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TRANSFER EFFECTS FROM TRADITIONAL ORTHOGRAPHY TO PITMAN'S INITIAL TEACHING ALPHABET

by

Fred John Rolf

A dissertation submitted in partial fulfillment
of the requirements for the degree of
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Doctoral Committee:

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A B S T R A C T

TRANSFER EFFECTS FROM TRADITIONAL ORTHOGRAPHY TO PITMAN'S INITIAL TEACHING ALPHABET

by

Fred John Rolf

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This study was concerned with an investigation of the compatibility of traditional orthography (TO) and Pitman's Initial Teaching Alphabet (ITA). Its main objective was to investigate the transfer from TO to ITA. This approach to the transfer problem is based on the assumption that if significant transfer occurs from TO to ITA, the same factors would promote transfer from ITA to TO. Variables which were studied in relation to this problem included the ability to read TO, intelligence, age, sex, socio-economic status, and word structure.

The Maumee, Ohio, Public Schools served as the source of the subjects. Children were included from Grades 1 through 6. There were 76 subjects in each grade, equally divided between boys and girls. None of these children had been exposed to ITA before. All had learned to read by TO.

A word recognition test consisting of 132 words was constructed and administered to each child in both ITA and TO print. The same words appeared in both tests with the ITA version administered 8 days prior to the TO

edition. The tests were administered individually and the child responded orally to the words. Scores on the California Test of Mental Maturity were also obtained on each child. Socio-economic ratings were obtained by means of Warner's Revised Scale for Rating Occupation. All of the information obtained on each child was coded on IBM cards. These data were then passed through an appropriate computer program for the purpose of the statistical analysis.

The results may be summarized in general terms as follows:

1. Children are able to transfer from TO to ITA without previous practice with ITA, but the transfer is not complete.

2. Complete transfer from TO to ITA is not likely to occur at any age level without previous experience with ITA.

3. The highest transfer from TO to ITA occurs on words in which the spelling is virtually the same or in which the ITA word is similar to the word as it is spelled phonetically in TO.

4. The lowest transfer from TO to ITA occurs on 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.

5. Words which are difficult in TO are also likely to be difficult in ITA.

6. The compatibility of the two alphabets might be increased by redesigning certain ITA characters, particularly h.

7. The ability to transfer from TO to ITA is positively related to the ability to read TO.

8. Intelligence alone does not account for the close relationship between the ITA scores and the child's ability to read TO.

9. Sex is apparently not a factor in the ability to transfer from TO to ITA.

10. Socio-economic status is apparently not a factor in the ability to transfer from TO to ITA.

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CHAPTER I

STATEMENT OF PROBLEM

