rolf procedure in which the word was pronounced by the examiner and the child told to continue. It was desired in the present study that no cues be given by the examiner which might lead to learning the orthography from any source other than the reader's interaction with the printed page. If a child continued to hesitate, he was told to turn the page to the next stimulus word. The examiners were able to keep track of the words by means of numbers on the backs of the pages.

All words were presented to all subjects. This, too, was a departure from Rolf's method, which included a cut-off when a subject missed eight words in two levels. This was necessary for him because of the grade range of his subjects, first through sixth grades. However, it was reasoned in the present case that fourth graders could be administered the entire test without undue fatigue and that cut-off levels based on words missed in the various levels might prevent the exposure of the subjects to many of the polysyllabic stimulus words, as well as to words which might be easier to read in either one of the simplified orthographies than their designated level of difficulty in TO indicated.

The attempt to limit the intervals between test sittings to no less than five and no more than ten days for all subjects was achieved, as was the limit of one month for the entire test administration program. The testing began February 19, 1968 and ended March 15, 1968. It was hoped

this spacing of tests and limiting of the span of time between the first and third sittings would allow enough time for the subjects to take one test without being influenced significantly by recall of words from another and yet avoid the problem of maturation between the first and last testing.

Scoring the Tests

Phonemic Transcription. The first step in scoring the tests was determining whether or not the subjects had given a response which was an acceptable pronunciation of the word in English. Two English speakers listened to the tapes the first time through. Each recorded any instance when the subjects gave responses which were recognized as the stimulus word. The investigator, then listened to the tapes transcribing phonemically all responses. The individual sound phonemes, as well as the primary stress, which is phonemic in English, were transcribed. The patterns which were considered acceptable responses to stimulus words are found in Table 78 in Appendix A. Both acceptable and unacceptable responses were transcribed, as one purpose of the study was to investigate the relationship of miscues in words printed in the simplified orthographies to elements which interfere with the compatibility of ITA and Unifon with TO. Table 12 contains the system of phonemic transcription used in this study. The phonemic symbols are given together with key words written in traditional orthography to indicate the sound for which the symbol stands. The portions of the

TABLE 12
SYMBOLS OF ENGLISH PHONEMES
USED IN THIS STUDY

ConsonantsKey Words

p	pet, tap, dapple
b	bed, tab, baby
t	tub, stop, sat, pretty
d	dot, bad, daddy
k	kill, cat, sack, locker
g	gate, bag, bigger
q	chest, rich, matches
j	jug, judge, wager, major, soldier
th	thing, bath, pithy
dh	they, bathe, mother
f	fate, phone, safer, staff, laugh
v	vat, waver, have
s	sad, boss, sister
z	zip, whiz, has, weasle
ʃ	shell, wish, motion
z	measure, azure
m	mat, ram, humming, column
n	net, knit, clan, cleaner
ŋ	sing, drank, swinging
h	hat, behold
l	let, spell, filler
r	ran, near, narrow
y	yet, lawyer
w	way

VowelsKey Words

i	bit
e	bet, care, pear, hair
æ	bat
a	pot, father, cart, heart
o	pour, court, bore, door
u	good, should
ə	hut, butter, hurry, worry, shirt
ɪ	often, in children, just, wanted
ɔ	saw, fall, haul, trough
iy	beet, beat, receive
ey	bait, mate, eight
ay	ride, fight, try
oy	boy, noise
uw	shoot, flute, flew, through, to, two
ow	hope, now, woe, go, though
aw	ouch, how

Stress

/ primary stress symbol

key words which have grapheme correspondence to the phonemes are underlined.

When the final response made by a subject was acceptable as a phonemic representation of the stimulus word, the response was counted as correct. When the subject gave either an unacceptable final response or no response, i.e., refused verbally to give an oral response, or turned the page and went on to the next item, the response was counted as incorrect. The number of times the subjects tried to correct a response, i.e., spontaneously attempted the word again, were recorded and listed as corrections. The number of times the subjects received prompting reminders was also recorded. Tables 79 and 80 of Appendix C contain the totals of the responses of the subjects in terms of number of correct responses, number of refusals, number of attempted corrections, and number of prompts.

CHAPTER IV

RESULTS

The research hypotheses and the procedures designed to collect data concerning them resulted in two general parts to this investigation. The first portion centered around the attempt to discover the degree of compatibility of ITA and Unifon with the traditional writing system as evidenced by the 80 TO trained fourth grade readers' performance in reading aloud identical words printed in each simplified orthography and TO. The statistical analyses of the subjects' test scores included:

1. A comparison of the means of the subjects' scores in each orthography of the word recognition test.
2. A comparison of the correlation coefficients obtained when the subjects' scores in the TO version of the test were compared with the scores of the simplified orthographic versions and the latter with one another.
3. Analyses of the influence of the order in which the orthographies and the word orders were presented on the subjects' ITA and Unifon scores.

The second portion of the investigation centered around the research hypotheses concerning elements in ITA and Unifon which interfere with the compatibility of each with TO. This phase included:

1. The selection of low transfer and high transfer words in each simplified orthography.
2. The analysis of miscues of low transfer words in an effort to identify the sources of incompatibility between each simplified orthography and TO.

Comparison of the Performance of the Sample
on the TO, ITA and Unifon Versions
of the Word Recognition Test

COMPARISON OF MEANS

Means of Correct Responses. The first research hypothesis stated that TO trained fourth grade readers would read more words correctly in ITA than in Unifon, when they were asked to read aloud identical words printed in TO, ITA and Unifon.

Table 13 presents the means and standard deviations of correct responses in each orthography. The results are presented separately for boys and girls and the total sample. Although the study of differences between performances of boys and girls was not a central part of this investigation, the breakdown of results by sex may be regarded as a source of secondary information.

The means for the total group in descending order were 104.49 for TO, 73.90 for ITA and 34.16 for Unifon. Girls achieved higher means in all orthographies. When this difference was tested by the pooled variance t , no significant differences between the means of the sexes in the scores of correct responses were found. The results of these t tests

TABLE 13

MEANS AND STANDARD DEVIATIONS OF THE NUMBER CORRECT
ON THE WORD RECOGNITION TEST
IN TO, ITA AND UNIFON

Sex	N	TO		ITA		Unifon	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
M	40	99.93	24.36	68.95	22.58	31.85	12.14
F	40	109.05	22.95	78.85	22.14	36.48	13.46
M+F	80	104.49	24.10	73.90	22.90	34.16	13.03

TABLE 14

COMPARISON OF MEANS OF NUMBER CORRECT FOR BOYS AND
GIRLS ON THE WORD RECOGNITION TEST IN
TO, ITA AND UNIFON

Test	Orthography	N	Boys		Girls		Diff.	t
			Mean	S.D.	Mean	S.D.		
TO		40	99.93	24.36	109.95	22.95	9.12	.38
ITA		40	68.95	22.58	78.85	22.14	9.90	.57
Unifon		40	31.85	12.14	36.48	13.46	4.63	.56

are in Table 14.

Table 15 summarizes the data obtained, when the mean scores in each of the orthographies were compared with each of the others for differences. The t test applied was that for correlated data. The results of the tests of all three mean differences (TO less ITA, TO less Unifon and ITA less Unifon) were significant well beyond the .01 level. The means of the TO scores were significantly higher than the means of ITA or Unifon and the means of ITA were significantly higher than the means of Unifon. These differences were found for boys, for girls and for the total sample.

The standard deviations of the Unifon scores were much smaller than those of the other two versions of the test. The range of scores in that orthography was 63, as opposed to 106 and 112 for ITA and TO respectively. Unifon scores, also, tended to cluster at the low end of the Unifon distribution.

The research hypothesis favoring ITA over Unifon as the simplified orthography in which the TO trained fourth grade readers would be most successful was supported.

Means of Refusals, Prompts, and Corrections. A related comparison was made of the behavior of the subjects with respect to their refusing to give a response, needing to be prompted to respond, or attempting to correct initial responses to items in each orthography. It was reasoned that refusals might indicate a lack of confidence in attacking a word or simply that the word contained insufficient

TABLE 15

COMPARISON OF MEANS OF NUMBER CORRECT ON THE WORD
RECOGNITION TEST IN TO, ITA AND UNIFON

Sex	N	Test Orthog- raphy	Mean	S.D.	Test Orthog- raphy	Mean	S.D.	Diff.	t ^a
<hr/>									
		ITA			TO				
M	40		68.95	22.58		99.93	24.36	30.98	20.38
F	40		78.85	22.14		109.05	22.95	30.20	22.37
M+F	80		73.90	22.90		104.49	24.10	30.59	31.21
<hr/>									
		Unifon			TO				
M	40		31.85	12.14		99.93	24.36	68.08	23.72
F	40		36.48	13.46		109.05	22.95	72.57	30.49
M+F	80		34.16	10.03		104.49	24.10	70.33	39.07
<hr/>									
		ITA			Unifon				
M	40		68.95	22.58		31.85	12.14	37.10	15.92
F	40		78.85	22.14		36.48	13.46	42.37	20.57
M+F	80		73.90	22.90		34.16	13.03	39.74	25.30

^a All differences significant beyond the .01 level

cues for the reader to make a response which was meaningful to him. The need to be prompted might mean either of the above, as well as that the reader was trying to apply skills learned in reading TO to decoding the unfamiliar printed pattern. Tinker (1968), as reported in Chapter II, has spoken of the letter-by-letter attack often made on unfamiliar words by TO readers. Corrections, it is suggested, might mean that the subject, on hearing his own response or on anticipating the remainder of the partially uttered response, decided he was "on the wrong track" and sought to recover his miscue. It seemed that these types of responses added further information concerning the behavior of the readers, when they were faced with reading in an unfamiliar writing system. The idea of recording this behavior emerged in the process of the test administration and was not a part of the initial design. However, some of the results of the comparisons are reported here to give a more complete picture of the behavior of the sample.

Tables 16 through 20 refer to behaviors regarding refusals, prompts and corrections on the three orthographic forms of the word recognition test. Table 16 summarizes the means attained in these categories in reading each orthography. Tables 17, 18, and 19 report the results of t tests to determine the significance of the differences between means, when the performances in each orthography were compared with the others. Table 20 reports the comparisons of means of boys and girls for each category and each orthography.

TABLE 16

MEANS AND STANDARD DEVIATIONS OF REFUSALS, PROMPTS,
AND CORRECTIONS ON THE WORD RECOGNITION TEST
IN TO, ITA AND UNIFON

Category	Sex	N	TO		ITA		Unifon	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
<u>Refusals:</u>	M	40	1.62	4.04	4.52	10.90	11.92	18.46
	F	40	1.22	3.82	4.57	8.36	11.17	17.71
	M+F	80	1.42	3.94	4.55	9.71	11.55	18.09
<u>Prompts:</u>	M	40	1.80	4.66	2.75	6.66	8.45	14.22
	F	40	.45	1.13	1.95	4.17	4.22	6.35
	M+F	80	1.12	3.46	2.35	5.57	6.33	11.22
<u>Corrections:</u>	M	40	7.02	7.25	8.32	9.43	9.92	9.93
	F	40	5.12	6.76	8.75	9.93	9.02	9.22
	M+F	80	6.07	7.08	8.53	9.69	9.47	9.59

TABLE 17

COMPARISON OF MEANS OF REFUSALS IN TO, ITA AND UNIFON
ON THE WORD RECOGNITION TEST

Sex	N	Test Orthog- raphy	Mean	S.D.	Test Orthog- raphy	Mean	S.D.	Diff	t
<hr/>									
		TO			ITA				
M	40		1.62	4.04		4.52	10.90	2.90	2.48 ^b
F	40		1.22	3.82		4.57	8.36	3.35	2.37 ^b
M+F	80		1.42	3.94		4.55	9.71	3.13	4.12 ^a
<hr/>									
		TO			Unifon				
M	40		1.62	4.04		11.92	18.46	10.30	4.07 ^a
F	40		1.22	3.82		11.17	17.71	9.95	4.09 ^a
M+F	80		1.42	3.94		11.55	18.09	10.13	5.79 ^a
<hr/>									
		ITA			Unifon				
M	40		4.52	10.90		11.92	18.46	7.40	4.16 ^a
F	40		4.57	8.36		11.17	17.71	6.60	3.32 ^a
M+F	80		4.55	9.71		11.55	18.09	13.54	5.33 ^a

^a Significant at .01 level

^b Significant at .05 level

TABLE 18

COMPARISON OF MEANS OF PROMPTS IN TO, ITA AND UNIFON
ON THE WORD RECOGNITION TEST

Sex	N	Test Orthog- raphy	Mean	S.D.	Test Orthog- raphy	Mean	S.D.	Diff.	t
		TO			ITA				
M	40		1.80	4.66		2.75	6.66	.95	1.64
F	40		.45	1.13		1.95	4.17	1.50	2.46 ^b
M+F	80		1.12	3.46		2.35	5.57	1.23	3.00 ^a
		TO			Unifon				
M	40		1.80	4.66		8.45	14.22	6.65	3.89 ^a
F	40		.45	1.13		4.22	6.35	3.77	3.70 ^a
M+F	80		1.12	3.46		6.33	11.22	5.21	5.11 ^a
		ITA			Unifon				
M	40		2.75	6.66		8.45	14.22	5.70	3.24 ^a
F	40		1.95	4.17		4.22	6.35	2.27	2.67 ^b
M+F	80		2.35	5.57		6.33	11.22	3.98	3.79 ^a

^a Significant at .01 level

^b Significant at .05 level

TABLE 19

COMPARISON OF MEANS OF CORRECTIONS IN TO, ITA AND UNIFON
ON THE WORD RECOGNITION TEST

Sex	N	Test Orthog- raphy	Mean	S.D.	Test Orthog- raphy	Mean	S.D.	Diff.	t
		TO			ITA				
M	40		7.02	7.25		8.32	9.43	1.30	.09
F	40		5.12	6.76		8.75	9.93	3.63	2.34 ^b
M+F	80		6.07	7.08		8.53	9.69	2.46	2.41 ^b
		TO			Unifon				
M	40		7.02	7.25		9.92	9.93	2.90	2.13 ^b
F	40		5.12	6.76		9.02	9.22	3.90	2.34 ^b
M+F	80		6.07	7.08		9.47	9.59	3.40	3.15 ^a
		ITA			Unifon				
M	40		8.32	9.43		9.92	9.93	1.60	.99
F	40		8.75	9.93		9.02	9.22	.27	.21
M+F	80		8.53	9.69		9.47	9.59	.94	.92

^a Significant beyond .01 level
^b Significant at .05 level

TABLE 20

COMPARISON OF MEANS OF REFUSALS, PROMPTS AND CORRECTIONS
FOR BOYS AND GIRLS ON THE WORD RECOGNITION TEST
IN TO, ITA AND UNIFON

Test Orthog- raphy	N	Boys		Girls		Diff.	t
		Mean	S.D.	Mean	S.D.		
<u>Refusals</u>							
TO	40	1.62	4.04	1.22	3.82	.40	.42
ITA	40	4.52	10.90	4.57	8.36	.05	.01
Unifon	40	11.92	18.46	11.17	17.70	.75	.16
<u>Prompts</u>							
TO	40	1.80	4.66	.45	1.13	1.35	1.89
ITA	40	2.75	6.66	1.95	4.17	.80	.59
Unifon	40	8.45	14.22	4.22	6.34	4.23	1.45
<u>Corrections</u>							
TO	40	7.03	7.25	5.13	6.76	1.90	.93
ITA	40	8.32	9.43	8.75	9.94	.43	.15
Unifon	40	9.92	9.93	9.03	9.23	.90	.30

The results of the comparisons of means for refusals, corrections and prompts are summarized in the following discussion.

The most refusals, prompts and corrections tended to occur when the children were reading the material printed in Unifon and the least, as might be expected, when they were reading the conventional orthography. ITA ranked second in producing these behaviors.

When the differences between means were compared for the total sample, the following results were significant:

1. Reading in Unifon resulted in higher means for refusals, prompts and corrections than did reading in TO. The significance was at the .01 level.
2. Reading in Unifon resulted in higher means for refusals and prompts than did reading in ITA. The significance level was .01.
3. Reading in ITA resulted in higher means for refusals, prompts and corrections than reading in TO. The levels of significance for these differences were .01 for refusals and prompts and .05 for corrections.

When the differences between means for boys were compared, the following differences were significant:

1. Reading in Unifon resulted in higher means for refusals, prompts and corrections than reading in TO. The levels of significance were .01 for refusals and prompts and .05 for corrections.
2. Reading in Unifon resulted in higher means for

refusals and prompts than reading in ITA. Both differences reached the .01 level of significance.

3. Reading in ITA resulted in higher means for refusals than reading in TO. The significance level was .05.

When the differences between means for girls were compared, the following differences were significant:

1. Reading in Unifon resulted in higher means for refusals, prompts and corrections than reading in TO. The levels of significance were .01 for refusals and prompts and .05 for corrections.
2. Reading in Unifon resulted in higher means for refusals and prompts than reading in ITA. The significance levels for these differences were .01 for refusals and .05 for prompts.
3. Reading in ITA resulted in more refusals, prompts and corrections than reading in TO. The significance level for all three categories was .05 .

When differences between the means for the sexes in each orthography were compared, there were no significant differences.

These comparisons of the mean refusals, prompts and corrections for and between the various orthographies indicate that the differences in refusing behavior were the most consistent, with the subjects tending to refuse to respond to Unifon items more often than ITA items. The same results were true to a slightly less significant degree of the need to be prompted. Neither orthography appeared to produce

significantly more correcting behavior than the other. Sex differences in these behaviors were not significant.

If refusing to respond and the need to be prompted are interpreted as indices of the difficulty of the medium, it may be concluded that Unifon was more difficult for these TO trained readers to read than ITA.

COMPARISON OF CORRELATION COEFFICIENTS

Correlations between Correct Responses. The second research hypothesis dealt with the relationship of the performances of the subjects in each of the simplified orthographies with their performances in TO. It was postulated that the ITA and TO performances would be more closely related than the Unifon and TO performances.

The product moment correlation coefficients were computed for each combination of variables. These are shown in Table 21. All were significant well beyond the .01 level. For the total sample the highest relationship was that between TO and ITA (.93) and the lowest between TO and Unifon (.78). The ITA-Unifon coefficient of correlation was .83 . The same order of coefficients from high to low was found in the results for boys and girls.

Table 22 reports the outcomes of the t tests of significance of the differences between each correlated combination and the others. The formula used for this t test is taken from Ferguson (1959, pp.154-55). The comparisons of differences between correlations for the total sample revealed that the TO-ITA coefficient (.93) was significantly higher than

TABLE 21

CORRELATION COEFFICIENTS BETWEEN THE NUMBER CORRECT
ON THE WORD RECOGNITION TEST IN TO, ITA AND UNIFON

Sex	N	Test Orthographies		
		<u>TO-ITA</u>	<u>TO-Unifon</u>	<u>ITA-Unifon</u>
		r^a	r^a	r^a
M	40	.85	.77	.82
F	40	.90	.78	.84
M+F	80	.93	.78	.83

^a All correlation coefficients are significant
at the .01 level

TABLE 22
COMPARISON OF CORRELATION COEFFICIENTS BETWEEN
NUMBER CORRECT ON THE WORD RECOGNITION
TEST IN TO, ITA AND UNIFON

Sex	N	Correlated Test Orthographies	r	Correlated Test Orthographies	r	Diff	t
		TO-ITA		TO-Unifon			
M	40		.85		.77	.08	1.59
F	40		.90		.78	.12	2.97 ^a
M+F	80		.93		.78	.15	6.00 ^a
		TO-ITA		ITA-Unifon			
M	40		.85		.82	.03	.54
F	40		.90		.84	.06	1.48
M+F	80		.93		.83	.10	4.03 ^a
		TO-Unifon		ITA-Unifon			
M	40		.77		.82	.05	.92
F	40		.78		.84	.06	1.52
M+F	80		.78		.83	.05	2.12 ^b

^a Significant at .01 level

^b Significant at .05 level

either the TO-Unifon coefficient (.78) or the ITA-Unifon coefficient (.83). The significance level was .01 in each case. The ITA-Unifon coefficient (.83) was significantly higher than the TO-Unifon coefficient (.78). This difference was significant at the .05 level.

While the differences between coefficients for boys and girls were higher in the same directions for the same comparisons, the only significant difference was that between the TO-ITA coefficient and the TO-Unifon coefficient for girls. This difference reached the .01 level of significance.

The Fisher z_r transformation (Ferguson, 1959, pp.153-54) was applied to test the differences between correlation coefficients for boys and girls when the orthographies were correlated. Table 23 summarizes these differences, which were not significant.

Correlations between Correct Responses and IQs. Much of the research related to reading has reported evidence of the high positive relationship between IQ and reading performance. Rolf (1968) found high positive correlations between ITA performance and IQ using the same word recognition test as the one used in the present investigation. Therefore, the IQs and number of correct responses of the subjects were correlated for each orthography in which the test was offered. The results of correlating these variables are reported in Table 24. The coefficients obtained were all positive and significant beyond the .01 level.

Table 25 summarizes the results of the t test applied

TABLE 23

COMPARISON OF BOYS' AND GIRLS' CORRELATION COEFFICIENTS
 BETWEEN NUMBER CORRECT ON THE WORD RECOGNITION
 TEST IN TO, ITA AND UNIFON

Correlated Orthographies	N	Boys	Girls	Diff.	z_r
TO-ITA	40	.85	.90	.15	.91
TO-Unifon	40	.77	.78	.01	.10
ITA-Unifon	40	.82	.84	.02	.27

TABLE 24
CORRELATION COEFFICIENTS BETWEEN THE NUMBER
CORRECT ON THE WORD RECOGNITION TEST IN
TO, ITA, AND UNIFON AND THE IQ

Variables Correlated				
Sex	N	TO-IQ r^a	ITA-IQ r^a	Unifon-IQ r^a
M	40	.67	.68	.70
F	40	.59	.65	.62
M+F	80	.65	.68	.65

^a All correlations significant at the
.01 level

TABLE 25

COMPARISON OF CORRELATION COEFFICIENTS BETWEEN THE
NUMBER CORRECT ON THE WORD RECOGNITION TEST
IN TO, ITA AND UNIFON AND THE IQ

Sex	N	Correlated Variables	r	Correlated Variables	r	Diff.	t
		TO-IQ		ITA-IQ			
M	40		.67		.68	.01	.12
F	40		.59		.65	.06	.57
M+F	80		.65		.68	.03	.44
		TO-IQ		Unifon-IQ			
M	40		.67		.70	.03	.35
F	40		.59		.62	.03	.28
M+F	80		.65		.65	.00	.00
		ITA-IQ		Unifon-IQ			
M	40		.68		.70	.02	.23
F	40		.65		.62	.03	.28
M+F	80		.68		.65	.03	.44

to the differences between correlation coefficients obtained for IQ and each of the orthographies. No significant differences were revealed. IQ was apparently related in a similar fashion to the subjects' success in reading in each orthography.

The comparisons of the correlation differences between the sexes for the IQ-TO, IQ-ITA, and IQ-Unifon relationships were also no greater than chance expectancy. Table 26 reports the results of the Fisher z_r transformation test applied to these correlation differences.

Partial Correlations. The high positive coefficients of correlation obtained between the IQs and the number of correct responses to the three versions of the test led to the computation of partial correlations. The purpose was to determine the relationships holding IQ constant. Table 27 contains the results of these computations. Both the correlation coefficients and their significance in terms of the t test are reported. Again, all showed positive and very significant (.01 level) relationships. The rank order of coefficients for the total sample was TO-ITA (.83), ITA-Unifon (.71) and TO-Unifon (.64). While the coefficients were somewhat reduced between the orthographies, the rank order was the same as that obtained for the correlations when IQ was not partialled out and again it held for the boys and girls, as well as the total sample.

The t test was applied to the partial correlations to check for the significance of the differences between them.

TABLE 26

COMPARISON OF CORRELATION COEFFICIENTS BETWEEN BOYS AND
GIRLS FOR NUMBER CORRECT ON THE WORD RECOGNITION
TEST IN TO, ITA AND UNIFON AND THE IQ

Correlated Variables	N	Boys	Girls	Diff.	z_r
TO-IQ	40	.67	.59	.08	.55
ITA-IQ	40	.68	.65	.03	.23
Unifon-IQ	40	.70	.62	.08	.63

TABLE 27

THE SIGNIFICANCE OF THE PARTIAL CORRELATIONS^b
 FOR NUMBER CORRECT ON THE WORD RECOGNITION
 TEST IN TO, ITA AND UNIFON

Correlated Orthographies							
<u>Sex</u>	<u>N</u>	<u>TO-ITA</u>		<u>TO-Unifon</u>		<u>ITA-Unifon</u>	
		<u>r</u>	<u>t^a</u>	<u>r</u>	<u>t^a</u>	<u>r</u>	<u>t^a</u>
M	40	.70	5.98	.58	4.33	.66	5.31
F	40	.84	9.44	.65	5.20	.70	5.98
M+F	80	.88	16.30	.64	7.36	.71	8.88

^a All ts significant at the .01 level

^b IQ held constant

The results are contained in Table 28. As in the product moment correlations, the differences between TO-ITA and TO-Unifon were the highest. These differences were significant for girls and for the total sample. The next highest set of differences was that between TO-ITA and ITA-Unifon. Of these differences, the one for the total sample was significant at the .01 level and the one for girls at the .05 level. In these two sets of differences the relationship of TO to ITA was higher than the others. The TO-Unifon and ITA-Unifon comparisons again showed ITA and Unifon performances to be more closely related, but the differences were no greater than chance expectancy. The differences for boys were insignificant in all three sets of comparisons. This had also been the finding when comparing the product moment coefficients.

When the Fisher z_r transformation was applied to the differences between correlation coefficients obtained for each sex between the comparisons of TO and ITA, TO and Unifon and ITA and Unifon, no significant differences were found. The z_r transformations for these comparisons are contained in Table 29.

In summary, the correlations involving number of correct responses in each orthography can be said to indicate that:

1. The ITA reading performances of these children were more closely related to their TO reading than to their Unifon reading performances. For the girls and the total sample, the differences between the

TABLE 28

COMPARISON OF PARTIAL CORRELATION COEFFICIENTS^c BETWEEN
NUMBER CORRECT ON THE WORD RECOGNITION TEST
IN TO, ITA AND UNIFON

Sex	N	Correlated Test Orthographies	r	Correlated Test Orthographies	r	Diff.	t
		TO-ITA		TO-Unifon			
M	40		.70		.58	.12	1.81
F	40		.84		.65	.19	2.79 ^a
M+F	80		.88		.64	.24	5.85 ^a
		TO-ITA		ITA-Unifon			
M	40		.70		.66	.04	.41
F	40		.84		.70	.14	2.03 ^b
M+F	80		.88		.71	.17	4.06 ^a
		TO-Unifon		ITA-Unifon			
M	40		.58		.66	.08	.86
F	40		.65		.70	.05	.76
M+F	80		.64		.71	.07	1.79

^a Significant at .01 level

^b Significant at .05 level

^c IQ held constant

TABLE 29

COMPARISON OF BOYS' AND GIRLS' PARTIAL CORRELATION
COEFFICIENTS^a BETWEEN NUMBER CORRECT ON
THE WORD RECOGNITION TEST IN
IN TO, ITA AND UNIFON

Correlated Orthographies	N	Boys	Girls	Diff.	z_r
TO-ITA	40	.70	.84	.14	1.48
TO-Unifon	40	.58	.65	.13	.47
ITA-Unifon	40	.66	.70	.04	.31

^a IQ held constant

coefficients of correlation were significantly greater than chance would yield. This was true when the effects of IQ had been eliminated and when they had not.

2. The sex differences between correlated pairs of orthographies were not significant. This was the case both when IQ was held constant and when it was not.

The research hypothesis favoring a stronger TO-ITA than TO-Unifon relationship for number correct in each orthography was supported for the girls and for the total sample.

Correlations between Refusals, Prompts and Corrections.

The comparisons of correlations of refusals, prompts and corrections are presented in Tables 30 through 34. In all except three instances the correlations for refusals, prompts and corrections yielded coefficients considered significant. The exceptions were the correlations for prompts, when the scores in TO-Unifon and ITA-Unifon were compared for girls and the girls' refusal coefficients for TO and Unifon. The girls' TO-ITA coefficients in the categories of prompts and corrections were at the .05 level, while the remaining relationships were significant at the .01 level.

Boys' correlations in all categories for all combinations except two were higher than girls'. These exceptions were the ITA-Unifon coefficients for corrections, where the girls had higher correlation coefficients and the TO-Unifon refusal coefficients, where the results were identical. Sex

TABLE 30

CORRELATION COEFFICIENTS BETWEEN REFUSALS, PROMPTS
AND CORRECTIONS ON THE WORD RECOGNITION
TEST IN TO, ITA AND UNIFON

Category	Sex	N	Correlated Orthographies		
			TO-ITA	TO-Unifon	ITA-Unifon
<u>Refusals</u>	M	40	.91 ^a	.68 ^a	.83 ^a
	F	40	.73 ^a	.68 ^a	.76 ^a
	M+F	80	.83 ^a	.68 ^a	.80 ^a
<u>Prompts</u>	M	40	.84 ^a	.80 ^a	.65 ^a
	F	40	.39 ^b	-.02	.24
	M+F	80	.74 ^a	.72 ^a	.55 ^a
<u>Corrections</u>	M	40	.52 ^a	.53 ^a	.45 ^a
	F	40	.36 ^b	.15	.65 ^a
	M+F	80	.44 ^a	.36 ^a	.55 ^a

^a Significant at .01 level

^b Significant at .05 level

TABLE 31

COMPARISON OF BOYS' AND GIRLS' CORRELATION COEFFICIENTS
FOR REFUSALS, PROMPTS AND CORRECTIONS ON THE WORD
RECOGNITION TEST IN TO, ITA AND UNIFON

Correlated Test Orthographies	N	Coefficients of Correlation		Diff.	z _r
		Boys	Girls		
<u>REFUSALS</u>					
TO-ITA	40	.91	.73	.18	2.43 ^b
TO-Unifon	40	.68	.68	.00	
ITA-Unifon	40	.83	.76	.07	.80
<u>PROMPTS</u>					
TO-ITA	40	.84	.39	.45	2.48 ^b
TO-Unifon	40	.80	-.02	.82	4.66 ^a
ITA-Unifon	40	.65	.24	.41	2.21 ^b
<u>CORRECTIONS</u>					
TO-ITA	40	.52	.36	.17	.81
TO-Unifon	40	.53	.15	.38	1.85
ITA-Unifon	40	.45	.65	.20	1.21

^a Significant at .01 level

^b Significant at .05 level

TABLE 32
COMPARISON OF CORRELATION COEFFICIENTS BETWEEN
REFUSALS ON THE WORD RECOGNITION TEST IN
TO, ITA AND UNIFON

Sex	N	Correlated Orthographies	r	Correlated Orthographies	r	Diff.	t
		TO-ITA		TO-Unifon			
M	40		.91		.68	.23	6.11 ^a
F	40		.73		.68	.05	.65
M+F	80		.83		.68	.15	3.80 ^a
		TO-ITA		ITA-Unifon			
M	40		.91		.83	.08	2.03 ^b
F	40		.73		.76	.03	.36
M+F	80		.83		.80	.03	.73
		TO-Unifon		ITA-Unifon			
M	40		.68		.83	.15	4.07 ^a
F	40		.68		.76	.08	1.03
M+F	80		.68		.80	.12	3.02

^a Significant at .01 level

^b Significant at .05 level

TABLE 33

COMPARISON OF CORRELATION COEFFICIENTS BETWEEN PROMPTS
ON THE WORD RECOGNITION TEST
IN TO, ITA AND UNIFON

Sex	N	Correlated Orthographies	r	Correlated Orthographies	r	Diff.	t
		TO-ITA		TO-Unifon			
M	40		.84		.80	.04	.69
F	40		.39		-.02	.41	2.35 ^b
M+F	80		.74		.72	.02	.33
		TO-ITA		ITA-Unifon			
M	40		.84		.65	.19	3.27 ^a
F	40		.39		.24	.15	.76
M+F	80		.74		.55	.19	3.31 ^a
		TO-Unifon		ITA-Unifon			
M	40		.80		.65	.15	1.81
F	40		-.02		.24	.26	2.49 ^b
M+F	80		.72		.55	.17	1.97

^a Significant at .01 level

^b Significant at .05 level

TABLE 34

COMPARISON OF CORRELATION COEFFICIENTS BETWEEN CORRECTIONS
ON THE WORD RECOGNITION TEST IN TO, ITA AND UNIFON

Sex	N	Correlated Orthographies	r	Correlated Orthographies	r	Diff.	t
		TO-ITA		TO-Unifon			
M	40		.52		.53	.01	.07
F	40		.36		.15	.21	1.65
M+F	80		.44		.36	.08	.83
		TO-ITA		ITA-Unifon			
M	40		.52		.45	.07	.53
F	40		.36		.65	.29	1.90
M+F	80		.44		.55	.11	1.07
		TO-Unifon		ITA-Unifon			
M	40		.53		.45	.08	.61
F	40		.15		.65	.50	3.55 ^a
M+F	80		.36		.55	.19	1.91

^a Significant at .01 level

differences between correlations were significant for all prompt correlation coefficients and for the TO-ITA coefficient in the refusal category. Only one of these, the TO-Unifon in the prompt category, was significant at the .01 level. The others attained only a .05 level of significance.

The comparisons of differences between relationships between TO and ITA and TO and Unifon revealed that the TO-ITA coefficient was higher in all categories (refusals, prompts and corrections) for all subjects. The level of significance for girls in the prompt category was at .05 .

While the results of the correlations for refusals, prompts and corrections are not so clear-cut as those for the correlation of number of correct responses, there is evidence that even the behaviors involving refusals to respond and needing to be prompted are more closely related, when the subjects read in ITA and TO, than when they read in Unifon and TO. Just as in the case of the differences between means, the differences between correlations for corrections were not significant.

ANALYSIS OF COVARIANCE

The design had called for the tests to be administered in four test patterns. The purpose of this patterning was to cancel out the influence of word order and order of presentation of each test orthography on the subjects' performances in reading the simplified orthographies. An analysis of covariance was made of the performances of the subjects in these test patterns in terms of each orthography. The

groups were studied on the basis of the word orders and sitting orders of the presentations of the orthographies. Both performance on the TO version of the word recognition test and the IQs of the sample had been shown in the earlier comparisons to be highly related to the performances in the two simplified orthographies. Therefore, analyses of covariance were computed controlling for the influence of each of these variables.

The results are reported for ITA achievement in Tables 35 through 42 and for Unifon achievement in Tables 43 through 50. The only significant F ratios obtained were those comparing the differences between groups presented Unifon words in Word Order 3 at different sessions. When IQ was controlled, the F ratio was significant at the .01 level (Table 46), and when TO achievement was controlled, the difference was significant at the .05 level (Table 45). This result indicates that, while order of words and order of presentations of orthographies did not affect the performance of the subjects where ITA was concerned, the sitting in which the Unifon form of Word Order 3 was presented did make a difference. Therefore, the patterning of the test forms according to word order and the presentation sittings according to orthography is a wise technique when same sample comparisons are to be made. Such patterning helped cancel out differences which would have had significant effects, if all subjects had been given only one word order form of the test and one simplified orthography had always been presented

TABLE 35

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN THE SAME WORD ORDER (2) BUT AT DIFFERENT
SESSIONS (I AND II) CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	41.97	41.97	.55
Within	37	2837.86	76.70	
Total	38	2879.83		

TABLE 36

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN THE SAME WORD ORDER (2) BUT AT DIFFERENT
SESSIONS (I AND II) CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F
Between	1	66.27	66.27	.98
Within	37	2505.26	67.71	
Total	38	2571.53		

TABLE 37

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN THE SAME WORD ORDER (3) BUT AT DIFFERENT
SESSIONS (I AND II) CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	29.07	29.07	.41
Within	37	2651.46	71.66	
Total	38	2680.53		

TABLE 38

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN THE SAME WORD ORDER (3) BUT AT DIFFERENT
SESSIONS (I AND II) CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	8.92	8.92	.10
Within	37	3259.08	88.08	
Total	38	3268.00		

TABLE 39

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN DIFFERENT WORD ORDERS (2 AND 3) BUT AT
THE SAME SESSION (I) CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	136.07	136.07	1.91
Within	37	2638.80	71.32	
Total	38	2774.87		

TABLE 40

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN DIFFERENT WORD ORDERS (2 AND 3) BUT AT
THE SAME SESSION (I) CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	43.79	43.79	.55
Within	37	2969.99	80.27	
Total	38	3013.78		

TABLE 41

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN DIFFERENT WORD ORDERS (2 AND 3) BUT AT THE
SAME SESSION (II) CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	1.89	1.89	.02
Within	37	2825.26	76.36	
Total	38	2827.15		

TABLE 42

ANALYSIS OF COVARIANCE OF ITA SCORES OF GROUPS PRESENTED
WORDS IN DIFFERENT WORD ORDERS (2 AND 3) BUT AT THE
SAME SESSION (II) CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	4.83	4.83	.05
Within	37	3526.49	95.31	
Total	38	3531.32		

TABLE 43

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN SAME WORD ORDER (2) BUT
AT DIFFERENT SESSIONS (I AND II)
CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	19.94	19.94	.25
Within	37	2969.98	80.27	
Total	38	2989.92		

TABLE 44

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN SAME WORD ORDER (2) BUT
AT DIFFERENT SESSIONS (I AND II)
CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Square	F
Between	1	677.53	677.53	2.70
Within	37	9285.59	250.96	
Total	38	9963.12		

TABLE 45

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN SAME WORD ORDER (3) BUT
AT DIFFERENT SESSIONS (I AND II)
CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	362.48	362.48	4.98 ^a
Within	37	2695.15	72.84	
Total	38	3057.63		

^a Significant at .05 level

TABLE 46

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN SAME WORD ORDER (3) BUT
AT DIFFERENT SESSIONS (I AND II)
CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	1408.78	1408.78	8.84 ^a
Within	37	5894.03	159.30	
Total	38	7302.81		

^a Significant at .01 level

TABLE 47

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN DIFFERENT WORD ORDERS
(2 AND 3) BUT AT THE SAME SESSION (I)
CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	18.83	18.83	.23
Within	37	3029.20	81.86	
Total	38	3048.03		

TABLE 48

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN DIFFERENT WORD ORDERS
(2 AND 3) BUT AT THE SAME SESSION (I)
CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	230.06	230.06	1.04
Within	37	8163.52	220.64	
Total	38	8393.58		

TABLE 49

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN DIFFERENT WORD ORDERS
(2 AND 3) BUT AT THE SAME SESSION (II)
CONTROLLING FOR IQ

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	42.21	42.21	.58
Within	37	2677.10	72.35	
Total	38	2719.31		

TABLE 50

ANALYSIS OF COVARIANCE OF UNIFON SCORES OF GROUPS
PRESENTED WORDS IN DIFFERENT WORD ORDERS
(2 AND 3) BUT AT THE SAME SESSION (II)
CONTROLLING FOR TO

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	1	0.00	0.00	.00
Within	37	6854.50	185.25	
Total	38	6854.50		

first.

Summary of Data on Items in the Word Recognition Test

WORD SCORES

Number Correct. The word scores for each item in each orthography were computed. These included the number of subjects responding correctly to each item, the number of times they refused the item, the number of times they needed to be prompted to respond to the item and the number of attempts which were made to correct the item. These scores appear in Tables 51 and 52. Table 51 contains the scores for the number of correct responses and the number of refusals, while Table 52 contains the scores for the number of prompts and the number of attempted corrections. The totals for each level of difficulty, indicate that, while the subjects tended to get fewer words correct as they progressed through the levels in TO and ITA, there was variation in the pattern for Unifon. Level 6 of the Unifon version of the test appeared easier for these children than Level 5. Note that Level 2 contains only 21 words, because of the omission of strong from consideration due to the error made in binding some of the test booklets. In all levels, of course, TO scores were higher than those in the simplified orthographies, but Unifon scores for each level were always lower than ITA scores for that level.

Refusals, Prompts and Corrections. The general pattern of responses in terms of refusals, prompts and corrections

TABLE 51

NUMBER OF CORRECT RESPONSES AND REFUSALS ON THE WORD RECOGNITION TEST

Level 1 Orthographies		Number of Correct Responses		Number of Refusals		TO	Unifon
TO	ITA	ITA	Unifon	ITA	Unifon		
friend	frend	79	75	0	0	0	0
never	never	75	76	0	0	0	0
little	littl	80	78	0	0	0	0
come	cum	80	57	0	1	0	2
use	ues	74	49	0	0	0	6
have	hav	80	76	0	0	0	0
zoo	zoo	80	73	0	1	0	0
new	nco	77	16	0	2	0	0
jumped	jumpt	74	51	0	1	1	1
mother	muther	80	74	0	0	0	10
train	trzn	78	63	0	2	2	0
ball	baull	79	65	0	2	2	3
guess	gess	75	70	0	0	0	16
about	about	77	77	0	0	0	6
walk	wauk	78	64	0	3	3	3
how	hou	77	27	0	1	1	2
as	as	79	73	0	0	0	2
ride	ried	78	46	0	0	0	6
find	fiend	75	24	0	0	0	1
she	shee	79	4	0	2	2	4
thank	thnqk	72	61	0	0	0	9
father	father	80	79	0	0	0	9
Total		1706	1278	0	15	0	90

TABLE 51-- Continued

Level 2 Orthographies		Number of Correct Responses		Number of Refusals			
TO	ITA	Unifon	TO	ITA	Unifon	TO	ITA
joke	jack	JOK	78	75	69	0	0
whistle	whist	HW*CU	75	71	1	1	0
care	car	KER	77	28	8	0	0
check	check	CEK	68	69	6	0	0
gun	gon	GAN	77	73	3	0	0
clown	cloun	KLON	79	65	15	0	1
strong	stroa	CTRAH		omitted			omitted
catch	catch	KAC	80	77	3	0	0
joy	joi	JG	78	52	1	0	3
leave	leev	LIV	71	68	3	0	1
garage	garas	GUROS	56	16	3	2	7
suit	scot	COT	72	32	0	0	3
plate	plat	PLAT	67	45	33	0	1
naughty	nauty	NATI	52	48	5	0	5
wash	wofh	WOS	75	1	1	7	5
most	mest	MOCT	77	65	5	0	5
stood	stood	CTOD	79	63	3	0	0
flew	flew	FLO	69	31	23	0	1
kite	kier	KYL	70	57	14	0	1
roof	roof	ROF	77	70	70	0	0
bakery	bakery	BAKERI	65	56	36	0	5
visit	visit	V*Z*Y	78	76	29	0	0
Total			1593	1213	331	10	33
							182

TABLE 51-- Continued

Level 3 Orthographies		TO		Unifon		Number of Correct Responses		TO		ITA		Number of Refusals		TO		ITA		Unifon	
TO	ITA	TO	ITA	TO	ITA	TO	ITA	TO	ITA	TO	ITA	TO	ITA	TO	ITA	TO	ITA	TO	ITA
edge	ed3	71	35	28	0	6	12	0	0	0	0	6	12	0	0	0	0	0	0
zebra	zeebra	75	70	45	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0
size	siez	73	47	3	0	3	14	0	0	0	0	3	14	0	0	0	0	0	0
health	helth	76	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mind	miend	74	52	51	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0
able	abl	77	73	44	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0
except	eksept	54	36	38	0	1	3	0	0	0	0	1	3	0	0	0	0	0	0
hoop	hoop	61	23	4	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0
double	dubl	74	59	59	0	3	1	0	0	0	0	3	1	0	0	0	0	0	0
fellow	felle	65	65	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
usually	ueguually	55	26	4	1	13	21	1	1	1	1	13	21	1	1	1	1	1	1
shoot	shoot	60	6	1	0	4	6	0	0	0	0	4	6	0	0	0	0	0	0
gather	gathar	75	73	18	0	0	4	0	0	0	0	0	4	0	0	0	0	0	0
thumb	thum	60	64	0	0	1	9	0	0	0	0	1	9	0	0	0	0	0	0
leather	lether	63	62	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
rang	rag	63	23	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1
blame	blam	62	49	34	1	4	4	1	1	1	4	4	4	1	1	1	4	4	4
clover	clæver	58	44	46	0	1	3	0	0	0	1	1	3	0	0	0	1	3	3
bounce	bouns	67	12	16	2	1	7	2	2	2	1	1	7	2	2	2	1	7	7
taught	taut	66	58	6	0	4	0	0	0	0	4	4	0	0	0	0	4	0	0
golden	gølden	78	70	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
silver	silver	78	72	13	0	0	7	0	0	0	0	0	7	0	0	0	0	7	7
Total														1485	1088	540	45	107	107

TABLE 51-- Continued

Level 4 Orthographies		Number of Correct Responses		Number of Refusals		Unifon
TO	ITA	TO	ITA	TO	ITA	
jaw	jau	64	31	0	6	16
polish	polish	49	31	0	5	4
court	cort	62	61	0	2	3
whos	whc	26	35	10	1	7
kingdom	kingdom	76	75	0	0	10
servant	servant	64	64	0	2	12
worry	wurry	69	68	0	2	3
sauce	saus	62	33	1	2	15
swinging	swingig	73	58	0	0	21
chairman	chairman	77	52	0	4	11
coil	coi	55	46	0	1	15
rule	rool	71	33	0	3	0
junior	jwiyor	64	54	1	0	7
agreed	agreed	57	57	0	1	16
magazine	magazeen	59	56	1	0	2
beauty	buey	68	53	1	3	14
hero	heere	71	62	0	2	4
wipe	wiep	67	27	1	2	2
wade	wad	62	38	1	2	6
naild	nald	65	31	0	5	8
couch	cough	40	18	1	1	13
crooked	crooked	51	25	1	2	8
Total		1352	1008	18	46	197

TABLE 51-- Continued

Level 5 Orthographies		Number of Correct Responses		Number of Refusals		Total
TO	ITA Unifon	TO	ITA Unifon	TO	ITA Unifon	
pleasure	pleguer	67	45	0	4	1
screw	scroo	61	36	1	4	12
hail	hal	63	28	1	4	0
fever	fever	53	53	0	2	3
gongs	gogs	38	11	7	7	5
ounce	ouns	52	11	1	7	11
whined	whind	29	18	3	3	14
sheriff	sheriff	67	38	1	7	1
duties	dwtees	53	14	3	9	11
fawn	faun	55	33	2	5	0
lunge	lunj	22	22	2	8	4
boiling	boilig	62	59	0	0	16
undaunted	undaunted	28	12	7	12	15
hearth	harh	42	38	7	5	7
single	singl	47	35	1	1	19
otherwise	utheries	72	49	0	7	20
pledge	pled3	70	34	0	3	7
hardship	hardship	76	43	0	10	15
hired	hierd	47	16	1	2	1
mayor	mazor	64	33	1	6	6
grant	grant	55	57	0	0	0
shudder	shudder	47	13	3	10	7
Total		1170	698	41	116	175

TABLE 51-- Continued

Level 6 Orthographies		Number of Correct Responses		Number of Refusals		TO	Unifon
TO	ITA	ITA	Unifon	ITA	Unifon		
tharch	thatch	41	19	0	2	9	9
whence	whens	37	8	6	5	18	18
result	result	51	46	37	2	6	6
material	material	41	37	6	6	18	18
clung	clug	46	27	7	1	10	10
capture	captuer	66	50	30	0	3	3
fascinate	fascinat	35	19	5	3	14	14
judge	jud3	65	48	33	0	11	11
razor	razer	62	49	49	2	3	3
tongue	toq	57	23	0	1	1	1
operation	opereshon	61	32	35	3	5	5
yoked	yokt	52	15	22	1	7	7
wedding	weddig	64	56	39	1	9	9
vote	vet	73	63	60	0	1	1
moist	moict	52	41	0	3	6	6
sites	siets	31	10	1	1	10	10
brood	brood	15	9	16	4	5	5
ankle	agkl	59	40	32	2	6	6
purpose	purpos	32	32	9	3	12	12
boyhood	boyhod	77	21	9	0	11	11
shack	shack	46	18	1	1	0	0
vase	v3s	63	40	9	0	8	8
Total		1126	702	406	41	110	173

TABLE 52

NUMBER OF PROMPTS AND ATTEMPTS AT CORRECTION FOR THE WORD RECOGNITION TEST ITEMS

Level 1 Orthographies		Number of Prompts		Number of Corrections			
TO	ITA	Unifon	TO	ITA	Unifon	TO	ITA
friend	frend	FREND	0	0	2	0	1
never	never	NEVER	1	0	0	0	0
little	littl	LITUL	0	0	0	1	2
come	cum	KUM	0	0	13	0	5
use	ues	WZ	0	0	2	2	3
have	hav	HAV	0	0	6	0	2
zoo	zoo	ZO	0	2	0	1	6
new	nco	ND	0	0	5	0	5
jumped	jumpt	JUMPT	0	0	0	0	2
mother	muther	MULER	0	0	2	0	3
train	tran	TRAN	0	4	3	2	10
ball	baull	BAL	0	6	5	1	0
guess	gess	GEC	0	0	4	0	3
about	about	UBOT	1	0	11	0	2
walk	wauk	WAK	0	0	5	2	3
how	hou	HO	0	3	3	0	2
as	as	AZ	0	1	3	0	2
ride	ried	RAD	0	1	3	1	1
find	fiend	FAND	0	0	1	3	5
she	free	SI	0	4	3	1	9
thank	phank	ΘANK	0	0	4	4	7
father	father	FOLER	0	0	10	4	6
			0	0	20	0	10
			2	21	120	20	70
Total							

TABLE 52-- Continued

Level 2 Orthographies		Number of Prompts		Number of Corrections		Total
TO	ITA	TO	ITA	TO	ITA	
Unifon		Unifon		Unifon		
joke	jok	0	0	0	5	3
whistle	whisl	1	0	0	2	13
care	car	0	0	0	4	10
check	chek	0	1	1	1	2
gun	gon	0	0	2	1	3
clown	cloun	0	0	1	8	6
strong	strong	0	omitted	1	omitted	5
catch	catch	0	0	1	3	5
joy	joi	0	0	1	3	5
leave	leev	0	0	2	5	4
garage	garag	2	4	5	5	6
suit	sout	1	3	2	12	0
plate	plat	0	1	1	2	5
naughty	nauty	5	3	11	5	8
wash	wofh	0	2	1	7	6
most	mæst	0	1	0	2	14
stood	stood	0	1	2	12	14
flew	flew	1	0	2	4	3
kite	kyl	0	0	1	8	4
roof	rof	0	0	3	1	4
bakery	bakeri	1	3	5	11	1
visit	vʌzɪt	0	0	0	1	3
Total		11	19	48	104	119

TABLE 52 -- Continued

Level 6 Orthographies		Number of Prompts		Number of Corrections			
TO	ITA	TO	Unifon	TO	ITA	Unifon	Unifon
thatch	thatq	1	3	4	3	3	3
whence	whens	2	7	8	4	6	6
result	result	1	2	6	6	6	6
material	material	3	8	7	15	18	18
clung	clug	1	5	4	9	9	9
capture	captuer	0	4	3	6	7	7
fascinate	fascinaz	3	4	11	11	12	12
judge	jud3	0	2	1	1	2	2
razor	razor	1	0	8	8	9	9
toeque	toq	1	1	3	2	4	4
operation	operazhon	2	4	1	12	9	9
yoked	yakt	2	3	3	7	7	7
wedding	weddiq	1	4	3	4	9	9
vote	vet	0	0	1	5	7	7
moist	moist	2	4	4	2	8	8
sires	siets	0	4	12	9	7	7
brood	brood	1	2	6	3	4	4
ankle	agkl	0	1	7	7	15	15
purpose	purpos	1	1	5	4	10	10
boyhood	boihood	0	5	1	6	11	11
shack	shack	0	3	6	9	4	4
vase	vaz	1	3	3	5	5	5
Total		23	50	107	138	172	172

tended to be that more of these behaviors occurred in Unifon than occurred in ITA or TO. However, at Levels 3 and 5 ITA corrections exceeded Unifon corrections. The pattern of an increase in the number of these three types of responses to each orthography as the levels became more difficult was consistent for TO behavior, less so of ITA and least so for Unifon. The full study of these reactions is not within the scope set for this report, but the above summary was reported here to point up the fact that words in Unifon elicited more of these types of responses than did words in ITA.

Phonemic Patterns of Correct Responses. Table 78 of Appendix A contains the summary of the phonemic patterns accepted as correct for each of the items on the word recognition test. As can be seen, the responses listed as acceptable pronunciations of the words ranged from 1 for most words to 10 for the word usually. In some cases, the differences among the accepted utterances are due to dialect variations and in others to the fact that many of the readers tried to pronounce the words carefully, thus rendering "spelling" pronunciations. The utterance /wárs̃/ for wash and /sín̩gɪŋ/ for singing are examples of the dialect variation found in the sample. The first pronunciation is often found in the speech of people from Appalachia and the southern midwest section of the nation, while the voiced velar plosive /g/ often follows the velar nasal /ŋ/ in the speech of people from the Detroit area whose families have immigrated from Poland. Most of these subjects used "standard"

upper midwest dialect. The pronouncing of about as /eybáwt/ rather than /əbáwt/ is an example of a spelling pronunciation. These different, but acceptable, pronunciations of the words of the test point up the difficulty of creating a phonemically consistent writing system for English which will satisfy the dialect patterns of all speakers of English.

Low and High Transfer Words in the Simplified Orthographies

Selection. Low transfer words, for the purposes of this study, were defined as those appearing below the first quartile of the distribution of the simplified orthography being studied and above the median of the distribution of the traditional orthography. High transfer words were defined as those appearing above the third quartile of the distributions of both the simplified and traditional orthographies. This was an adaptation of a technique commonly used to analyze test items by taking the most missed and least missed items for intensive study.

The relative difficulty of the ITA and Unifon versions of the words is readily apparent when the quartiles are compared. The quartile word scores for each orthography were as follows:

Quartile Three:

TO-- 76.09; ITA-- 63.75; Unifon-- 34.88

Quartile Two:

TO-- 66.73; ITA-- 47.00; Unifon-- 13.25

Quartile One:

TO-- 55.13; ITA-- 27.63; Unifon-- 3.00

The resulting lists of the most difficult ITA and Unifon words, when compared to the same TO words, are contained in Tables 53 and 54. The lists include 9 ITA words and 15 Unifon words. The lists of high transfer words are presented in Tables 55 and 56. These lists contain 22 ITA words and 14 Unifon words. The numbers of the words in each of these lists are also indicative of the relatively higher compatibility of ITA with TO.

The words in the tables are listed according to the number of correct responses in the simplified orthographies. The highest possible score for each word was 80. The degree of difficulty of the words of the low transfer list is emphasized by the distance of the ITA and Unifon word scores from the TO scores. None of the low transfer Unifon words was correctly identified by more than 3 people, while the low transfer ITA list contains a word which was identified by as many as 28 of the 80 subjects. The high transfer list for Unifon contains one word identified by only 39 readers, while the lowest word score on the ITA list is 65.

Summary of Phonemic Responses to Low Transfer Words.

After the low transfer words in each orthography were chosen, the phonemic responses made to these words were summarized. The summaries for ITA are contained in Table 57 and those for Unifon in Table 58. Acceptable phonemic patterns are indicated for each word together with the number of subjects

TABLE 53

LOW TRANSFER ITA WORDS ARRANGED ACCORDING TO
WORD SCORES IN ITA

TO Spelling	ITA Spelling	TO Scores	ITA Scores
care	cær	77	28
how	hou	77	27
wipe	wiep	67	27
find	fiend	75	24
boyhood	boihwɔd	77	21
new	nɔ	77	16
bounce	bouns	67	12
she	ʃhæ	79	4
wash	wɔʃh	75	1

TABLE 54

LOW TRANSFER UNIFON WORDS ARRANGED ACCORDING TO
WORD SCORES IN UNIFON

TO Spelling	Unifon Spelling	TO Scores	Unifon Scores
catch	KAO	77	3
gone	GAN	77	3
how	HO	77	3
leave	LIV	71	3
new	NO	77	3
stood	CTOD	79	3
joy	JG	78	1
she	SI	79	1
thank	ΘANK	72	1
wash	WOS	75	1
whistle	HW+CUL	75	0
chairman	ČERMUN	77	0
health	HELO	76	0
suit	CDT	72	0
swinging	CW*H*H	73	0

TABLE 55

HIGH TRANSFER ITA WORDS ARRANGED ACCORDING TO
WORD SCORES IN ITA

TO Spelling	ITA Spelling	TO Scores	ITA Scores
father	father	80	79
little	littl	80	78
about	about	77	77
catch	catç	80	77
have	hav	80	76
visit	visit	78	76
friend	frend	79	75
joke	jøk	78	75
kingdom	kingdom	76	75
mother	mumher	80	74
able	æbl	77	73
as	as	79	73
gone	gon	77	73
zoo	zø	80	73
silver	silver	78	72
golden	gølden	78	70
roof	røf	77	70
health	helth	76	69
ball	bau1	79	65
most	møest	77	65
clown	cløun	79	65
walk	wauk	79	65

TABLE 56

HIGH TRANSFER UNIFON WORDS ARRANGED ACCORDING TO
NUMBER OF CORRECT RESPONSES IN UNIFON

TO Spelling	Unifon Spelling	Number TO	Correct Unifon
have	HAV	80	77
friend	FREND	79	75
train	TRAN	78	72
roof	RDF	77	70
joke	JOK	78	69
ball	BAL	79	63
golden	GOLDUN	78	62
as	AZ	79	54
zoo	ZO	80	54
come	KUM	80	53
walk	WAK	78	47
able	ABUL	77	44
little	L+TUL	80	41
about	UBOT	77	39

TABLE 57

PHONEMIC ANALYSIS OF ORAL RESPONSES TO LOW TRANSFER ITA WORDS

Word Spellings: 1. TO 2. ITA 3. Accepted Phonemic Response	Correct	Miscues		
		Word and Phrase Substitutions		Miscue
		Phonemic Spelling	TO Spelling	No. Phonemic Spelling No. Total

One Syllable Words

1. bounce Word Substitutions:

2. bouns	12	/bawnz/	bounds	19	/bownz/	1
3. /bawnz/		/bownz/	bones	16	/brorn/	1
		/bownes/	bonus	8	/bownen/	1
		/banz/	bonds	8		
		/benz/	buns	5		
		/bawnd/	bound	2		
		/bawz/	bows, boughs	2		
		/band/	bond	1		
		/buwnz/	boons, Boones,	1		
			Boone's	1		
			bonus	1		
		/bownis/		63		
Total	12			3		66

1. care Word Substitutions:

2. car	28	/kar/	car	47	/krer/	1
3. /ker/		/karz/	cars	1		

TABLE 57-- Continued

Word Spellings: 1. TO 2. ITA 3. Accepted Phonemic Response	Correct	Miscues			
		Word and Phrase Substitutions		Non-Word Substitutions	
		Phonemic Spelling	TO Spelling	No. Phonemic Spelling	Miscue No. Total
Total	28	/kyér/ /kéy/ /kéryi/	cure Kay, K, k carry, Cary	1 1 1 51	1 52
1. find		Word Substitutions:			
2. fiend					
3. /fáynd/	24	/frénd/ /frínd/ /fíynd/ /fínd/ /fed/ /fénd/ /fréd/	friend friend fiend finned fed fend Fred	47 2 2 2 1 1 1 56	
Total	24				0 56
1. how		Word Substitutions:			
2. hu					
3. /háw/	27	/húw/ /hów/ /háws/	who hoe, ho house	23 15 3	

TABLE 57 -- Continued

Word Spellings: 1. TO 2. ITA 3. Accepted Phonemic Response	Correct	Miscues			
		Word and Phrase Substitutions		Non-Word Substitutions	
		Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total
Total	27	/hɔ/	haw	2	
		/aw/	ow	2	
		/awer/	hour, our	2	
		/haw/	howl	1	
		/hɔrn/	horn	1	
		/hyuw/	hue, Hugh	1	
		/nɔw/	no, know	1	
		/ow/	owe, oh, O, o	1	
				52	52
1. new 2. nɔ 3. /nɔw/	16	Word Substitutions:			
		/nɔw/	no, know	40	
		/naw/	now	16	
		/niy/	knee	1	
Total	16	/nɔ/	gnaw	1	
				62	62

Word Spellings:	Miscues		
	Word and Phrase Substitutions	No. Phonemic Spelling	No. Total
1. TO			
2. ITA			
3. Accepted Phonemic Response			
1. she			
2. [ʃe]			
3. /ʃi:/			

TABLE 57 -- Continued

Word Spellings: 1. TO 2. ITA 3. Accepted Phonemic Response	Correct	Miscues			
		Word and Phrase Substitutions		Non-Word Substitutions	
		Phonemic Spelling	TO Spelling	No. Phonemic Spelling	Miscue No. Total
Total	4	/tri:/	tree	1 74	0 74
1. wipe		Word Substitutions:			
2. wip			weep	27	9
3. /wayp/	27	/wiyp/ /hwip/ /hwipt/ /hwet/ /wisp/ /swép/ /swiyp/ /wter/ /wiyzel/	whip whipped whet wisp swept sweep water weasle	/wip/ /hwáyp/ /wáb/ /wép/ /wéyp/ /wép/ /wérp/	1 1 1 1 1 1 1
Total	27			36	15 51
1. wash		Word Substitutions:			
2. wofh			wolf	38	2
3. /wáš/ /wǒš/ /wárs/ /wórs/	1	/wúlf/ /wúf/ /húw/ /wów/	woof who whoa	18 2 2	1 1 1

TABLE 57 --- Continued

Word Spellings: 1. TO 2. ITA 3. Accepted Phonemic Response	Correct	Miscues			
		Word and Phrase Substitutions		Non-Word Substitutions	
		Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total Miscue
Total Oral Responses	160	496	41	537	
Per Cent of Possible Responses	22.22%	68.89%	5.69%	74.58%	

TABLE 58

PHONEMIC ANALYSIS OF ORAL RESPONSES TO LOW TRANSFER UNIFON WORDS

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Correct	Miscues		
		Word and Phrase Substitutions	Non-Word Substitutions	Miscue
		Phonemic Spelling	TO Spelling	No. Phonemic Spelling No. Total

One Syllable Words

Word Substitutions:

1. catch

2. KAC

3. /kæč/

/kéč/

/kæt/

/kéyk/

/kæn/

/kéy/

/kár/

/kæf/

/kæp/

/kér/

/kéys/

/kéyt/

/kéyv/

/kowk/

/ček/

/čéys/

/séyv/

cat

cake

can

Kay, K, k

car

calf

cap

care

case

Kate

cave

coke, Coke

check

chase

save

20

16

2

2

1

1

1

1

1

1

1

1

1

1

1

51

19

Total

3

19

70

TABLE 58 -- Continued

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Miscues			
	Word and Phrase Substitutions		Non-Word Substitutions	
	Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total
1. gone				
2. GAN				
3. /gón/ /gán/	3 /géyn/ /gón/ /kæn/ /gæs/ /gés/ /gréyn/ /dúw/ /čín/ /jæn/ /jín/ /kəm/	gain gun can gas guess grain dew, do, due chin Jan gin come	29 5 2 1 1 1 1 1 1 1 1 1	21 2 1 1 1 1 1
Total	3		44	71
1. health				
2. HELΘ				
3. /hélth/ /hélθ/	0 /helów/ /helów/ /hélp/ /hiyl/	hello hello help heel, heal	52 21 6 1	80
			80	80

TABLE 58 --- Continued

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Correct	Miscues		
		Word and Phrase Substitutions		Non-Word Substitutions
		Phonemic Spelling	TO Spelling	No. Phonemic Spelling No. Total
1. how				
2. H ⁰				
3. /háw/	3	/hów/ /háý/ /ów/ /húw/ /híy/ /yúw/	hoe, ho, whoa high, hi owe, oh who he, hee you, ewe, U, u	42 13 10 7 2 1 <u>74</u>
Total	<u>3</u>			<u>1</u> 75
1. joy				
2. J ^g				
3. /jóy/	1	/jéy/ /jów/ /já/ /j ^o / /jéyd/ /jéyn/ /jéd/ /jést/ /jówk/	Jay, jay, J, j Joe, Jo jaw jau jade Jane Judd just joke	33 4 3 3 2 2 2 2 2
				2 1 1 1 1 1 1 1

TABLE 58--- Continued

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Miscues			
	Word and Phrase Substitutions		Non-Word Substitutions	
	Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total
Correct 0 Z	/j'ab/	job	1	
	/j'ag/	jug	1	
	/j'éyk/	Jake	1	
	/g'ow/	go	1	
	/z'éyn/	Zane	1	
	/zúw/	zoo	1	
	Total		59	8 67
1. leave 2. LIV 3. /liyv/	Word Substitutions:			
	3 /lív/	live	54	
	/láyv/	live	15	
	/lít/	lit	2	
	/læv/	love	1	
	/seprít/	separate	1	
	Total		73	0 73

TABLE 58-- Continued

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Miscues			
	Word and Phrase Substitutions		Non-Word Substitutions	
	Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total
Correct				
1. new				
2. NO				
3. /núw/	Word Substitutions: 3 /nów/ /naw/ /niys/ /nen/ /an/	no, know now niece nun, none on	71 /nə/ 2 1 1 1 76	1
Total	3			77
1. she				
2. SI				
3. /šíy/	Word Substitutions: 1 /sáy/ /iz/ /sly/ /sít/ /šay/ /sayn/ /síd/ /sis/ /sáwnd/ /zów/	sigh, Cy is see, sea sit shy sign Síd sis sound zo (zoology)	22 /is/ 20 /sí/ 15 /s-/ 3 2 2 1 1 1 1	2 1 1

TABLE 58 -- Continued

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Miscues			
	Word and Phrase Substitutions		Non-Word Substitutions	
	Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total Miscue
Correct				
0				
2				
	/kayt/ /kówt/ /krówd/ /kúð/ /kyúwt/ /dats/ /sík/ /tówd/ /katén/ /kléver/ /kówtéd/ Total	kite coat crowed could cute dots sick toad, toed, towed cotton clever coated	1 1 1 1 1 1 1 1 1 1 1 1 54	12 66
1. suit 2. COT 3. /súwt/	0	cut cot, caught coat cat caught, cot cart	38 18 11 5 4 1	
	Word Substitutions:			
	/kát/ /kát /kówt/ /káp/ /kót /kart/			

TABLE 58-- Continued

[illegible]

TABLE 58-- Continued

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Miscues			
	Word and Phrase Substitutions		Non-Word Substitutions	
	Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total Miscue
Correct	/tæk/	tack	1	
	/wɔk/	walk	1	
	/wɔwk/	woke	1	
	<u>1</u>		<u>53</u>	
Total			17	70
1. wash 2. WOS 3. /wɔʃ/ /wɔʒ/ /wɔrʃ/ /wɔrʒ/	Word Substitutions:			
	/wɔʃ/	was	33	/wɔʃs/
	/wɔʒ/	whose	12	/wɔʒs/
	/wɔrʃ/	woes	7	/wɔrʃs/
	/wɔrʒ/	was	4	/wɔrʒs/
	/wɔʃz/	wise	1	/hwɔʒz/
	/wɔʒz/	wasp	1	/mɔʃs/
	/wɔl/	wall	1	/yɔwweɪl/
	/wɔwz/	woos	1	
	/hɔwz/	whose	1	
	/sɔn/	sun, son	1	
	/sɔw/	so, sew, sow	1	
	/dɔhowz/	those	1	
	/wɔtɔr/	water	1	
Total	<u>1</u>		<u>65</u>	10 75

TABLE 58 --Continued

[illegible]

TABLE 58 --- Continued

Word Spellings:		Miscues		Miscue	
1. TO		Word and Phrase Substitutions		Non-Word Substitutions	
2. Unifon		Phonemic Spelling		Phonemic Spelling	
3. Accepted Phonemic Response		TO Spelling		No. Total	
Correct		gene, Gene, Jean		1	
		con		1	
		cow		1	
		cause		1	
		cling		1	
		craze		1	
		quaint		1	
		quick		1	
		save		1	
		swan		1	
		swim		1	
		teat		1	
Total		0		26	
1. whistle		wiggle		2	
2. HW#CUL		awful		1	
3. /hwísel/		fellow		1	
		hallow		1	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	
		wíggle		3	
		awful		2	
		fellow		2	
		hallow		2	
		howler		1	
		haircut		1	
		hurry		1	

TABLE 58-- Continued

Word Spellings: 1. TO 2. Unifon 3. Accepted Phonemic Response	Miscues			
	Word and Phrase Substitutions		Non-Word Substitutions	
	Phonemic Spelling	TO Spelling	No. Phonemic Spelling	No. Total
Correct				
	/káwərd/ /kérfəl/ /kələr/ /lɪtəl/ /həwəyən/ /gərl/ /háw/ /háws/ /háý/ /hók/ /hwów/ /kól/ /klúw/ /tót/	coward careful color little Hawaiian girl how house high, hi hawk whoa call clue taught, tot	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Phrase Substitutions: /éyc+kyúw/ /hæf+kət/ /háw+kəm/ /háw+kúwl/	H Q, h q half cut how come how cool	1 1 1 1	1 1 1 1
Total			23	49

TABLE 58 -- Continued

Word Spellings:	Correct		
	Miscues		
1. TO	Word and Phrase Substitutions	No. Phonemic Spelling	No. Total
2. Unifon			
3. Accepted Phonemic Response			
Total Oral Responses	22	884	171 1055
Per Cent of Possible Responses	1.80%	73.70%	14.25% 87.95%

giving them. The word and phrase and non-word substitutions are then summarized according to frequency. Totals are given in each category of response for each word and for the entire list. The per cent of possible responses is given for the totals in each category.

In ITA 22.22 per cent of the responses to low transfer words were accepted as correct, while in Unifon only 1.80 per cent were accepted as correct. In ITA 74.58 per cent of the total responses were miscues, while the per cent was 87.95 for Unifon. While the substitutions given to items in both orthographies tended to be meaningful utterances in English, i.e., words for the most part with an occasional phrase substitution, there were relatively more non-word substitutions in Unifon than in ITA. Such words as whistle and swinging on the Unifon list and boyhood on the ITA list illustrate the great variety of responses which some of the words elicited from the subjects. ~~swinging~~ (swinging), for example, was refused by 21 subjects, but the 59 who tried it gave 52 different responses. It is safe to assume that confusion reigned when most of the subjects looked at some of these words.

Comparisons of Physical Features of Low Transfer Words

WORD LENGTH

ITA. A research hypothesis had been formulated that for the majority of the low transfer words in each simplified orthography the differences in their length, when compared

to the TO spelling, would be greater than the average difference in length of high transfer words in the same two comparisons. Number of letters was chosen as the criterion of length because the wider letters in Unifon made comparisons in linear measure impractical. Table 59 contains the comparison of low transfer ITA words and their TO counterparts with respect to number of letters. In Table 60 may be found the high transfer ITA words and the number of letters contained in the TO and ITA spellings. As was noted earlier, the simplified versions tend to be shorter in this respect than the TO versions. It is interesting to find that the average difference in length is 1.11 for the low transfer words and .44 for the high transfer words.

Most high transfer words are at least one letter shorter in ITA than TO. The same general difference is also true of the majority of low transfer words. While both bohwd and bouns on the low transfer ITA list are shorter by two letters than their TO counterparts, helh, which is on the high transfer list, is also two letters shorter than its TO spelling. The augmented letters of ITA, which have been formed by tying certain TO vowel and consonant symbols together, may appear to be more like two letters to TO trained readers. Therefore, the words containing them may seem more nearly like the TO versions.

It cannot be said that more than half of the low transfer ITA words differ from their TO mates by more letters than the majority of the high transfer ITA words differ from

TABLE 59

AVERAGE DIFFERENCE IN THE NUMBER OF LETTERS IN
TO AND ITA SPELLINGS OF LOW TRANSFER
ITA WORDS

Word		Number of Letters		
TO Spelling	ITA Spelling	TO Spelling	ITA Spelling	Difference
care		4	3	1
how		3	2	1
wipe		4	3	1
find		4	4	0
boyhood		7	5	2
new		3	2	1
bounce		6	4	2
she		3	2	1
wash		4	3	1
Total		38	28	10
Average Difference= 1.11				

TABLE 60

AVERAGE DIFFERENCE IN THE NUMBER OF LETTERS IN
TO AND ITA SPELLINGS OF HIGH TRANSFER
ITA WORDS

Word		Number of Letters		
TO Spelling	ITA Spelling	TO Spelling	ITA Spelling	Difference
father	fa th er	6	5	1
little	littl	6	5	1
about	about	5	4	1
catch	cat h	5	4	1
have	hav	4	3	1
visit	visit	5	5	0
friend	frend	6	5	1
joke	joek	4	3	1
kingdom	kin d om	7	6	1
mother	mu th er	6	5	1
able	a b l	4	3	1
as	as	2	2	0
gone	gon	4	3	1
zoo	z o	3	2	1
silver	silver	6	6	0
golden	go l den	6	6	0
roof	ro o f	4	3	1
health	hel th	6	4	2
ball	ba ll	4	4	0
most	mo e st	4	4	0
clown	cl ow n	5	4	1
walk	wa lk	4	3	1
Totals		106	89	17
Average Difference= .44				

theirs. Length in special instances may be a source of confusion at the time of TO-ITA transfer, but it is probably not the primary one.

Unifon. A comparison of the word length of the Unifon low transfer words and their TO versions yielded an average difference of .79 of a letter, while the high transfer comparison yielded an average difference of 1.33 letters. The lists contained in Tables 61 and 62 present the summaries of these comparisons. Because it makes no concessions to retaining TO spellings for the sake of compatibility, Unifon tends to produce shorter spellings than ITA. This results in the higher average differences in number of letters between the Unifon and TO spellings.

Of the 14 words on the high transfer list 11 have one less letter in the Unifon version than in the TO version. None differs by more than 1 letter. Of the 15 low transfer words 10 differ in length by a single letter and 5 by 2 letters. Again, more than half of the low transfer words do not differ from their TO spelling by more than the number of letters by which the majority of high transfer Unifon words differ from their TO spellings.

The modification of the Unifon words, which has been done within a specified space with the result that all letters are uniform in height and width, may make it more difficult for TO readers who are conditioned to expect two letters to represent many phonemes of English. Those who transfer from Unifon to TO would probably have the reverse problem to

TABLE 61

AVERAGE DIFFERENCE IN THE NUMBER OF LETTERS IN
TO AND UNIFON SPELLINGS OF LOW TRANSFER
UNIFON WORDS

TO Spelling	Word Unifon Spelling	Number of Letters		
		TO Spelling	Unifon Spelling	Difference
catch	KAO	5	3	2
gone	GAN	4	3	1
how	HO	3	2	1
leave	LIV	5	3	2
new	NO	3	2	1
stood	CTOD	5	4	1
joy	JG	3	2	1
she	SI	3	2	1
thank	ΘANK	5	4	1
wash	WOS	4	3	1
whistle	HW*CU	7	6	1
chairman	ČERMUN	8	6	2
health	HELO	6	4	2
suit	COT	4	3	1
swinging	CW*H*H	8	6	2
Total		<u>73</u>	<u>53</u>	<u>20</u>
Average Difference= 1.33				

TABLE 62

AVERAGE DIFFERENCE IN THE NUMBER OF LETTERS IN
TO AND UNIFON SPELLINGS OF HIGH TRANSFER
UNIFON WORDS

TO Spelling	Word Unifon Spelling	Number of Letters		Difference
		TO Spelling	Unifon Spelling	
have	HAV	4	3	1
friend	FREND	6	5	1
train	TRAN	5	4	1
roof	ROF	4	3	1
joke	JOK	4	3	1
ball	BAL	4	3	1
golden	GOLDUN	6	6	0
as	AZ	2	2	0
zoo	ZO	3	2	1
come	KUM	4	3	1
walk	WAK	4	3	1
able	ABUL	4	4	0
little	L* ^T TUL	6	5	1
about	USOT	5	4	1
Total		61	50	11
Average Difference=				.79

overcome.

WORD SHAPE

The second hypothesis related to elements in the beginning orthographies which might be the source of confusions leading to their incompatibility with TO had stated that when an outline is drawn around each low transfer ITA word and its TO counterpart, significant differences in shape will be apparent in more than one-half the words. Only ITA needed to be checked for this difference, as the letters in Unifon are based on the upper case system and the TO stimulus words were lower case. Therefore, all Unifon words differed in this respect from the TO items.

Table 63 presents the comparisons of the outlines of the general shape of low transfer ITA words beside their outlined TO versions. The ITA versions of boyhood, wash, she, and wipe appear to have the most apparent differences. The ITA boihwɔd lacks a descender in the medial position, while wɔɪh has added one at the end, and ʃhæ, one at the beginning. In the case of wɪɛp, the combining of the e with the i has changed the lower configuration pattern.

A check of the spellings of word substitutions in the miscues for the ITA spelling of boyhood shows that TO spellings of boiled, behold, behind, and boated have ascenders in the medial position with no descenders preceding them. Several of the non-word substitutions, also, would have had an ascending letter, if spelled in TO using the most common graphemes representing the phonemes in the response. These

TABLE 63

COMPARISON OF WORD OUTLINE OF TO AND ITA VERSIONS
OF LOW TRANSFER ITA WORDS

TO Outline	ITA Outline
care	cær
how	hou
wipe	wiep
find	fiend
boyhood	boihood
new	nœ
bounce	bouns
she	ſhee
wash	woſh

responses indicate that many children may well have responded in terms of the general shape of buhwd, missing the shorter cue of the u letter between the ascending b and h.

The alteration of the shapes of the ITA she and wolf from their TO mates is due to the change in the TO sh in which the s is elongated and attached to the ascender h, as well as extended below the base line. This change affects both the upper and lower portions of the words. No TO printed letter is both an ascender and a descender. These fourth grade readers tended to substitute ascending letters rather than descending ones for this ITA letter. One subject responded correctly to wofh, while 38 of the 69 miscues were /wúlf/ (wolf). This miscue response spelled in TO has two ascenders at the end. In the case of the, 4 children responded correctly to the word, but 20 said /hiy/ (he, hee), 13 /dhiy/ (the, thee), and 9 said /thriy/ (three). The TO spellings of these substitutions contain th as the initial digraph. This, again, is two ascenders. The most frequent substitution used h alone. A single subject responded with a substitution for these words which contained a descender in the initial or final position. This leads to the conclusion that the ascending portion of the pattern had the stronger influence.

Aside from the 27 who responded correctly to wiep, the second most frequent oral response to this item was the word substitution, /wiyp/ (weep), and the third was the non-word /wíp/ which might be spelled in TO, wip. The numbers of

subjects responding in these ways were 27 and 9 respectively. Both substitutions have the same relative shape as the ITA stimulus.

While 4 of the 9 low transfer words varied rather significantly in shape from their TO spellings, this was not the case for the majority. Therefore, the research hypothesis was not supported. The children did, however, give miscue substitutions which tended to agree with the shape of the 4 words in question.

Upper Half of Word Configuration. When miscues to the upper half of word configuration were studied, the comparisons were again made only with ITA. The hypothesis under consideration here had stated that more than one-half of the ITA low transfer words would differ significantly in upper half configuration from their TO counterparts. The designers of ITA maintain that serious consideration was given to matching TO in this feature, when the letters were designed. It was reasoned that failure to achieve this goal in a word might, then, be a source of confusion, hence incompatibility with TO.

Table 64 presents the upper half of the low transfer words in both ITA and TO. The dots above the ie in fiend and the ai in boihwɔd seem to be significant differences. The open portions of the u in the ITA spelling of boyhood do not resemble the closed oo in the TO spelling. The top of u in nɔw does not really resemble the ew of new. The transposition of the e shape to a position following the i in wipe is not

TABLE 64

COMPARISON OF UPPER HALF OF THE WORD CONFIGURATION
OF TO AND ITA VERSIONS OF LOW TRANSFER ITA WORDS

TO Spelling	Top Half Configuration	
	TO	ITA
care	care	care
how	how	how
wipe	wipe	wien
find	find	fiend
boyhood	boyhood	boihood
new	new	new
bounce	bounce	bounc
she	she	shce
wash	wash	wash

quite so noticeable as the transposition of the e to the position following the a in care, because both p and e have rounded tops. The elimination of the e and the substitution of s for c in bounce make two changes, though the top half of s and c are very similar. To this observer the transposition of the e in the ITA version of care appears more significant. The top half of the ou-ow contrasts in hou and how might not be too different, because the closed-open orders of the letter tops are the same. The h of woh and hæ appears to alter the stimulus words in respect to the top half configuration, as it did in respect to the total pattern.

The miscue responses to the alterations apparent in the ITA versions of wash, she and wipe discussed in the previous section on differences in general shape apply to upper half configuration differences and will not be repeated here. However, in addition to the elimination of the descender in boyhood, two elements of difference have been noted here for that stimulus word. The first was the dot over the second portion of the ITA ai. The miscue responses to this word were checked for the occasions, when the subjects responded with a substitution which contained an oi spelling in T0. This was true of 13 of the word substitutions and 4 of the non-word substitutions. Non-words containing /bóy-/ responses, could be spelled oi in T0. This is not a majority of the 50 miscues, but it still is fair to say that some children responded to the ITA ai, as if it were the T0 oi. The patterns of responses to the u symbol are not so easy to

identify. However, 21 children got the entire word right and 5 additional subjects responded to the last half of the word with /-hud/ which is the correct response. In the case of the 9 subjects who said boiled, there is the possibility that the od was confused with the past tense suffix representation of TO, ed.

The most frequent oral responses to fiend were utterances which are spelled with an ie in TO. Forty-nine children gave the word substitution, friend, and 2 gave the substitution, fiend. The next most frequent oral response was the correct one, find. No miscues contained the /ay/ phoneme, though finned contains the /i/. In TO ie has more than one response, and when the e stands next to the i the response is not always /ay/, as called for in the ITA version.

The ow of now was recognized by the 16 children who responded to it correctly. However, 40 children said /nów/ (no, know) and 16 said /náv/ (now) in response to this stimulus word. The source of the confusion is not really clear. The TO o does not resemble ow closely and the k in the TO know tends to rule out that as the intended choice in this pair of homonyms. Yet, the ow in now might lead to the conclusion that a confusion with w is somehow relevant to this series of miscues.

The æ in car was interpreted correctly by 28 subjects, but 47 of the 52 miscues were /kár/, spelled car in TO. The top half of the r appeared to be a stronger stimulus than the attached e in this case.

This discussion of discrepancies in top half configuration of the low transfer ITA words has centered around the comparisons of ITA and TO versions of wash, she, boyhood, find, wipe, new and care. These 7 low transfer words stimulated responses which contain phonemes that are also contained in TO spellings of words, whose top half configuration is similar to the ITA stimulus words, rather than phonemic responses intended by the ITA spellings. Therefore, it is concluded that more than half of the ITA low transfer words are significantly different from their TO counterparts in the upper half of their word configuration. This failure seems to be attributed to the unusual shapes of certain letters such as ω ω and jh and the attaching of the final e to the medial vowel to form representations of "long" vowel phonemes of English. The confusions for the pattern of ie in fiend may be a function of both the fact that ie has more than one phoneme correspondence in TO and the fact that words ending in nd do not have an e in them in TO to signal an /ay/ response to the i.

Analysis of Miscue Responses to Dominant Letters

The miscues of the low transfer words in both ITA and Unifon were analyzed in order to find out if there was support for the final hypothesis of the investigation. This hypothesis was that analyses of the miscues of low transfer words of the simplified orthographies will reveal letters which differ radically in shape from their graphemic representations

in TO or which are identical or very similar in shape to TO letters that usually call for different phonemic responses than the ones assigned them in ITA or Unifon.

ANALYSIS OF ITA MISCUES

The check for the frequency of the correct phoneme in the responses to ITA low transfer words produced several letters which are probably in the categories described in the hypothesis.

The frequencies of correct responses to dominant letters in low transfer ITA words are contained in Tables 65, 66, 67 and 68. The letters showing the lowest percentage of phoneme-grapheme correspondence in the miscues with respect to each category were:

1. Initial Letter -h
2. Final Letter -u,o,s,h
3. Ascenders and Descenders -h,h
4. Stressed Vowel -o,ie,æ, ai, au, o

When the duplications were eliminated, the list was narrowed to the consonants h and h and the vowels, u, o, o, ie, æ, and ai.

h and o. The letters h and o seemed out of place in this list, because they are identical to letters in TO which usually call for the same phonemic response as that called for in ITA. An analysis of the phonemic miscues in response to bahod shows that, in addition to the 21 subjects who got this item right in ITA, 12 more responded with an utterance which had /h/ in the medial position. Six of the

TABLE 65

FREQUENCY OF PRESENCE OF PHONEMES CORRESPONDING
TO INITIAL LETTERS IN MISCUES OF
LOW TRANSFER ITA WORDS

Word		No. Word Miscues	Stimulus Letter	Frequency of Responses Containing Corresponding Phonemes			
				Correct Position		Other	
TO Spelling	ITA Spelling			No.	% of Miscues	No.	% of Miscues
<u>One Syllable Words</u>							
bounce	bams	66	b	66	100	0	0
care	cær	52	c	51	98	0	0
find	fiend	56	f	56	100	0	0
how	hou	52	h	51	98	0	0
new	nə	62	n	60	100	0	0
she	ʃhæ	74	ʃh	0	0	0	0
wipe	wiep	51	w	49	96	0	0
wash	wojh	74	w	72	97	0	0
<u>Two Syllable Words</u>							
boyhood	bəihud	50	b	47	94	0	0

TABLE 66

FREQUENCY OF PRESENCE OF PHONEMES CORRESPONDING
TO FINAL LETTERS IN MISCUES OF
LOW TRANSFER ITA WORDS

		Frequency of Responses Containing Corresponding Phonemes					
Word		No. Word Miscues	Stimulus Letter	Correct Position		Other	
TO Spelling	ITA Spelling			No.	% of Miscues	No.	% of Miscues
<u>One Syllable Words</u>							
bounce	bams	66	s	10	15	1	1
care	cær	52	r	49	94	2	3
find	fiend	56	d	56	100	0	0
how	hou	52	au	2	3	6	11
new	nœ	62	œ	0	0	0	0
she	ʃæ	74	æ	68	91	0	0
wipe	wiep	51	p	43	84	0	0
wash	wojh	74	jh	1	1	0	0
<u>Two Syllable Words</u>							
boyhood	bœhud	50	d	37	74	1	2

TABLE 67

FREQUENCY OF PRESENCE OF PHONEMES CORRESPONDING TO ASCENDING AND DESCENDING
LETTERS IN MISCUES OF LOW TRANSFER ITA WORDS

<u>Word</u>		Number of Miscues	<u>Letters</u>		<u>Presence Indicated by Phonemic Analysis</u>	
<u>TO</u> Spelling	<u>ITA</u> Spelling		<u>Ascending</u>	<u>Descending</u>	<u>In</u> Expected Position	<u>Not In</u> Expected Position
			N	%	N	%
<u>One Syllable Words:</u>						
bounce	bouns	66	b		66	100
find	fiend	56	f		56	100
			d		56	100
she	ſhe	74	ſh		0	0
wipe	wiep	51		p	43	84
wash	woſh	74	ſh		1	1
<u>Two Syllable Words:</u>						
boyhood	baɪhʊd	50	b		47	94
			h		12	24
			d		37	74
						1
						2

TABLE 68

FREQUENCY OF PRESENCE OF PHONEMES CORRESPONDING
TO STRESSED VOWELS IN MISCUES OF
LOW TRANSFER ITA WORDS

Word		No. Word Miscues	Stimulus Letter	Frequency of Responses Containing Corresponding Phonemes			
				Correct Position		Other	
TO Spelling	ITA Spelling			No.	% of Miscues	No.	% of Miscues
<u>One Syllable Words</u>							
bounce	bouns	66	ou	23	34	0	0
care	cær	52	æ	2	3	0	0
find	fiend	56	ie	0	0	0	0
how	hou	52	ou	2	3	6	11
new	nə	62	e	0	0	0	0
she	ʃæ	74	æ	68	91	0	0
wipe	wiep	51	ie	1	1	0	0
wash	wojh	74	o	1	1	0	0
<u>Two Syllable Words</u>							
boyhood	bəihud	50	ai	20	40	0	0

12 miscue utterances with /h/ (h) in the medial position also included /-hud/ (-hood), the second morpheme of this compound word, in the correct position. This leads to the conclusion that h was not the primary source of confusion in buhud.

The o contained in wofh may not have been the true source of confusion in this word. Note that 38 children responded to this item with /wúlf/. The TO spelling, wolf, contains o. The TO o does not always represent /a/, the phonemic response called for in ITA. It appears that the fh cue, which reminded the children of lf in TO, was stronger than the o.

fh. The fh of fhæ and wofh was identified in connection with the discussions on total word pattern and upper half of word configuration. The phonemic responses made to it included: /h/, /th/, /dh/, /lf/, and /f/. It appears that the ITA designers have failed to make this letter conform closely enough to the TO digraph sh to facilitate transfer. Rolf (1968) said that this letter might well be redesigned and the evidence here certainly suggests support for this conclusion.

o, e, and æ. The miscue responses to the o, e, and æ symbols were also discussed in connection with discrepancies in top half of the ITA low transfer words with their TO versions. The problem with o may be the fact that it is being used in ITA to represent a sound usually expressed in TO by a variety of grapheme combinations. For example, ew, ue, oo, ough and even o and ou are used in TO to stand for

/uw/. The new symbol, while it serves as a solution for ITA in its attempt to simplify the spelling for beginners, may make transfer a bit more difficult between all but the most closely related shapes. Here the ew-u transfer was not successful for 62 subjects.

The problem central to ie and ae may be the fact that in these letters the e is attached to the i and the a shapes of TO to form graphemes representing "long" i and a. As was pointed out, ie in TO represents more than one English phoneme, and /ay/ is not the most frequently called for response when the symbols are side by side. The children may have simply chosen the phonemic pattern that appeared in a familiar TO word when responding to fiend. The responses to wiep seem to have occurred because the shape of the word was altered when the e was transposed. Also, it is important to remember that TO readers are usually drilled on the rule concerning the final e as the cue to a "long" vowel in single syllable words. Perhaps that drill is more effective than the drill on the rule, "When two vowels go walking the first one says its name."

The transposing of the e in care to a position following the a changed the top half of the word and TO readers responded with the familiar word car. The ae of cær is a concession to TO spelling, because the most frequent response to care in TO is /kér/ not /kéyr/ as the ae would indicate.

ai. The response to ai appears to be a case of the children responding to it in two ways. The first and most

frequent was with the ITA expected response and the second was with a substitution which could be spelled with an oi in TO. On the whole, then, the letter is fairly successful. The miscue problem with baihd probably does not rest with any one letter alone. Possibly total shape and configuration differences to which single letters contribute are sources of confusion as well.

ou and s. The ou in bouns was correctly identified 23 times in miscue responses, in addition to the 12 times the entire word was correctly identified. The problem in this word appeared to be one of the ways in which the subjects responded to the final s. The 53 miscue responses to s which contained /z/ were probably due to the children's conditioning to respond to s in TO with the voiced sibilant, when it is preceded by a nasal or a nasal and a silent e. In TO the voiceless sibilant after /n/ response is usually indicated by ce, as the TO spelling of bounce indicates.

The ou in hou was responded to correctly by the 27 subjects who got the entire item right, and 5 more who gave such word substitutions as house and hour or our. The most frequent grapheme representations for /aw/ in TO are ou and ow. Perhaps these fourth grade TO readers are more conditioned to ow than to ou to represent this diphthong.

The preceding discussion has narrowed the list of letters which are probable sources of confusion at the time of transfer from one orthography to another to include only the following: h, o, o, e and æ. h, o, and o fit the hypothesis

description of being radically different from their TO counterparts, while ɛ and æ both called for responses which differed from those most frequently called for by similar letters in TO.

ANALYSIS OF UNIFON MISCUES

Analyses of the frequency of the presence of phonemes corresponding to the initial and final letters and letters in the stressed vowel position in miscues of low transfer Unifon words produced the following list of low percentage symbols with respect to each category:

1. Initial Letter - C, Q, Q, S
2. Final Letter - Q, Q, S, Q, Q, W, I, L
3. Stressed Vowel - Q, Q, I, Q, Λ, Q, E, +

Tables 69, 70 and 71 contain the results of these frequency checks.

When the list was consolidated 14 letters were possible troublemakers. These included the consonants C, S, Q, W, Q, and L and the vowels E, I, +, Λ, Q, Q, Q, and Q.

In the discussions which follow upper case rather than lower case TO letters will be used where it is felt that the comparisons will be more clear to the reader.

C. In Unifon C stands for the phoneme /s/. This phoneme is usually represented by S in TO. A capital letter identical to C in TO stands most frequently for /k/, though it sometimes represents /s/, when it is followed by i, y or e. When the subjects tackled C7QD, CDI, CW+V+V, and H+V+V+CUL

TABLE 69

FREQUENCY OF PRESENCE OF PHONEMES CORRESPONDING
TO INITIAL LETTERS IN MISCUES OF
LOW TRANSFER UNIFON WORDS

Word		Frequency of Responses Containing Corresponding Phonemes					
		No. Word Miscues	Stimulus Letter	Correct Position		Other	
				No.	% of Miscues	No.	% of Miscues
TO Spelling	Unifon Spelling						
<u>One Word Syllable Words</u>							
catch	KAO	70	K	67	95	1	1
gone	GAN	71	G	63	88	0	0
health	HELO	80	H	80	100	0	0
how	HO	75	H	64	85	0	0
joy	JG	67	J	61	91	0	0
leave	LIV	73	L	72	98	0	0
new	NO	77	N	76	98	1	1
she	SI	75	S	2	2	0	0
stood	CTOD	66	C	2	3	1	1
suit	COT	79	C	0	0	0	0
thank	ΘANK	80	Θ	0	0	0	0
wash	WOS	75	W	56	74	2	2
<u>Two Syllable Words</u>							
chairman	ČERMUN	69	Č	1	1	0	0
swinging	CW*W*W	59	C	14	23	0	0
whistle	HW*ČUL	49	H	33	55	0	0

TABLE 70
 FREQUENCY OF PRESENCE OF PHONEMES CORRESPONDING
 TO FINAL LETTERS IN MISCUES OF
 LOW TRANSFER UNIFON WORDS

		Frequency of Responses Containing Corresponding Phonemes					
		No. Word Miscues	Stimulus Letter	Correct Position		Other	
				No.	% of Miscues	No.	% of Miscues
Word TO Spelling	Unifon Spelling						
<u>One Word Syllable Words</u>							
catch	KAΘ	70	C	0	0	2	2
gone	GAN	71	N	65	91	2	2
health	HEΛΘ	80	Θ	0	0	0	0
how	HΘ	75	Θ	0	0	0	0
joy	JG	67	G	0	0	0	0
leave	LIV	73	V	70	95	0	0
new	NO	77	O	0	0	0	0
she	SI	75	I	15	20	0	0
stood	CTOD	66	D	45	68	2	3
suit	COT	79	T	78	98	0	0
thank	ΘANK	80	K	63	90	1	1
wash	WOS	75	S	1	1	0	0
<u>Two Syllable Words</u>							
chairman	ČERMUN	69	N	49	71	7	10
swinging	CW*W*W	59	W	1	1	0	0
whistle	HW*ČUL	49	L	23	38	6	10

TABLE 71

FREQUENCY OF PRESENCE OF PHONEMES CORRESPONDING
TO STRESSED VOWELS IN MISCUES OF
LOW TRANSFER UNIFON WORDS

		Frequency of Responses Containing Corresponding Phonemes					
		No. Word Miscues	Stimulus Letter	Correct Position		Other	
Word				No.	% of Miscues	No.	% of Miscues
TO Spelling	Unifon Spelling						
<u>One Word Syllable Words</u>							
catch	KAQ	70	A	43	61	0	0
gone	GAN	71	A	0	0	0	0
health	HELE	80	E	58	72	0	0
how	HO	75	O	0	0	0	0
joy	JG	67	G	0	0	0	0
leave	LIV	73	I	0	0	0	0
new	NO	77	O	0	0	0	0
she	SI	75	I	15	20	0	0
stood	CTOD	66	O	1	1	0	0
suit	COT	79	O	1	1	0	0
thank	ΘANK	80	A	41	58	0	0
wash	WOS	75	O	10	13	0	0
<u>Two Syllable Words</u>							
chairman	QERMUN	69	E	5	7	2	2
swinging	CW*U*W	59	*	8	13	9	15
whistle	HW*CU	49	*	3	5	0	0

in the low transfer Unifon list, they tended to respond with /k/ whenever C occurred. The most frequent miscue responses of the 66 given to CTOD were /kówd/ (code), and /kát/ (cut). In responding to CUT, the subjects said /kát/ (cut) 38 times. CW+V+V produced 52 different responses. Half of these fell in the non-word substitution category. In 33 of the responses the initial phoneme was /k/. Thirteen of the word substitutions begin with C when spelled in TO, 7 begin with Q, and 1 begins with K. Three children did get the root morpheme correct and responded with /swín/. In HW+CUL, where the C is in a medial position, the non-word substitutions and the phrase substitutions contain the most clues. Here, the phonemic response to the medial consonant was most frequently /k/.

S . The called for response in Unifon to the letter S is /š/, usually represented by the digraph SH in the TO capital form. SI and WOS contain this letter. When the children looked at SI, they usually responded with a word containing the phoneme /s/, such as SIGH or CY, or SEE or SEA. However, 20 subjects reversed the letters and said /íz/, which is spelled IS in upper case TO. When they looked at WOS, 40 subjects responded with some form of WAS. Only 5 responses in the total given to both words had the expected /š/ response to this letter.

Q . In Unifon the upper case TO digraph CH is represented by Q. This was not conducive to automatic transfer. The Q is contained in KAQ (CATCH) and QERMUN (CHAIRMAN). When

it was in the final position in the Unifon spelling of CATCH, 20 children said /kæt/ (CAT) and 16 said /kéyk (CAKE). The first group must have ignored the Q altogether and the second group apparently responded as if it were the TO C. In the case of the responses to the Unifon version of CHAIRMAN, the favored response was again /s/. Twenty-two subjects responded with the phonemic pattern for SERMON, /sérmon/. Fifteen gave a response which contained the phoneme /k/, which can be represented in upper case TO by C. Eleven replied with /jǽrmən/ (GERMAN). The one child, who responded with CHICKEN, was the only subject who used the /č/ phoneme expected in Unifon as the response to the initial letter, Q.

Ų. The velar nasal /ŋ/, is represented in TO by NG, when it is not followed by K as in THANK or G as in SINGLE. Then N is used. Unifon has changed the N by reversing it and altering the descending vertical stroke to make a letter to represent this phoneme. It is contained in ΘAŲK and CW+ŲŲŲ from the low transfer Unifon list. The final part of the response to ΘAŲK made by 48 of the subjects contained /ŋk/. Whether they realized that the Ų was anything other than N cannot be determined, because native English speakers say /ŋ/ before /k/, when the preceding letter is N. This word also contained Θ, which resulted in even more miscues than Ų. CW+ŲŲŲ contains the Ų twice. Only the responses /swín/ (SWING), /swéŋ/ (SWUNG), /sínŋ/ (SINGING) and /kəŋgərúw/ (KANGAROO) contain /ŋ/. The majority of the other responses contain /n/, represented in TO by N. The Unifon

version of SWINGING contains only one letter that was not identified as a possible source of difficulty, when the dominant letters were checked. It is, therefore, difficult to attribute miscues to any one symbol.

Θ. The International Phonetic Association has assigned the symbol Θ to the phoneme which stands for the voiceless dental fricative represented in upper case TO by TH. Malone has used this same symbol in his orthography to represent the same phoneme. This adaptation, logical though it may be to an adult familiar with linguistic symbols, was lost on these subjects. When responding to ΘAWK, they most often said /b^hnk/ (BANK), or a phonemic pattern involving an initial vowel. When responding to HELΘ, they mistook the Θ for O, and 73 responded with some form of HELLO. It is apparent that the shape of Θ has little, if any, similarity to TH and the confusions with O and B are understandable.

L. The L was no problem to TO readers except in the final position in HW+LUL (WHISTLE). Even here, it was recognized more frequently than any letter other than H. It was responded to correctly in all oral responses except one in LIV (LEAVE), and was contained on all 80 responses to HELΘ (HEALTH). It is reasonable to conclude that the L was not the element of confusion in the Unifon spelling of whistle.

E. The E in CHERMUN (CHAIRMAN) stands for /e/, just as the TO E usually does. However, in TO, when E is followed

by R, the response most frequently expected is /ə/, as in the miscue response to DERMUN given by those who replied to the stimulus with SERMON and GERMAN. The /e/ phoneme followed by /r/ in English is usually represented as in the homonyms, FARE and FAIR. These children were not conditioned to responding with E with /e/, when an R follows it. Most of them used /e/ in their miscue responses to HELØ. Therefore, the Unifon letter E is probably not always so troublesome.

I. The Unifon letter I appeared in the Unifon spellings of LEAVE (LIV) and SHE (SI). When an identical TO letter, I, is in the medial position between two consonants in a single syllable word, it usually stands for /i/. This was the phoneme assigned it by 54 subjects, when they looked at LIV and said /lív/ (LIVE). Fifteen assigned it /ay/, when they said /láyv/ (LIVE). I, also, was usually assigned these phonemic values, when the children responded to SI. Malone may have capitalized the i, the IPA symbol for /iy/, when he designed this letter. Again, not being linguists, the subjects did not get the connection.

±. The unusual looking letter ± stands for /i/ or "short" i in Unifon. It is in HtttCUL and CtttVttV of the low transfer Unifon list. The appropriate phonemic response to it appeared in the stressed vowel position of the miscues of CtttVttV 13 per cent of the time and in HtttCUL miscues 5 per cent of the time. Both of these words had varied phonemic patterns of responses, and at least three of the symbols

appearing in the low percentage of correspondence lists. + cannot be identified positively as the major source of confusion. The responses to the stressed vowel position in these words include 10 vowel phonemes of the language. The children apparently used the other cues more consistently, though often incorrectly, in arriving at pronunciations for the Unifon versions of SWINGING and WHISTLE.

^. The Unifon symbol ^ stands for the phoneme /ɔ/. It appears in G^N, the Unifon version of GONE. The subjects often recognized the basic TO shape of capital A, from which it is derived. The word substitution /géyn/ (GAIN) and the non-word /gén/, which could be spelled with an A in TO, were given as responses 29 and 21 times respectively. The TO spelling of GONE is irregular, because of the final e, which should signal /ow/. These readers were not conditioned to expect an A shaped letter to stand for /ɔ/ before N. The general pattern in TO is for A to be followed by U, UGH, or W, a consonant cluster beginning with L or by R, when its expected response is /ɔ/. In the high transfer words B^L (BALL) and W^K (WALK) this symbol was more successful. B^L was correctly identified by 63 subjects and W^K by 47. Therefore, while ^ is a source of confusion in some environments, it may not be in others.

Q, Q, and Q. The Unifon symbols Q, Q, and Q have in common the fact that they stand for vowel phonemic expressions which are usually represented by more than one letter in TO. The subjects' responses to them have in common the

trend to assign to them phonemes which are usually assigned to the unaltered TO upper case letters from which they are derived. For example, the most frequent response to COT (SUIT) was /kát/ (CUT) and 43 replied to H@ (HOW) with /hów/ (HO, HOE, WHOA). CT@D had varied responses, possibly because the CT combination was hard for TO readers. The letters exactly like C and I in traditional printing never appear as an initial pair. The subjects gave many two syllable responses in which the stressed vowel was in the second syllable. Many of these miscues were non-words. The most frequent word substitutions were /kówd/ (CODE), /kát/ (CUT), /klád/ (CLOD), /tád/ (TOD) and /kát/ (COT).

G. The Unifon letter @ also stands for a sound which is usually represented by two TO letters. This sound, /oy/, is represented by either OI or OY in TO. The Unifon letter is derived from O and I apparently. However, the subjects may have confused it with the lower case q of manuscript writing used in primary grades, because 33 responded to it with /jéy/ (JAY). They also may have ignored the vowel letter altogether, and simply pronounced the name of the letter J.

The analyses of responses to dominant letters in the low transfer words of Unifon revealed 12 letters, which seem to have failed to elicit the responses called for by the orthography to a significant degree. These were the consonants, C, S, Q, @ and perhaps V and the vowels I, O, @, @, @ and possibly ^ and +.

The hypothesis regarding letters which might be revealed by this analysis of miscues suggested two categories of confusing letters. The first category included those in the simplified orthographies which differ radically in shape from their TO representations. The second included those which are identical or very similar in shape to TO letters that usually call for different phonemic responses than the ones assigned them in ITA or Unifon.

The Unifon consonant, ə , definitely falls in the first category. It was not even associated with consonants by the majority of the subjects. The letter + is very unusual in shape and several children commented on this during the test. The attempt to produce a letter the same width as the others appears to have resulted in making a simple letter into a complicated one.

Letters C, S, and I fall in the second category. They are identical to TO upper case letters which call for different phonemic responses from the ones called for in Unifon.

Letters Q, D, Q, Q, and Q have a similarity to TO letters which are part of a two or more letter combination standing for the same phonemes represented by the Unifon letters. The problem seems to be that TO readers are conditioned to expect more letters to represent these phonemes and the alterations in the basic C, U and Q, which the Unifon designer has made, do not suggest more than one letter to TO readers. The transfer is not automatic and readers would need help in making new associations to connect the two.

The question arises as to whether the single letter per phoneme solution can ever be entirely satisfactory for this type of situation, if compatibility with TO is the goal, unless the design of the letter somehow includes a suggestion of other letters in the pairs or groups of letters which stand for the phonemic expressions in traditional orthography. It should be recalled that the difficult letter, ω, in ITA also attempts to represent more than one TO grapheme in one letter. Other ITA letters which represent TO digraphs or sets of graphemes tend to include elements of more than one letter of the TO representation in their design.

The issue concerning Λ and ∅ is less clear. Λ was fairly successful in words other than those in the low transfer group and ∅ was in words which contained letters eliciting even lower percentages of phoneme correspondence in the miscues. ∅ does look a great deal like N and did stimulate that response. However, N in TO often stimulates the /ŋ/ assigned ∅ in Unifon.

Letters in the Most Missed Words

ITA

Tables 72 and 73 contain the results of an analysis of the frequency with which ITA and Unifon letters appear in words with scores falling in the top and bottom 25 per cent of the distributions of their respective orthographies. Letters which make 50 per cent or more of their appearances

TABLE 72

COMPARISON OF THE FREQUENCY OF ITA LETTERS IN THE TOP AND BOTTOM TWENTY-FIVE PER CENT OF WORDS IN THE ITA DISTRIBUTION WITH THEIR FREQUENCY IN THE TOTAL WORDS

Letter	Consonants			Vowels		
	Frequency		Letter	Frequency		Letter
	Total	Top 25% Bottom 25%		Total	Top 25% Bottom 25%	
b	12	4	2	15	2	æ
c	15	3	5	9	3	æ
d	27	3	11	10	0	ie
f	10	5 ^a	2	9	5 ^a	æ
g	10	4	2	6	0	ue
h	10	2	4	4	1	ɑ
j	7	1	1	8	2	au
k	12	6	3	23	7	a
l	32	16	4	30	13	e
m	13	5	0	17	6	i
n	26	5	10	13	2	o
p	13	0	2	14	5	u
r	13	5	1	4	0	ω
r	32	7	6	11	2	ω
s	23	5	6	6	2	au
t	33	7	8	5	0	ɑ ^b
v	10	7 ^a	0	5	1	y ^b
w	8	4 ^a	2	5	1	
y	1	0	0			

TABLE 72-- Continued

Letter	Consonants		Vowels		
	Total	Frequency Top 25% Bottom 25%	Letter	Total	Frequency Top 25% Bottom 25%
z	6	3 ^a			0
s	6	1			2
wh	4	1			2
ch	4	2 ^a			2 ^a
th	5	3 ^a			1
fh	5	2			0
jh	9	0			5 ^a
3	6	0			2
g	12	1			4

(The vowel list was completed on the previous page.)

^a Frequency 50% or more of total in all words.

^b Represents consonant-vowel combination.

in words in either the top or bottom one-fourth of the distribution are indicated. h and e, which were pointed out as 2 of the 4 most troublesome ITA letters when miscues to dominant letters were analyzed, make 50 per cent or more of their appearances in words in the bottom 25 per cent and do not appear at all in words of the top 25 per cent.

The letter u, also appears 2 out of 4 possible times in the bottom 25 per cent and not at all in the top 25 per cent. This letter was discussed in connection with the discrepancies in the upper half configuration of the ITA and TO spellings of boyhood. It was not identified in the discussion of the dominant letters, because it does not represent the vowel receiving the primary stress in boihod. However, a check reveals that the /u/, which it represents, was present in only 10 per cent of the miscue responses. This is less than the percentage established for the stressed vowel represented by ai. This fact would appear to confirm u as a source of interference in transfer from TO to ITA. Here, again, is a single letter standing for a phoneme which is usually represented by more than one letter in TO.

UNIFON

Table 73 shows that o, o and g appear 50 per cent or more times in words with scores below the first quartile and in none of the words falling above the third quartile of the Unifon distribution. These were 3 of 12 letters identified earlier as possible elements in decreasing the compatibility of Unifon with TO. Letters which appear 50 per cent or more

TABLE 73

COMPARISON OF THE FREQUENCY OF UNIFON LETTERS IN THE TOP AND BOTTOM TWENTY-FIVE PER CENT
OF WORDS IN THE UNIFON DISTRIBUTION WITH THEIR FREQUENCY IN THE TOTAL WORDS

Letter	Consonants			Vowels		
	Total	Frequency Top 25%	Bottom 25%	Letter	Total	Frequency Top 25% Bottom 25%
B	12	6 ^a	1	A	13	5 0
D	22	6	2	I	14	4 3
F	9	4	1	Δ	10	2 1
G	10	3	2	Q	9	6 ^a 3
H	14	2	4	O	12	1 6 ^a
J	10	2	1	A	11	2 4
K	25	6	6	A	13	4 4
L	30	10	5	E	17	7 3
M	13	4	3	E	20	6 1
N	26	9	3	*	16	3 4
P	13	4	1	O	7	1 3
R	44	14	7	U	34	12 5
C	23	1	9	Θ	3	0 1
T	30	8	8	Θ	6	1 1
V	10	4	1	G ^b	5	0 3 ^a
W	12	2	3	W ^b	3	0 0
Y	2	0	0			
Z	12	5	2			
J	6	0	3 ^a			
L	5	0	1			
Θ	5	0	5 ^a			
S	9	1	5 ^a			
Σ	3	1	1			
W	12	1	7 ^a			

^a Frequency 50% or more of total
in all words.

^b Represents consonant-vowel combination.

times in words at the bottom quarter of the distribution, but which appear only once in the words in the top quarter are S, W, and Q. These were also on the list of letters suggested as being difficult for TO readers to identify correctly.

Some of the letters appear less frequently than others in the words of the list, making it difficult to balance comparisons accurately. However, these discrepancies of appearances in the most missed and least missed words of the lists add support to the earlier conclusion regarding the difficulty of h, e, and w in ITA and Q, e, a, S, W, and Q in Unifon.

Words on Both Low Transfer Lists

Four items of the word recognition test appeared on the low transfer lists of both simplified orthographies. These were how, new, she and wash. The symbols which appeared to be the most significant sources of confusion to fourth grade readers in these words were au in ITA and @ in Unifon which stand for the phonemic expression /aw/, h in ITA and S in Unifon which stand for the expression /s^v/ and w in ITA and Q in Unifon which stand for the expression /uw/. Each of these phonemic expressions is represented by more than one grapheme pattern in traditional printing. This factor could contribute further to the problems of transfer from TO to ITA and TO to Unifon, and probably from both simplified orthographies to TO, also. Perhaps the presence of letters standing

for these phonemic expressions in the low transfer words of each orthography indicates that it is particularly difficult to design letters that will be compatible with the traditional writing system to stand for them.

Analysis of Syllable and Stress
Agreement in Miscues of
Low Transfer Words

SYLLABLE ANALYSIS

ITA. Table 74 contains the results of the tabulation of the frequencies with which subjects responded to low transfer ITA words with miscues containing the same number, fewer or more syllables than the called for response.

The only two syllable word on the ITA low transfer list, boihwɔd, had about the same number of responses containing only one syllable as responses containing the correct number, and one response contained 3 syllables. It should be pointed out that 21 children replied correctly to this item. This raises the syllable agreement to 46 out of the 80 possible responses. The word boiled, which was the most frequent response aside from the correct one, has a suffix ed that is pronounced as a second syllable, /əd/, in some English words and merely as the consonant /d/ at the end of others. Its TO spelling follows a two syllable pattern of distribution of vowels and consonants. Earlier discussion suggested that the shape of boihwɔd may have cued responses with similar shapes in their TO spellings. Boiled appears to be one of these.

The ITA word bans was given 10 two syllable responses.

TABLE 74

COMPARISON OF SYLLABLE AGREEMENT WITH CORRECT
RESPONSE IN MISCUES OF LOW TRANSFER
ITA WORDS

Word		Syllables				
		Number of Miscues	Number in Correct Response	Number in Miscue		
TO Spelling	ITA Spelling			Same	Fewer	More
<u>One Syllable Words:</u>						
bounce	bouns	56	1	56	-	10
care	caer	52	1	51	-	1
find	fiend	56	1	56	-	0
how	hou	52	1	51	-	0
new	nw	60	1	60	-	0
she	ſhæ	74	1	74	-	0
wipe	wiep	51	1	49	-	2
wash	wojh	74	1	72	-	2
<u>Two Syllable Word:</u>						
boyhood	boihwɔd	50	2	25	24	1

These were 8 responses of /bównəs/ (bonus), 1 of another version of bonus, (bównis), and the non-word, /bówsən/. All contained /s/, which appeared infrequently in miscues of this word. Perhaps the two syllable responses in this case were attempts to respond with utterances including this phoneme for the s cue in bouns.

Unifon. Table 75 reports the frequency with which miscues of low transfer Unifon words contained the same number of syllables as the correct response. The least agreement was between miscues of HEL@ and the correct response. Seventy-three of the 80 responses contained more than the called for one syllable. Earlier discussion pointed out the fact that @ was mistaken for a vowel instead of a consonant and 73 of the 80 subjects responded to this item with hello rather than health. The vowel-consonant confusion was the problem.

It has been suggested that most of the children who gave two syllable responses to CT@D were trying to solve the linguistic puzzle of a word which started with what looked like the TO letters, CT. CT in TO usually calls for /kt/, which does not occur in initial position in English words. Being native speakers of English, they inserted a vowel between /k/ and /t/ and uttered two syllable responses.

The discrepancies in syllable response in the miscues of CW+@+@ tend to be in the direction of reducing the number of syllables. A check with the phonemic patterns of the miscues to the Unifon version of SWINGING shows a variety of

TABLE 75

COMPARISON OF SYLLABLE AGREEMENT WITH CORRECT
RESPONSE IN MISCUES OF LOW TRANSFER
UNIFON WORDS

Word		Syllables				
		Number of Miscues	Number in Correct Response	Number in Miscue		
<u>To Spelling</u>	<u>Unifon Spelling</u>			<u>Same</u>	<u>Fewer</u>	<u>More</u>
<u>One Syllable Words:</u>						
catch	KAJ	70	1	70	-	-
gone	GAN	71	1	71	-	-
health	HELO	80	1	7	-	73
how	HO	75	1	74	-	1
joy	JG	67	1	67	-	-
leave	LIV	73	1	72	-	1
new	NO	77	1	77	-	-
she	SI	75	1	74	-	1
stood	CTOD	66	1	53	-	13
suit	CDT	79	1	79	-	-
thank	BAWK	70	1	67	-	3
wash	WOS	75	1	73	-	2
<u>Two Syllable Words:</u>						
chairman	DERMUN	69	2	64	3	2
swinging	CW*H*H	59	2	24	30	5
whistle	HW*CU	49	2	33	10	6

single syllable responses. Apparently the cues to the presence of two syllables in this word were not clear to the subjects. Perhaps this is where ± and W played some part in the confusions regarding this word. Most did not identify either morpheme of the word, i.e., SWING or ING.

The syllable agreement with the correct response to HW±CUL was relatively low, also. Some of this was probably the result of attempts to reconcile the HW pattern of the initial pair of consonant letters. TO readers respond to WH in TO with /hw/, but are not conditioned to respond to HW in this manner. The Unifon HW is almost identical to HW. Some children made three or four syllable responses. The first syllable of such responses often began with /h/ and the second with /w/.

The single syllable responses are more difficult to analyze. Some responses seem to have been triggered by the H and others by the C. A possibility is that the ± before the C drew attention to C as a letter which looked familiar. Therefore, subjects responded to it, as they would to the TO letter C.

STRESS ANALYSIS

An analysis of the frequency with which the miscues agreed with the correct responses with respect to the syllable in which stress (accent) occurred depended upon the preceding syllable analysis. Responses were selected in which the miscues had the correct number of syllables in response to the two syllable stimulus words. When English utterances

TABLE 76

FREQUENCY OF STRESS AGREEMENT WITH CORRECT RESPONSE IN MISCUES OF LOW TRANSFER
TWO SYLLABLE UNIFON AND ITA WORDS

TO Spelling	Simplified Spelling	Total Number of Miscues	Number with Syllable Agreement	Syllable Stressed in Correct Response	Syllable Stressed in Miscue First Second
<u>Unifon</u>					
chairman	ČERMUN	69	64	1st	62 2
swinging	CW*W*W	59	24	1st	22 2
whistle	HW*CUŁ	59	33	1st	30 3
<u>ITA</u>					
boyhood	boihod	50	25	1st	20 5

of one syllable are pronounced in isolation, all have primary stress. This is why only words of more than one syllable could be studied in this connection. Table 76 shows that where syllable agreement was present stress agreement tended to be present, also. This was to be expected, since most of the words without a prefix in English are Anglo-Saxon or Germanic in origin and the pattern of an accented first syllable is the usual one for such words. The subjects were conditioned to make this response.

CHAPTER V

SUMMARY AND CONCLUSIONS

Problem

This study was designed to investigate the relative compatibility of Pitman's Initial Teaching Alphabet (ITA) and Malone's New Single Sound Alphabet (Unifon) with traditional English orthography by comparing the scores of readers who have learned to read in conventional orthography on tests printed in these two simplified systems and TO. A further objective was to analyze the words which appear least compatible, when printed in either Malone's or Pitman's writing systems, to uncover the bases for miscues which TO trained readers make in trying to read them. It was hoped that the findings would contribute information helpful to those choosing to use simplified orthographies as media for introducing beginners to reading in English.

Rolf (1968) and McCracken (1966) have previously studied the responses of TO trained children to tests printed in ITA. The assumption made in these studies was that problems of transfer in this direction would have much in common with transfer from reading ITA to TO. The difficult, indeed impossible, feat of keeping the subjects' environments free of TO materials, which faces investigators of orthographic

compatibility, when ITA or Unifon trained readers are given TO materials to read as a test of transfer, is eliminated. Accordingly, this investigation was designed to measure the extent of immediate transfer from TO to ITA and Unifon.

Research Hypotheses

The research hypotheses were based on the following assumptions:

1. The more alike two orthographies are, the more alike will be the responses made by the readers to the stimulus words printed in the two orthographies. Therefore, the degree to which TO trained readers can give satisfactory pronunciations of words printed in a simplified orthography the first time they attempt to read in it, can be accepted as evidence of degree of compatibility of that orthography with traditional.
2. TO trained readers will continue to use the same sorts of cues in reading or attacking words in the unfamiliar orthographies that they would use, if they were reading the same words printed in TO. Therefore, a comparison of the unexpected phonemic responses (miscues) made by these readers to the cues which previous research has posited as those most important to reading success in TO, should yield elements, such as letters or combinations of letters, that cause the readers to respond the way

they would in reading TO, even though that was not the way the designers of the simplified orthographies intended that they should respond.

3. When the general physical properties of a word presented in a simplified orthography vary greatly from the TO version, TO trained readers will respond to the word in a way which differs from that expected in the simplified orthography. Therefore, a comparison of differences in number of letters, general shape, and upper half of word configuration should yield information on the importance of these differences to the degree of compatibility of the simplified orthography with traditional printing.

Elements in the design of the two orthographies relating to concessions to TO compatibility made in the ITA spellings which are not made in Unifon, as well as the fact that ITA is based on the lower case traditional alphabet and Unifon on the upper, led to two initial research hypotheses favoring greater transfer, hence higher compatibility between ITA and TO than between Unifon and TO:

1. If students in the fourth grade trained to read English in traditional orthography are asked to read identical words printed in TO, ITA, and Unifon, their oral responses will indicate they can read more words correctly in ITA than in Unifon.
2. The performances of these subjects in reading ITA and TO will be more closely related than their

performances in reading Unifon and TO.

The problem of sources of incompatibility between the simplified orthographies and TO led to the following research hypotheses relating to the simplified and TO versions of low transfer words:

1. More than one-half the low transfer words will contain fewer letters, when compared with their TO spellings, than the majority of high transfer words do, when compared with their TO spelling.
2. When an outline is drawn around each low transfer ITA word and its TO counterpart, significant differences in shape will be apparent in more than one-half of the cases.
3. When the upper half of the ITA and TO versions of low transfer words are compared visually, significant differences in configuration pattern will be apparent in more than one-half the words.
4. Analysis of miscues of low transfer words of the simplified orthographies will reveal letters in ITA or Unifon which differ radically in shape from the letters in their graphemic representations in TO, or which are identical or very similar in shape to TO letters that usually call for different phonemic responses than the ones assigned to them in ITA or Unifon.

Procedure

The 80 subjects of this study were 40 boys and 40 girls drawn at random from the fourth grades of 3 elementary schools in the Cherry Hill Public Schools of Inkster, Michigan. Insofar as could be determined, none of them had ever been exposed to the ITA or Unifon systems before.

The instrument used to test differences in responses to the orthographies was an adaptation of Rolf's (1968) word recognition test. It consisted of 132 words equally divided according to 6 levels of difficulty. Each level of 22 words was contained in a booklet in which each item was centered on a 3½ inch by 5 inch page. The words in each level were identical, but there were 3 word orders. Word Orders 2 and 3 were printed in ITA and Unifon and Word Order 1 was printed in TO.

As the subjects were drawn at random from the population pool, they were assigned to test patterns which had been ordered at random. Subjects were administered one of the simplified orthography versions of the test in each of their first and second sittings and the TO version in their third sitting. No subject received the same order of words twice. All subjects were exposed to all stimulus words except one, which had been left out of some booklets at the time of binding. This word was omitted from consideration with the result that the final list of items numbered 131 rather than 132. Level 2 thus contained 21 words rather than 22.

The oral responses to the items were recorded and later

transcribed phonemically for scoring and analysis. Two examiners were responsible for administering all tests. The testing period was confined to slightly less than one month. No less than 5 and no more than 10 days intervened between the test sittings for any subject.

Scoring consisted of tallying the number of final responses to items which were acceptable phonemic patterns of the word, the number of times subjects refused to respond, the number of prompts needed to encourage subjects to respond or go on to another item and the number of spontaneous corrections attempted by the subjects. Both subject and word scores were computed.

Results

COMPARISONS OF MEANS

The first statistical analysis of data obtained from subjects' performances in reading items printed in the various orthographies of the word recognition test consisted of a series of comparisons of the differences between means. The results are reported under each type of comparison made.

Comparisons of the Means of the Number of Correct Responses. The means of the number of correct responses made by the subjects in the orthographies were compared with the following results:

1. The means of number of correct responses in TO were significantly higher than those in either ITA or Unifon for both sexes and for the total sample.

- The significance level of these differences was .01.
2. The means of the number of correct responses in ITA were significantly higher than those in Unifon for both sexes and the total sample and the level of significance was .01 .
 3. While the means of the girls' scores of number correct were higher than the boys', the differences were not significant.

Comparisons of the Means of Refusals. The means of the number of refusals made by the subjects in reading the items of the test in each orthography were compared with the following results:

1. The means of the number of refusals were significantly higher in Unifon than in either ITA or TO for both sexes and the total sample at the .01 level of significance.
2. The means of refusals in ITA were significantly higher than those in TO. The significance levels of the differences were .01 for the total sample and .05 for each sex.
3. The means of the refusals for boys were higher than those for girls in reading TO and Unifon, and higher for girls than boys in reading ITA. None of these differences were significant, however.

Comparisons of the Means of the Number of Prompts. The means of the number of prompts needed by the subjects to respond or continue to the next item were compared for the

orthographies with the following results:

1. The means of the number of prompts were significantly higher in Unifon than in ITA or TO. Both differences were significant for the total sample at the .01 level. The level of significance for these differences for prompts was also .01 for boys. The difference between Unifon and TO was significant for girls at the .01 level, while that between Unifon and ITA was significant at the .05 level.
2. The means of the number of prompts in ITA were higher than those in TO. The level of significance of the difference for girls was .05 and for the total sample .01. The difference was not significant for boys.
3. Boys' means for prompts were higher in TO and Unifon than the girls' means while the girls' means for prompts exceeded the boys' means in ITA. The differences were not significant.

Comparisons of the Means of Corrections Attempted. The means of the number of corrections attempted by the subjects in reading in the orthographies in which the test was presented were compared with the following results:

1. The means of the number of corrections in Unifon were higher than those in ITA or TO. Only the differences in the means between TO and Unifon were significant. The difference for the total sample was significant at the .01 level and the differences for the

boys and girls at the .05 level.

2. The means of the number of corrections in ITA exceeded those in TO. However, only the differences for the total sample and the girls were significant. The level of significance was .05 .
3. The means of the boys' corrections exceeded the girls' in TO and Unifon, while the means for the girls' corrections exceeded the boys in ITA, but none of these differences was significant.

COMPARISONS OF CORRELATIONS

The second group of statistical comparisons involving subjects' scores was a series of product moment correlations and comparisons of differences between correlations. The results are reported for each type of comparison.

Correlations between the Number Correct in the Orthographies. The number of correct responses in the orthographies were correlated and then the significance of the differences between the correlations was determined. The results of both sets of computations were as follows:

1. The correlation coefficients between the number correct in the orthographies were positive and significant at the .01 level for all comparisons.
2. While the correlations in each case were slightly higher for girls than for boys, the differences were not significant.
3. TO-ITA coefficients of correlation were higher than TO-Unifon coefficients. The differences were

significant at the .01 level for girls and the total sample. The difference for boys was not significant.

4. TO-ITA correlations were higher than ITA-Unifon correlations. The difference was significant for the total sample only. The significance level was .01 .
5. ITA-Unifon correlations were higher than TO-Unifon correlations. The difference was significant for the total sample only and at the .05 level.

Comparisons between the Number Correct and IQ. The reports in the literature of the close relationship of IQ to reading achievement led to the correlation of the number of correct responses made by the subjects with their IQs. Comparisons were then made to determine the significance of the differences between these correlations. The results of both sets of computations were as follows:

1. The correlations of the subjects' IQs with their scores of correct responses in each orthography were positive and significant at the .01 level for both sexes and the total sample.
2. While the correlations between IQ and the three orthographies were higher for boys than for girls, the differences were not significant.
3. In all but one instance, Unifon-IQ correlations were higher than ITA or TO correlations with IQ. This exception was the girls' ITA-IQ coefficient, which was higher than the Unifon-IQ coefficient. However, all differences were so small that they

were no greater than those which might have been expected by chance.

4. ITA-IQ coefficients were all slightly higher than TO-IQ coefficients, but again the differences were not significant.

Partial Correlations between the Number Correct in the Orthographies. Partial correlations in which the influence of IQ was controlled were computed between the number correct in the orthographies. Comparisons of the differences were then made to determine their significance. The results of both sets of computations were as follows:

1. When IQ was held constant, the correlations between the number correct in the orthographies were still positive and significant at the .01 level for the total sample and both sexes.
2. The partial correlations between the number correct in the orthographies were higher for girls than for boys, but the differences were no greater than chance expectancy.
3. The TO-ITA partial correlations were higher than the TO-Unifon partial correlations. The differences for girls and the total sample were significant at the .01 level. The difference for boys was not significant.
4. The partial correlations between TO-ITA were greater than those between ITA-Unifon. The difference for girls was significant at the .05 level and that for the total sample at the .01 level. The difference

for boys was not significant.

5. The ITA-Unifon partial correlations were higher than the TO-Unifon partial correlations, but the differences were not significant.

Correlations between the Number of Refusals in the Orthographies. As in the previous sets of computations, the correlations for the number of refusals were computed and the significance of the obtained differences was determined. The results were as follows:

1. The correlation coefficients for the number of refusals in the orthographies were all positive and significant at the .01 level.
2. The refusal coefficients obtained for boys for the relationships between TO and ITA and between ITA and Unifon were higher than those for girls. The difference between TO-ITA coefficients was significant at the .05 level. The coefficients for boys and girls for the TO-Unifon refusal relationship were identical.
3. The TO-ITA refusal relationship was higher than the TO-Unifon refusal relationship in all cases. Differences in correlations for boys and the total sample were significant at the .01 level. The difference for girls was not significant.
4. The TO-ITA refusal coefficients for boys and the total sample were higher than the ITA-Unifon coefficients. The difference for the boys was significant at the .05 level, while that for the total sample was

not significant. The girls' ITA-Unifon refusal correlation was slightly higher than the TO-ITA correlation, but the difference was no greater than chance expectancy.

5. The ITA-Unifon refusal correlations exceeded the TO-Unifon correlations in all cases. The differences in correlations for boys and the total sample were significant at the .01 level. The difference for girls was not significant.

Correlations between the Number of Prompts in the Orthographies. The correlations between the number of prompts needed by the subjects in the orthographies were computed along with the tests for determining the significance of the differences obtained between them with the following results:

1. The correlation coefficients between the number of prompts in the orthographies showed variations. Those for boys and the total sample were all positive and significant at the .01 level. The correlations between prompts for TO and ITA and for ITA and Unifon for girls were positive, but only the TO-ITA relationship was significant and then at the .05 level. The TO-Unifon correlation was low and in the negative direction for girls. This was the only negative correlation obtained in the study. It was not, however, significant.
2. The prompt correlation coefficients for boys were

all higher than those for girls. The TO-Unifon correlational difference between the sexes was significant at the .01 level and those for the TO-ITA and ITA-Unifon relationships were significant at the .05 level.

3. The prompt TO-ITA coefficients were higher than those for TO and Unifon, but only the difference between the coefficients of correlation for girls was significant and then at the .05 level.
4. The TO-ITA prompt coefficients were higher than the ITA-Unifon in all comparisons. The differences for the boys and the total sample were significant at the .01 level. The differences for girls were not significant.
5. The girls' prompt coefficients of correlation were higher for the ITA-Unifon relationship than the TO-Unifon relationship, and the difference reached the .05 level of significance. The TO-Unifon prompt coefficients were higher than the ITA-Unifon coefficients for boys and the total sample, but these differences were not significant.

Correlations between the Number of Attempted Corrections in the Orthographies. Both the correlations between the number of corrections in the orthographies and the tests for the significance of the obtained differences were computed with the following results:

1. All correlations for corrections were positive. The

correlations for boys and for the total sample were significant at the .01 level. The girls' ITA-Unifon coefficient for corrections was significant at the .01 level, and that for TO-ITA at the .05 level.

That for TO-Unifon was not above chance expectancy.

2. The boys' correction coefficients were higher than the girls' for the TO-ITA relationship and the TO-Unifon relationship, while the girls' coefficients were higher than those of the boys for the ITA-Unifon. However, none of these differences were significant.
3. The correlation differences between corrections for TO-ITA and TO-Unifon showed variations as to which was the higher relationship. For the girls and the total sample the TO-ITA relationship was slightly higher. The TO-Unifon relationship for boys was only .01 higher than the TO-ITA relationship. As might be expected from these descriptions, the differences were not significant.
4. The same pattern of variation held true for the ITA-Unifon and TO-ITA comparisons of correlations in the correction category. The differences again were not significant, though the ITA-Unifon coefficient exceeded the TO-ITA coefficient for girls and the total sample, and the TO-ITA coefficient exceeded the ITA-Unifon coefficient for boys.
5. The variation persisted into the comparisons of the differences between the ITA-Unifon coefficients and

the TO-Unifon coefficients for corrections. Again, the comparisons for girls varied in the same direction as those for the total sample. In these cases the ITA-Unifon coefficients were higher than the TO-Unifon. The difference was significant at the .01 level for girls, while that for the total sample was not significant. The boys, on the other hand, had insignificantly higher coefficients for the TO-Unifon relationship than for the ITA-Unifon relationship.

ANALYSES OF COVARIANCE

The third set of computations involving the subjects' scores consisted of two series of comparisons of the scores obtained by the subjects in the different patterns in which the word recognition test was presented. The object of these comparisons was to see if sources of variation in test pattern had influenced test scores. Sources of variation in these patterns were the orders of the words in the six levels of the test and the orders in which the ITA and Unifon versions were presented. The earlier correlations had shown high positive relationships between performance in each orthography and IQ. As a result, analyses of covariance were computed in which TO achievement and IQ were used as the variables which were controlled. Subjects' scores in the simplified orthographies were compared in terms of those who had been presented words in the same orders, but at different sessions, and in different orders at the same sessions. All F ratios except two proved to be no greater than those which

might have been expected by chance. Both of these involved the third word order of Unifon. When IQ was controlled, the difference between the performances of the subjects taking the test in this order at the first and second sessions was significant at the .05 level. When TO achievement was controlled, the difference was at the .01 level. This indicates that variation in pattern of testing is important, when same sample comparisons are made.

COMPARISONS INVOLVING LOW TRANSFER WORDS

Three comparisons were made involving the physical characteristics of low transfer words in the simplified orthographies. The differences in length (number of letters) between ITA and Unifon high and low transfer words, when compared with their TO spellings, were studied to determine whether or not more than one-half of the low transfer group tended to be shorter in this respect than the majority of high transfer words. The general outline and the upper half of the word configuration of the ITA low transfer words were compared with their TO counterparts in an effort to locate elements which might interfere with transfer from TO to that simplified system.

The phonemic transcriptions of responses to low transfer words were studied to find out the extent of phoneme correspondence to dominant letters in the stimulus word. The extent to which the miscues indicated syllable and stress agreement with correct responses to low transfer words was also studied. An effort was made to analyze the responses where the

phoneme-grapheme correspondence was low in each of the above comparisons to find which elements in the low transfer words may have cued the miscues made by the TO trained subjects. The words falling in the top 25 per cent and the bottom 25 per cent of the ITA and Unifon distributions were studied to locate letters which made 50 per cent or more of their appearances in the lowest group and no more than one appearance in the highest group.

High and Low Transfer ITA and Unifon Words. Low transfer words were defined as those in the simplified orthographies which were among the words in the lowest 25 per cent of the distributions of their respective orthographies and in the upper 50 per cent of the words in the TO distribution. In ITA 9 words met these specifications and in Unifon 15 met them.

High transfer words were chosen for the purpose of comparing their length with the length of low transfer words. These words were those in each simplified orthography which appeared in the upper 25 per cent of the ITA or Unifon distributions, as well as the upper 25 per cent of the TO distribution. These specifications were met by 22 ITA words and 14 Unifon words.

No word on the ITA low transfer list was responded to correctly by more than 28 subjects. No word on the Unifon list was responded to correctly by more than 3 subjects. The lowest number of correct responses to a word on the ITA high transfer list was 65, while the lowest number of correct

responses to a word on the Unifon high transfer list was 39. These large differences were due to the fact that the ITA quartile scores were so much higher than the Unifon quartile scores.

Physical Features of Low Transfer Words. When the comparison was made between the differences in length of high and low transfer words and their TO spelling, both high and low transfer words in the simplified orthographies tended to be shorter than their TO forms. The Unifon words, because of the system's strict adherence to the practice of representing one phoneme with one grapheme, tended to be shorter than ITA words, when compared to their TO versions. However, the majority of low transfer words of both ITA and Unifon differed in length from their TO spelling by a single letter. The same was true of the majority of the high transfer words in each orthography. Differences in word length from their TO versions in terms of number of letters did not, therefore, seem to be a problem common to more than one-half of the low transfer words in either simplified orthography.

Comparisons in general word shape or outline between the ITA versions and the TO versions of low transfer words revealed that less than one-half of the low transfer ITA words varied significantly from their TO forms in this respect. Alterations in the ITA transliterations from TO which did appear to make a difference in subjects' responses were those involving the adding or subtracting of a descender, or which placed a descender in a different position in the ITA word

than it occupies in the TO version. ITA letters involved in this type of interference were h, a, and e.

The upper half of the word configuration of more than one-half of the ITA low transfer words appeared to have been significantly altered from the upper half configurations of their TO versions. Letters which appeared to have been responsible for resulting miscues were h, o, u, e, and æ.

The study of the miscues to words containing letters which appeared to change the general word shape and the upper half of the word configuration of ITA versions of low transfer words from their TO versions to a significant degree revealed that subjects tended to respond with substitutions which, if spelled in TO, would be quite similar to the general shape or upper half word configuration of the ITA stimulus words.

Phoneme Correspondence to Dominant Letters of Low Transfer Words. The miscues of low transfer words in each simplified orthography were analyzed for the frequency with which subjects responded with the expected phoneme to the initial letter, the final letter and the stressed vowel. In ITA the responses to ascending and descending letters were also analyzed. The responses to the letters with the lowest percentage of correct phonemic responses were further studied to seek explanations for the miscues.

Letters located by this method which seemed to be sources of serious confusions to TO readers transferring to ITA were h, o, e, and æ. Letters which appeared to be interfering with transfer from Unifon to TO were z, s, z,

W, Q, I, O, Q, G, Q, A, and +. These letters appeared to fall into the following categories:

1. h and w in ITA and Q and + in Unifon appear to be so different from their TO counterparts as to fail to elicit similar responses.
2. e and æ in ITA and C, S, and I in Unifon are identical or similar to letters or combinations of TO letters which usually call for a response other than that assigned them in the simplified orthographies.
3. S, Q, O, Q, G and Q in Unifon each have a similarity of shape to one letter of a two or more letter TO combination standing for the same phoneme represented by the single Unifon letter.
4. h and w in ITA and S, Q, O, Q, G, Q, A and W in Unifon each represent a phoneme pattern which is represented by more than one grapheme pattern in TO.

Subjects tended to respond to the confusing letters in ITA and Unifon as they were conditioned to respond in TO. When a letter in either simplified orthography looked like one in TO, they responded with the phoneme appropriate to the TO letter, whether or not that was the one called for by the stimulus letter. When a letter failed to remind them of a TO letter, the variation in responses increased. When responding to single letters in the simplified orthographies which are usually represented by more than one letter in TO,

they tended to respond as they would to the single TO letter which the simplified symbol most closely resembles.

When the low transfer lists in each simplified orthography were compared, four words, how, new, she and wash, were on both lists. The letters with the lowest percentage of phonemic correspondence were au (ITA) and o (Unifon), h (ITA) and s (Unifon) and u (ITA) and o (Unifon). The phonemes which each of these letters represent are represented in TO by more than one set of graphemes containing more than one letter in each set.

ITA and Unifon Letters Appearing Most Frequently in the Most Missed Words. A frequency count was made of the letters of the ITA and Unifon systems to find out how often each appeared in words with scores falling above the third quartile or below the first quartile of the distributions of the respective orthographies. Letters were noted which appeared in the lowest one-fourth of the words more than 50 per cent of the time and in the highest one-fourth no more than once. Letters which fell within these limits in ITA were h, ie and u. Letters identified in Unifon were o, e, a, s, v and o. All of these had been identified by at least one of the other methods of locating confusing elements in the simplified orthographies.

Syllable and Stress Agreement with Correct Response in Miscues of Low Transfer Words. The miscues to the low transfer words in each orthography were analyzed to determine the frequency with which they contained the same number of

syllables as the response expected for the stimulus word. The findings indicated that most miscues to low transfer words contained the same number of syllables as the correct response. When a large number of miscues varied in this respect, an analysis of the responses indicated that the subjects were attempting to make a response that was conditioned by their previous experience with TO. For example, if a consonant resembled a TO vowel in shape, they responded as if it were that vowel, thus producing two syllable miscues in response to a one syllable word.

Two syllable low transfer words were analyzed for stress agreement with the correct response. This could be done only in cases where the miscues agreed with the correct response with regard to the number of syllables. The analysis showed that, where there was syllable agreement, the stress appeared to be the same as was expected in the correct response. Again, the subjects responded as they are conditioned to respond in TO, because the low transfer two syllable words contained the stress pattern which is commonly found in English words of Anglo-Saxon and Germanic origin. The first syllable contained the primary stress in each case.

Discussion of Results

COMPARISONS OF SUBJECTS' SCORES

The comparisons of the means of the scores of number of correct responses made by these TO trained fourth grade subjects to identical items printed in TO, ITA and Unifon

indicated that the subjects were able to read words in both simplified orthographies. However, they could read in neither ITA nor Unifon as well as they could read in traditional orthography. While this is not unexpected, it does indicate that complete transfer did not take place between TO and either ITA or Unifon. The significantly higher means obtained in reading ITA compared to those obtained in reading in Unifon indicate that the automatic transfer was greater between TO and ITA than between TO and Unifon. Since the hypothesis that these TO trained subjects would read ITA with more success than they would read Unifon was supported, it is probable that the ITA system is more compatible with TO. If there are common elements in the reading transfer from TO to a simplified system and the transfer from a simplified writing system to TO, as assumed by Rolf and McCracken and this investigator, then it is probable that more explicit teaching for transfer would have to take place, when beginning readers make the shift from Unifon to TO, than when they make the shift from ITA to TO.

The case for greater compatibility of ITA than Unifon with traditional orthography gained support, but not complete support, from the results of the correlations of the performances with respect to the number of correct responses in the orthographies. The second hypothesis which had favored a higher relationship between reading in ITA and TO than between reading in Unifon and TO was supported for girls and the total sample, but not for boys. All correlations were high

and positive, both when IQ was controlled and when it was not, showing that those who attained high scores in one orthography tended to attain high scores in the others.

While girls obtained higher mean scores than boys, and the correlation coefficients for girls were higher than those for boys, the differences were not significant. This finding supports the general pattern of lack of sex differences found by Rolf (1968), when he studied transfer from TO to ITA. The correlations between IQ and each of the orthographies were higher for boys than girls; these differences were not significant either. In this study, at least, transfer between the simplified orthographies and TO, as well as the relationships between reading performances in the orthographies, was similar for both sexes.

The high positive correlation coefficients obtained when the number of correct responses in the orthographies were correlated with IQ, and the subsequent lack of significance in the difference in the correlation between the various pairs reveals that the subjects with the highest intelligence tended to make the highest scores in all the orthographies and that intelligence tended to be related in a similar manner to reading in all three orthographies, TO, ITA and Unifon.

The results relating to the study of the subjects' refusing to respond to items and needing to be prompted to respond or go on to the next item tend, also, to show that the subjects' responses to ITA were more like their responses

to TO than their Unifon responses were. Comparisons of the means showed that, while the subjects refused and needed to be prompted more frequently both in Unifon and ITA than in TO, the difference was greater between Unifon and TO. If, as earlier discussion suggested, the refusals and prompts indicated items which were difficult for these TO readers, then this finding supports the earlier evidence that ITA was easier for these subjects to read than Unifon.

The means for the number of corrections attempted were also higher in Unifon than in ITA or TO, and the ITA means were higher than the TO means in this category of responses. The differences between the TO and Unifon means were all significant. Those between ITA and TO were significant for girls and the total sample. These comparisons also indicate that the subjects' ITA performances in terms of correcting responses were more like their TO performances than their Unifon performances. The fact that the differences between means of ITA and Unifon corrections were not significant would indicate that the subjects' behaviors were even more alike in attempting to correct their responses in each of the simplified orthographies.

The sex differences between means of the refusals, prompts and corrections were no greater than chance expectancy, though the boys tended to display more of these behaviors in TO and Unifon and the girls more in ITA. Again, behavior in reading in each of these orthographies appears to be similar for the sexes.

The correlations between refusals, prompts and corrections for the orthographies were somewhat more varied in size and the significance of the differences between them than the correlations for number of correct responses had been. All refusal and correction correlations were positive, but one of the correlations for prompts, that for the girls' TO-Unifon relationship, was negative and very low. The ITA-TO correlations were positive and tended to be the highest of the three comparisons, but the differences for boys and girls and the total sample varied from being highly significant to being no greater than chance expectancy. It seems safe to conclude that there was a tendency for the TO-ITA relationship to be higher than the TO-Unifon relationship, but the difference appears to be less well defined than that found for the number of correct responses.

The only significant sex differences revealed in the study were obtained when the correlation coefficients for boys and girls were compared in the refusal and prompt categories. The boys' refusal correlations between TO and ITA were significantly higher than the girls' for all three sets of correlation coefficients, TO-ITA, TO-Unifon and ITA-Unifon.

COMPARISONS OF WORDS AND RESPONSES TO THEM

The higher number of Unifon low transfer words compared to the number of ITA low transfer words and the reverse situation with regard to numbers of high transfer words tend to bear out earlier hunches that ITA would be easier for

these children to read than Unifon.

The greater reduction in word length with regard to number of letters when TO words are transliterated into Unifon than when they are transliterated into ITA also points up a potential source of incompatibility between Unifon and TO. However, more than one-half the low transfer words in neither ITA nor Unifon differed more in number of letters from their TO spellings than the majority of high transfer words differed from their TO spellings. Therefore, the hypothesis that low transfer words would be significantly shorter in this respect was not supported.

When total word shape and upper half configurations of ITA and TO versions of the low transfer ITA words were compared, the ITA spellings seemed to have altered the upper half of the configuration of the words more significantly than the total word shape. This finding was supportive of the hypothesis that more than one-half of the ITA low transfer words would differ significantly from their TO versions in upper half configuration. Since, compatibility with TO upper half configuration was a stated goal of the ITA designers, this area of compatibility might well be investigated further.

Checking the frequency with which the miscues made in response to low transfer words contained correct responses to certain dominant letters of high cue value to TO readers appeared to be a systematic method of locating letters in ITA or Unifon which confuse TO readers. The analysis of

the miscues to words containing such letters, as well as the analysis of the miscues involving syllable and stress agreement with the correct response, revealed that TO readers responded to ITA and Unifon spelling patterns on the basis of their experience with TO.

The study of miscues to dominant letters also produced information which supported the original hypothesis that difficult letters in ITA or Unifon would be very different in shape from their TO counterparts or would be similar or identical to TO letters calling for phonemic responses other than those required by the simplified orthographies. In addition, a third and fourth type of letter was located. These types included letters standing for phonemes which have more than one TO presentation and single letters standing for phonemes which are usually represented by a grapheme pattern of more than one letter in TO. One confusing letter might, of course, fall into more than one of the four categories. These findings were further supported by the identification of the most confusing letters in low transfer words common to both ITA and Unifon and the letters which appeared with disproportionate frequency in the most missed words in each simplified orthography.

The large number of letters which appeared to interfere with transfer from TO to ITA or Unifon that stood for phonemes usually represented by more than one set of TO grapheme patterns of more than one letter was of particular interest. The Unifon system has more of these types of

letters, because it adheres more strictly than ITA to the principle of assigning one letter per phoneme and because the size of the letters are of uniform height and width. Also, ITA has followed the practice of combining the shapes of two TO letters to make a single letter in a more obvious fashion than has Unifon.

The construction of a simplified beginning reading orthography is not a simple task. Since transfer to traditional orthography is the final goal, the designer must do much research on the grapheme-phoneme correspondence of TO. The results of this study indicate that phonemic patterns which are represented in TO by two or more sets of graphemes, particularly those represented by two or more sets of two or more letters each, should be studied with utmost care. The question is raised here as to whether or not a single symbol can ever represent such phonemes satisfactorily in an English beginning reading orthography.

The larger number of Unifon letters with low incidence of phoneme correspondence in the miscues of low transfer words was, of course, additional evidence of the greater difficulty TO readers had in reading Unifon as opposed to ITA, and gives further support to the conclusion that Unifon is less compatible than ITA with TO.

Conclusions

Within the limits of the conditions of the present investigation the following conclusions appear to be

warranted from its findings:

1. TO trained readers appear to be able to transfer from TO to either ITA or Unifon without previous training in reading in either orthography, but the transfer is not complete in either case. The transfer from TO to either ITA or Unifon is similar for boys and girls.
2. The immediate transfer from TO to ITA is greater than that from TO to Unifon.
3. Intelligence appears to be positively related in similar fashion to ability to read in TO, ITA or Unifon.
4. As partial correlations with IQ held constant indicated, intelligence alone does not account for ability of TO readers to read in ITA or Unifon.
5. Ability to read in ITA or Unifon is positively related to ability to read in TO.
6. Abilities to read in ITA and TO are more highly related than abilities to read in Unifon and TO in the case of girls alone or both sexes grouped together.
7. TO trained readers refuse more words presented in Unifon than ITA.
8. TO trained readers need to be prompted more often when reading Unifon than when reading ITA.
9. With regard to incidence of refusing items, needing to be prompted and attempting corrections in any one

of the three orthographies (TO, ITA and Unifon)
there are no sex differences.

10. Differences in word length from their TO versions in terms of number of letters is not an element of confusion common to the majority of low transfer words in either ITA or Unifon.
11. Discrepancy in general word shape between ITA and TO spellings is not a significant element of confusion in the majority of ITA low transfer words. Where it does exist as a problem, there is a strong tendency for TO readers to respond with miscues, which, when spelled in TO, resemble the ITA word in general shape.
12. The discrepancy in the upper half of word configuration between ITA and TO spellings is an element of confusion in the majority of low transfer ITA words. There is a tendency for TO readers to respond to low transfer words with miscues, which, when spelled in TO, are similar in upper half configuration to the ITA stimulus words.
13. Letters which are sources of confusion, when TO readers read in ITA, are h, o, u, e, and æ.
14. Letters which are sources of confusion, when TO readers read in Unifon, are c, s, z, o, u, i, o, g, q, u, and ±.
15. Four categories of letters are sources of miscues, when TO trained readers read ITA or Unifon:

- a. Letters which are identical or similar to TO letters calling for phonemic responses other than those called for by a simplified orthography.
 - b. Letters which are very different in shape from those used in TO to represent the same phonemic pattern.
 - c. Single letters standing for phonemes which are usually represented by a grapheme pattern of more than one letter in TO.
 - d. Letters standing for phonemes which have more than one TO representation.
16. When TO trained readers read low transfer words in ITA or Unifon, their miscues tend to contain the same number of syllables as the stimulus words. When discrepancies occur, they appear to be the result of associations with TO elements which are similar to elements in the stimulus words.
17. If a miscue in a two syllable low transfer ITA or Unifon word agrees with the correct response with respect to the number of syllables, it also tends to agree with respect to the syllable which is stressed.
18. ITA is more compatible than Unifon with traditional English orthography, when the following are considered to be evidence of compatibility: TO trained readers with no previous instruction in ITA or

Unifon have more success in reading ITA than Unifon; the correlation between reading in ITA and TO tends to be higher than that between Unifon and TO for TO trained readers; TO trained readers tend to make fewer refusals, need to be prompted less often, and attempt fewer corrections when reading ITA than when reading Unifon; and fewer ITA letters than Unifon letters are identified as elements of confusion to TO readers.

APPENDIX A

THE WORD RECOGNITION TEST

DIRECTIONS FOR THE ADMINISTRATION OF THE
WORD RECOGNITION TEST

The following directions are to be read to each subject prior to the administration of the test at the specified test sitting:

Test Sitting 1. We are studying ways some people have tried to write words in English. You will be asked to read some words printed in these new ways. Some of the letters may look strange to you. Simply look at each word and then say the word you think it represents. Our purpose is to find out how people your age react to these new writing systems. Do not worry about making mistakes. Saying what you think a word is will help us in our research. This is the first group of words for today. Look at each word and tell me what you think it is. Speak clearly and loudly enough to be heard.

Test Sitting 2. You remember the last time you came to read from one kind of printing in English. Today you will read from another. Again look at each word and tell me what you think it is. Speak clearly and loudly enough to be heard.

Test Sitting 3. This is the last time you will be coming to read words for us. Again, look at each word and tell me what you think it is. Speak clearly and loudly enough to be heard.

TABLE 77

WORD RECOGNITION TEST ITEMS NUMBERED ACCORDING TO WORD ORDERS OF THE THREE ORTHOGRAPHIES

TO	Level 1 Orthographies:		Test Items Numbered According to Word Orders:		
	ITA	Unifon	1 TO only	2 ITA and Unifon	3 ITA and Unifon
friend	friend	FREND	1	8	21
never	never	NEVER	2	20	16
little	littl	LϕTUL	3	9	19
come	cum	KUM	4	13	9
use	ues	WZ	5	12	20
have	hav	HAV	6	16	15
zoo	zoo	ZO	7	2	13
new	nœ	NO	8	18	11
jumped	jumpt	JUMPT	9	19	18
mother	muther	MULER	10	15	7
train	tren	TRAN	11	1	5
ball	baull	BAL	12	3	17
guess	gess	GEC	13	17	10
about	about	UBOT	14	14	8
walk	wauk	WAK	15	5	14
how	hou	HO	16	4	6
as	as	AZ	17	11	12
ride	ried	RAD	18	7	3
find	fiend	FAND	19	21	4
she	ſhee	SI	20	6	1
thank	thangk	ΘANK	21	10	22
father	father	FOLER	22	22	2

TABLE 77-- Continued

Level 2		Test Items Numbered According to Word Orders:		
	Orthographies:	1	2	3
TO	ITA Unifon	TO only	ITA and Unifon	ITA and Unifon
jok	JOK	23	27	34
whistle	HWT#CUL	24	30	36
car	KER	25	32	26
check	CEK	26	24	31
gun	GAN	27	23	44
clown	KLON	28	29	23
strong	CTRAM	29	25	33
catch	KAC	30	36	30
joy	JG	31	43	42
leave	LIV	32	38	27
garage	GUROS	33	40	24
suit	COT	34	34	28
plate	PLAT	35	26	35
naughty	NATI	36	35	40
wash	WOS	37	33	43
most	MOCT	38	31	32
stood	CTOD	39	42	37
flew	FLO	40	39	38
kite	KYL	41	37	25
roof	ROF	42	44	39
bakery	BAKERI	43	41	29
visit	V#Z#T	44	28	41

TABLE 77 --- Continued

Level 3		Test Items Numbered According to Word Orders:		
TO	Orthographies:	1	2	3
		ITA	Unifon	ITA and Unifon
edge	edʒ	45	60	52
zebra	zeɪbrə	46	45	47
size	sɪz	47	52	53
health	helθ	48	50	57
mind	maɪnd	49	48	50
able	əbl	50	47	54
except	ɪksept	51	46	61
hoop	hʊp	52	53	51
double	dʌbl	53	59	46
fellow	feloʊ	54	57	66
usually	uːʒuəli	55	65	62
shoot	ʃu:t	56	58	67
gather	gæθər	57	66	49
thumb	θʌm	58	61	56
leather	leðər	59	62	48
rag	ræg	60	49	59
blame	blæm	61	63	55
clover	klɒvər	62	55	65
bounce	baʊns	63	64	63
taught	tɔ:t	64	51	58
golden	gəʊlden	65	54	64
silver	sɪlvər	66	56	60
	Eʃ			
	ZIBRU			
	CAZ			
	HELΘ			
	MΔND			
	ΔBUL			
	EKCEPT			
	HOP			
	DUBUL			
	FELQ			
	WISQULI			
	SOT			
	GALER			
	ΘUM			
	LEIER			
	RAV			
	BLΔM			
	KLOVER			
	BQNC			
	TAT			
	GOLDUN			
	CΔLVER			

TABLE 77-- Continued

Level 4		Test Items Numbered According to Word Orders		
TO	Orthographies	1	2	3
		TO only	ITA and Unifon	ITA and Unifon
	ITA Unifon			
jaw	jau	67	76	70
polish	polih	68	83	87
court	cort	69	71	84
whoa	whoe	70	87	76
kingdom	kingdom	71	86	80
servant	servant	72	79	77
worry	wurry	73	77	81
sauce	sauz	74	85	85
swinging	swigig	75	67	71
chairman	chairman	76	84	79
coil	coil	77	81	88
rule	rool	78	88	83
junior	jwnior	79	70	72
agreed	agreed	80	73	75
magazine	magazeen	81	69	67
beauty	bueety	82	80	86
hero	heeroe	83	74	68
wipe	wiep	84	72	73
wade	wzqd	85	75	74
naild	nald	86	82	82
cough	cough	87	78	69
crooked	crooked	88	68	78
	JA			
	POL#S			
	KART			
	HWO			
	K#NDUM			
	CERVUNT			
	WERI			
	CVC			
	CW#M#M			
	DERMUN			
	KGL			
	RDL			
	JONYER			
	UGRID			
	MAGUZIN			
	BUTI			
	HIRO			
	WAP			
	WAD			
	NALD			
	KOC			
	KROKUD			

TABLE 77--- Continued

Level 5		Test Items Numbered According to Word Orders:		
Orthographies:		1	2	3
TO	ITA Unifon	TO only	ITA and Unifon	ITA and Unifon
pleasure	pleguer	89	98	95
screw	scrow	90	97	89
hail	hal	91	104	103
fever	fever	92	107	98
gongs	gogs	93	100	93
ounce	ouns	94	96	99
whined	whiend	95	89	96
sheriff	sheriff	96	94	90
duties	dootees	97	91	91
fawn	faun	98	99	108
lunge	lunj	99	110	107
boiling	boilig	100	93	97
undaunted	undaunted	101	102	92
hearth	harth	102	92	94
single	siggl	103	109	102
otherwise	utherwies	104	95	105
pledge	pledz	105	106	104
hardship	hardship	106	108	106
hired	hierd	107	101	101
mayor	mæor	108	103	109
grant	grant	109	105	100
shudder	shudder	110	90	110
	PLESER			
	CKRO			
	HAL			
	FIVER			
	GAUZ			
	QNC			
	HWAND			
	SERWF			
	DOTIZ			
	FAN			
	LUNJ			
	BGLWM			
	UNDANTUD			
	HORØ			
	CWVGUL			
	ULERWAZ			
	PLEJ			
	HORDSP			
	HARD			
	MÆER			
	GRANT			
	SUDER			

TABLE 77-- Continued

Level 6		Test Items Numbered According to Word Orders:		
Orthographies:		1	2	3
TO	ITA	Unifon	ITA and Unifon	ITA and Unifon
<hr/>				
thatch	thatch	ΘAC	111	113
whence	whence	HWENC	112	118
result	result	RWZULT	113	132
material	material	MUTIRWUL	114	130
clung	clung	KLUM	115	115
capture	capture	KAPCER	116	111
fascinate	fascinate	FACUNAT	117	119
judge	judge	JUJ	115	122
razor	razor	RAZER	121	114
tongue	tongue	TUM	118	120
operation	operation	OPERASUN	130	121
yoked	yoked	YOKT	128	124
wedding	wedding	WEDW	131	117
vote	vote	VQT	125	123
moist	moist	MGCT	129	116
sites	sites	CATC	120	112
brood	brood	BROD	122	131
ankle	ankle	ANKUL	127	128
purpose	purpose	PERPUC	111	127
boyhood	boyhood	BGHOD	132	125
shack	shack	SAK	123	129
vase	vase	VAC	126	126
			124	

PLATE I

THREE PAGES FROM THE WORD
RECOGNITION TEST BOOKLETS

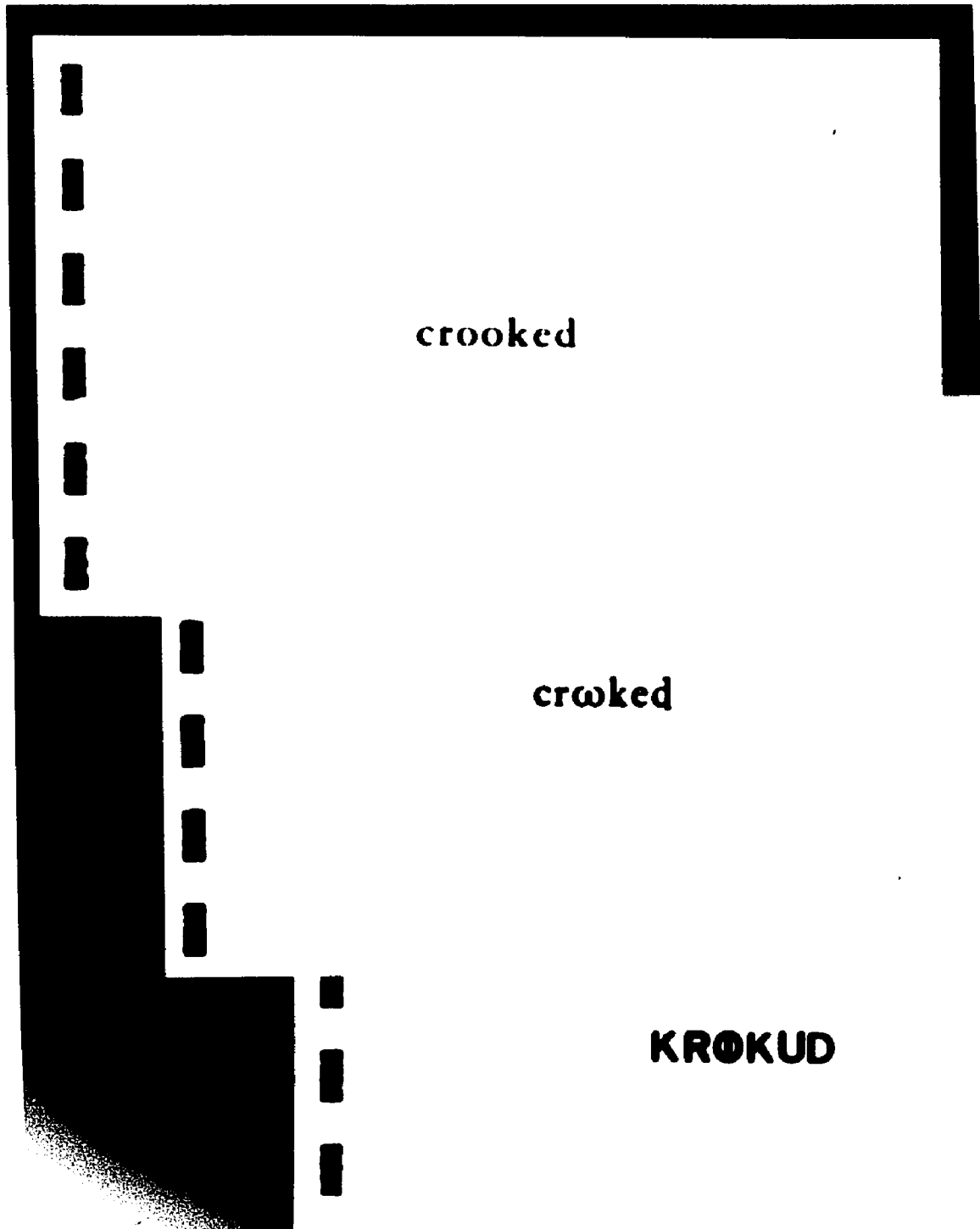


PLATE II

FRONT COVERS OF THREE WORD
RECOGNITION TEST BOOKLETS

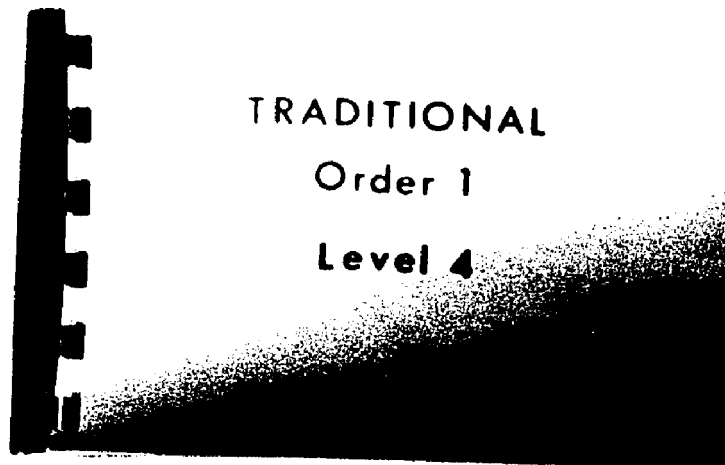
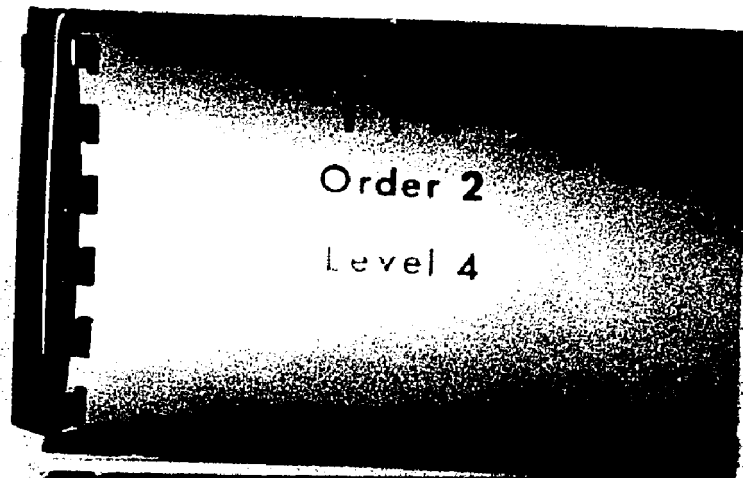
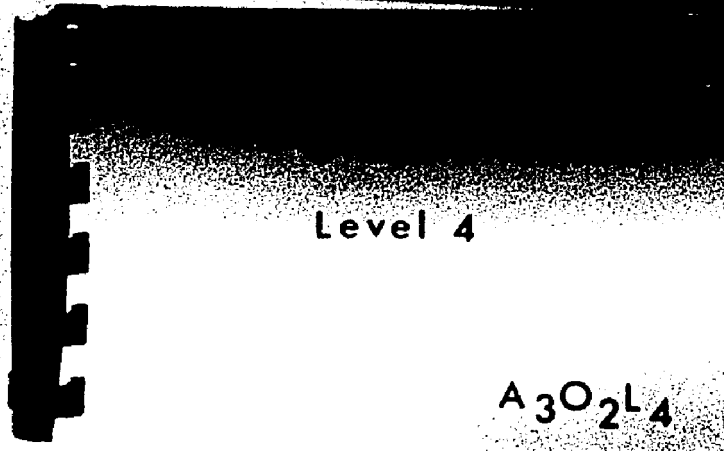


PLATE III

A SUBJECT RESPONDING TO THE
WORD RECOGNITION TEST

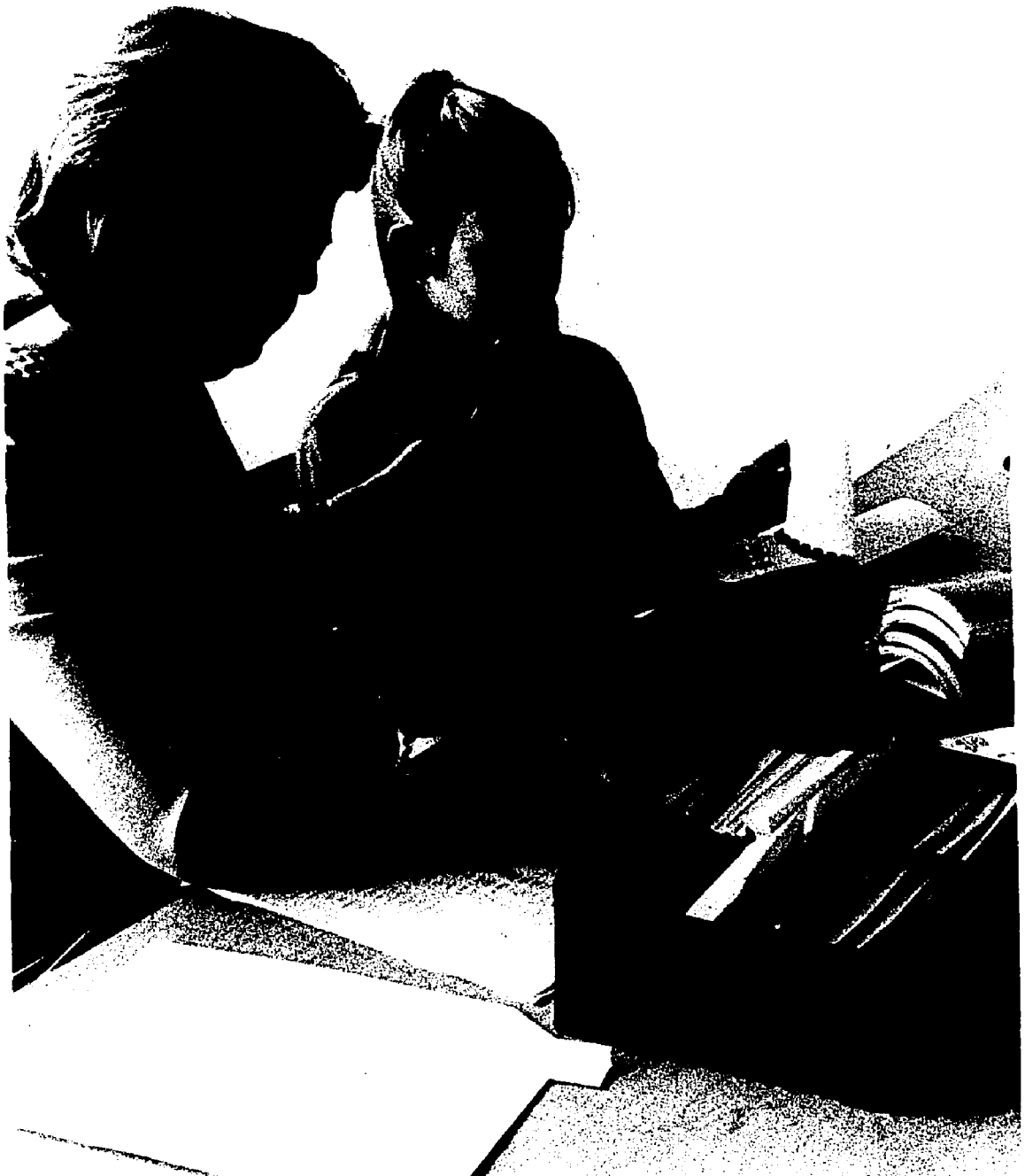


TABLE 78

PHONEMIC RESPONSE PATTERNS ACCEPTED AS CORRECT FOR ITEMS
ON THE WORD RECOGNITION TEST

Word TO Spelling	Level	Accepted Phonetic Patterns
friend	1	/frénd/, /frén/, /frínd/, /frín/
never	1	/névər/
little	1	/lítəl/
come	1	/kám/
use	1	/yúwz/, /yúws/
have	1	/hæv/
zoo	1	/zúw/
new	1	/núw/
jumped	1	/júmpt/
mother	1	/módhər/
train	1	/tréyn/
ball	1	/ból/, /bál/
guess	1	/gés/
about	1	/əbáwt/, /eybáwt/
walk	1	/wók/, /wák/, /wólk/
how	1	/háw/
as	1	/æz/, /éz/
ride	1	/ráyd/
find	1	/fáynd/
she	1	/šiy/
thank	1	/thənk/, /thénk/
father	1	/fádhər/, /fódhər/
joke	2	/jówk/
whistle	2	/hwísəl/, /wísəl/
care	2	/kér/, /kéyr/, /kír/
check	2	/čék/
gone	2	/gón/, /gán/
clown	2	/kláwn/
strong	2	(omitted)
catch	2	/kəč/, /kéč/
joy	2	/jóy/
leave	2	/líyv/
garage	2	/gəráž/, /gəráj/
suit	2	/súwt/
plate	2	/pléyt/
naughty	2	/nótiy/, /nóti/, /nátiy/, /náti/
wash	2	/wóš/, /wáš/, /wórs/, /wárs/
most	2	/mowst/
stood	2	/stúd/
flew	2	/flúw/
kite	2	/káyť/

TABLE 78-- Continued

Word TO Spelling	Level	Accepted Phonemic Patterns
roof	2	/rúwf/, /rúf/, /rəf/
bakery	2	/béykəriy/, /béykəri/, /béykriy/, /béykri/
visit	2	/vízət/, /vízit/, /vízit/
edge	3	/éj/
zebra	3	/ziybərə/, /ziybra/
size	3	/sáyz/
health	3	/héłth/
mind	3	/máynd/
able	3	/éybəl/, /éybul/
except	3	/eksépt/, /iksépt/, /əksépt/, /eksep/
hoop	3	/húwp/, /húp/
double	3	/dəbəl/, /dəbul/
fellow	3	/félow/, /félo/, /félə/
usually	3	/yúwžuwəliy/, /yúwžuwəli/, /yuwžuliy/, /yúwžuli/, /yúwžəliy/, /yúwžəli/, /yúwžiliy/, /yúwžuli/, /yúwžliy/, /yúwžli/
shoot	3	/suwt/
gather	3	/gədhər/, /gədhər/
thumb	3	/thəm/
leather	3	/lédhər/
rang	3	/rən/, /rén/, /rəng/
blame	3	/bləym/
clover	3	/klówvər/, /kəlówvər/
bounce	3	/bəwns/
taught	3	/tót/, /tát/
golden	3	/gówldən/, /gówldin/, /gówlden/, /góldən/
silver	3	/sílver/
jaw	4	/jə/, /já/
polish	4	/páliš/, /páliyš/, /pəliš/, /pəliyš/
court	4	/kórt/, /kórt/
whoa	4	/hwów/, /wów/, /hwo/, /wó/, /hów/, /hó/
kingdom	4	/kíndəm/, /kíngdəm/
servant	4	/sərvənt/, /sərvənt/, /sərvənt/, /sərvənt/, /sərvənt/
worry	4	/wəriy/, /wəri/
sauce	4	/sós/, /sás/
swinging	4	/swínɪŋ/, /swínɪŋ/, /swínən/, /swínɪn/, /čérmin/, /čérmin/, /čérmin/, /čérmin/, /čérmin/
chairman	4	/čérmin/, /čérmin/
coil	4	/kóyl/, /kóyl/
rule	4	/rúwl/
junior	4	/júwnyər/, /júwnyər/, /júwnyir/
agreed	4	/əgríyd/, /eygríyd/, /əgríyd/
magazine	4	/megəziyn/, /megəziyn/, /megəziyn/, /megəziyn/

TABLE 78-- Continued

Word TO Spelling	Level	Accepted Phonemic Patterns
beauty	4	/byúwtiy/, /byúwti/
hero	4	/híyrow/, /hírow/, /híro/
wipe	4	/wáyp/
wade	4	/wéyd/
nailed	4	/néyld/
couch	4	/káwc/
crooked	4	/krúkæd/, /krúkɪd/, /krúkt/
pleasure	5	/pléžər/, /pléyzər/, /pléžyər/, /pələyzər/
screw	5	/skrúw/
hail	5	/héyl/
fever	5	/fíyvər/
gongs	5	/gɔ̃nz/, /gənz/
ounce	5	/áwns/
whined	5	/hwáynd/, /wáynd/
sheriff	5	/šérəf/, /šérɪf/, /šérif/, /širəf/
duties	5	/dúwtiyz/, /dúwtiz/
fawn	5	/fɔ̃n/, /fán/
lunge	5	/lɔ̃nj/
boiling	5	/bóylin/, /bóylin/, /bóyling/, /bóylin/, /bóylin/, /bóylin/
undaunted	5	/əndəntəd/, /əndəntəd/, /əndəntɪd/, /əndəntɪd/, /əndəntɪd/, /əndəntɪd/
hearth	5	/háρθ/, /háρθ/
single	5	/sɪŋgəl/
otherwise	5	/ədʰərwayz/
pledge	5	/pléj/
hardship	5	/hárdʃɪp/, /hɔ̃rdʃɪp/
hired	5	/háýrd/, /háýərd/
mayor	5	/méyər/, /méyər/, /míər/, /mír/, /míýr/, /mér/
grant	5	/grənt/
shudder	5	/šədər/
thatch	6	/thæč/, /théč/
whence	6	/hwəns/, /wəns/, /hwɪns/
result	6	/rizəlt/, /riyzəlt/, /rizəlt/, /riyzəlt/, /rizəlt/, /riyzəlt/, /rəzəlt/
material	6	/mətíriyəl/, /mətíriəl/, /mətíriyəl/
clung	6	/klɔ̃ŋ/, /klɔ̃ŋ/
cature	6	/kəpčər/
fascinate	6	/fəsəneyt/, /fəsɪneyt/
judge	6	/jəj/
razor	6	/réyzər/, /réyzər/, /réyzər/
tongue	6	/tɔ̃ŋ/, /təŋ/
operation	6	/əpərəýsən/

TABLE 78-- Continued

Word TO Spelling	Level	Accepted Phonemic Patterns
yoked	6	/yówkt/
wedding	6	/wédin/, /wédin/, /wédɪn/, /wédən/
vote	6	/vówt/
moist	6	/móyst/
sites	6	/sáyts/
brood	6	/brúwd/
ankle	6	/ænkəl/
purpose	6	/pərpəs/
boyhood	6	/bóyhud/, /bóyhud/
shack	6	/šæk/
vase	6	/veys/, /véyz/

APPENDIX B

DIALECT CHECK SENTENCES

DIALECT CHECK SENTENCES

The following sentences were typed on 3" by 5" cards using pica size type. The subjects were asked to read the sentences aloud into a tape recorder microphone. The responses to the words containing underlined letters were analyzed for the phonemic response to the underlined portion. There was no underlining on the cards from which the subjects read.

Jerry hit the ball with his bat. (Sample item to test voice pick-up on tape)

1. Jim will carry the cot to his room.
2. The horse in that pen has a sore hoof.
3. The prince wanted to marry the princess.
4. Father caught a fish as big as a whale.
5. The sad fairy began to weep and wail.
6. Which boy likes jam on his bread?
7. Her mother taught her to hem a dress.
8. Santa wished the children a Merry Christmas.
9. A tiny tot will carry the pail to the sand dune.
10. The root on the tree is very deep in the ground.
11. Cinderella had ashes and soot all over her dress.
12. Do you know the tune he is playing on the lute?
13. At dawn the roof of the house was wet with dew.
14. Aunt Mary gave me an odd gold pin with a blue gem in it.
15. Even the witch was awed by the wild animal.
16. The captain of the ferry wore a suit with gold braid.
17. A pan made of tin will weigh less than a pan made of iron.

DIALECT CHECK SENTENCES--Continued

18. Don bet his brother ten cents that he could roll a
 hoop farther than Harry.
19. The ham sandwich was just enough to whet his appetite.
20. The hoot of an old owl frightened him.

APPENDIX C

WORD RECOGNITION TEST SCORES AND
PERSONAL DATA ON THE SUBJECTS

TABLE 79

SCORES OF SAMPLE FOR CORRECT RESPONSES, REFUSALS, PROMPTS, AND ATTEMPTED CORRECTIONS
IN EACH ORTHOGRAPHY OF THE WORD RECOGNITION TEST BY SEX AND TEST PATTERN

Test Patterns and Subject Numbers	Correct Responses		Refusals		Prompts		Corrections	
	TO	ITA Unifon	TO	ITA Unifon	TO	ITA Unifon	TO	ITA Unifon
<u>Pattern I</u>								
Girls: 1	124	90	46	0	30	40	0	1
5	123	91	50	3	8	54	0	2
9	69	57	24	0	0	0	0	5
13	94	59	35	0	0	0	0	28
17	72	50	31	0	13	0	0	27
21	128	101	56	0	0	0	0	2
25	90	53	23	0	0	0	0	1
29	97	56	16	0	3	0	0	14
33	121	99	45	0	5	19	0	8
37	120	87	20	0	0	0	0	3
Boys: 41	101	57	23	0	0	0	0	7
45	105	49	25	13	43	75	0	14
49	95	58	29	0	0	0	0	1
53	59	35	13	1	0	2	0	2
57	98	67	47	5	15	18	0	32
61	95	58	19	10	38	68	13	27
65	70	50	19	0	0	0	1	6
69	127	113	62	0	0	1	0	0
73	124	95	45	0	0	0	0	7
77	69	44	22	0	0	0	0	5
								21
								14
								9

TABLE 79 -- Continued

Test Patterns and Subject Numbers	Correct Responses		Refusals		Prompts		Corrections	
	TO	ITA Unifon	TO	ITA Unifon	TO	ITA Unifon	TO	ITA Unifon
<u>Pattern II</u>								
Girls: 2	117	83	28	0	0	3	0	4
6	91	51	20	1	0	3	38	8
10	76	51	23	2	0	2	5	6
14	114	75	32	0	1	10	5	18
18	17	10	4	0	0	8	8	23
22	124	84	39	1	1	0	12	6
26	124	104	35	0	0	1	1	3
30	93	45	16	1	0	0	5	43
34	112	82	38	8	16	0	6	6
38	123	99	43	0	4	32	2	10
Boys:								
42	103	71	19	1	4	0	5	24
46	104	75	27	1	0	10	1	10
50	85	62	31	20	42	58	1	2
54	109	70	23	1	4	12	11	3
58	111	80	49	1	4	33	2	0
62	102	63	26	0	0	2	5	6
66	33	23	12	0	1	8	12	12
70	103	79	35	0	0	0	21	43
74	119	76	41	2	4	41	2	1
78	29	16	7	0	0	8	26	31

TABLE 80
BACKGROUND DATA FOR SAMPLE BY SEX AND TEST PATTERN

Test Pattern and Subject Numbers	CA	IQ	Stanford Achievement Test Scores		Occupational Rank of Chief Wage Earner	Years of Formal Education of Father or Male Guardian
			Word Meaning	Paragraph Meaning Study		
<u>Test Pattern I</u>						
Girls: 1	111	116	44	43	53	10
5	118	116	41	49	60	14
9	115	92	27	24	30	13
13	114	108	31	40	30	8
17	113	109	37	30	30	12
21	114	111	54	49	32	12
25	113	99	26	24	22	12
29	112	105	35	31	26	12
33	115	123	42	40	63	16
37	115	94	36	30	27	12
Boys: 41	126	105	29	44	46	12
45	117	106	31	41	40	11
49	114	93	31	37	24	12
53	125	78	32	31	21	12
57	120	96	32	29	40	10
61	116	85	26	21	16	12
65	114	93	27	25	22	10
69	115	118	42	47	70	12
73	122	102	37	37	53	16
77	126	82	36	38	22	12

TABLE 80 --Continued

Test Pattern and Subject Numbers	CA	IQ	Stanford Achievement		Occupational Rank of Chief Wage Earner	Years of Formal Education of Father or Male Guardian
			Word Meaning	Test Scores Paragraph Meaning Study		
<u>Test Pattern II</u>						
Girls: 2	112	115	41	46	58	12
6	121	92	27	29	24	13
10	122	106	38	31	21	12
14	121	114	38	41	53	12
18	113	98	33	27	20	12
22	117	118	47	47	37	8
26	114	115	44	37	53	12
30	111	90	33	27	26	3
34	117	93	36	37	33	8
38	117	114	38	40	45	15
Boys: 42	114	110	41	48	24	10
46	114	115	39	37	52	12
50	113	111	29	31	27	12
54	112	91	26	25	26	16
58	115	110	38	38	27	12
62	119	101	36	41	22	12
66	123	87	30	29	22	11
70	117	87	33	24	20	12
74	118	109	49	47	44	12
78	126	86	29	27	24	10

TABLE 80-- Continued

Test Pattern and Subject Numbers	CA	IQ	Stanford Achievement		Occupational Rank of Chief Wage Earner	Years of Formal Education of Father or Male Guardian
			Word Meaning	Test Scores Paragraph Word Meaning Study		
<u>Test Pattern III</u>						
Girls: 3	111	118	38	38	44	12
7	118	123	56	59	58	16
11	114	84	32	36	26	12
15	117	123	73	67	73	8
19	113	120	59	52	71	12
23	120	103	35	40	58	11
27	119	111	61	65	55	12
31	117	100	32	36	58	12
35	116	113	36	43	57	16
39	115	102	38	42	40	12
Boys: 43	115	124	52	61	62	10
47	119	103	30	34	34	10
51	118	102	32	25	22	12
55	118	100	38	34	36	16
59	112	117	51	56	58	12
63	119	119	51	49	67	12
67	111	101	41	30	22	11
71	119	111	44	46	42	12
75	115	97	18	24	34	12
79	122	115	42	46	37	10

TABLE 80 -- Continued

Test Pattern and Subject Numbers	CA	IQ	Stanford Achievement Test Scores		Occupational Rank of Chief Wage Earner	Years of Formal Education of Father or Male Guardian
			Word Meaning	Paragraph Word Meaning Study		
<u>Test Pattern IV</u>						
Girls: 4	117	110	33	43	4	12
8	113	103	42	37	5	11
12	116	123	46	34	4	14
16	115	117	47	44	2	14
20	115	98	29	29	4	12
24	116	111	38	23	5	12
28	119	111	56	60	5	13
32	117	104	37	29	6	12
36	112	129	67	75	6	12
40	116	113	42	52	5	12
Boys: 44	114	99	31	29	5	12
48	114	116	46	52	6	11
52	119	108	35	41	5	12
56	126	84	38	38	2	17
60	119	103	38	41	5	14
64	124	95	33	30	5	12
68	118	105	64	43	4	13
72	110	121	49	48	3	12
76	118	113	51	54	2	16
80	116	118	36	44	4	12

APPENDIX D

SOURCES OF TESTS MENTIONED IN THIS REPORT

SOURCES OF TESTS MENTIONED IN THIS REPORT

Botel Reading Inventory; 1961-66; Morton Botel; Follett Publishing Company, 1010 West Washington Boulevard, Chicago, Illinois.

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California Test of Mental Maturity; 1957; Willis W. Clark and Ernest W. Tiegs; California Test Bureau, Del Monte Research Park, Monterey, California.

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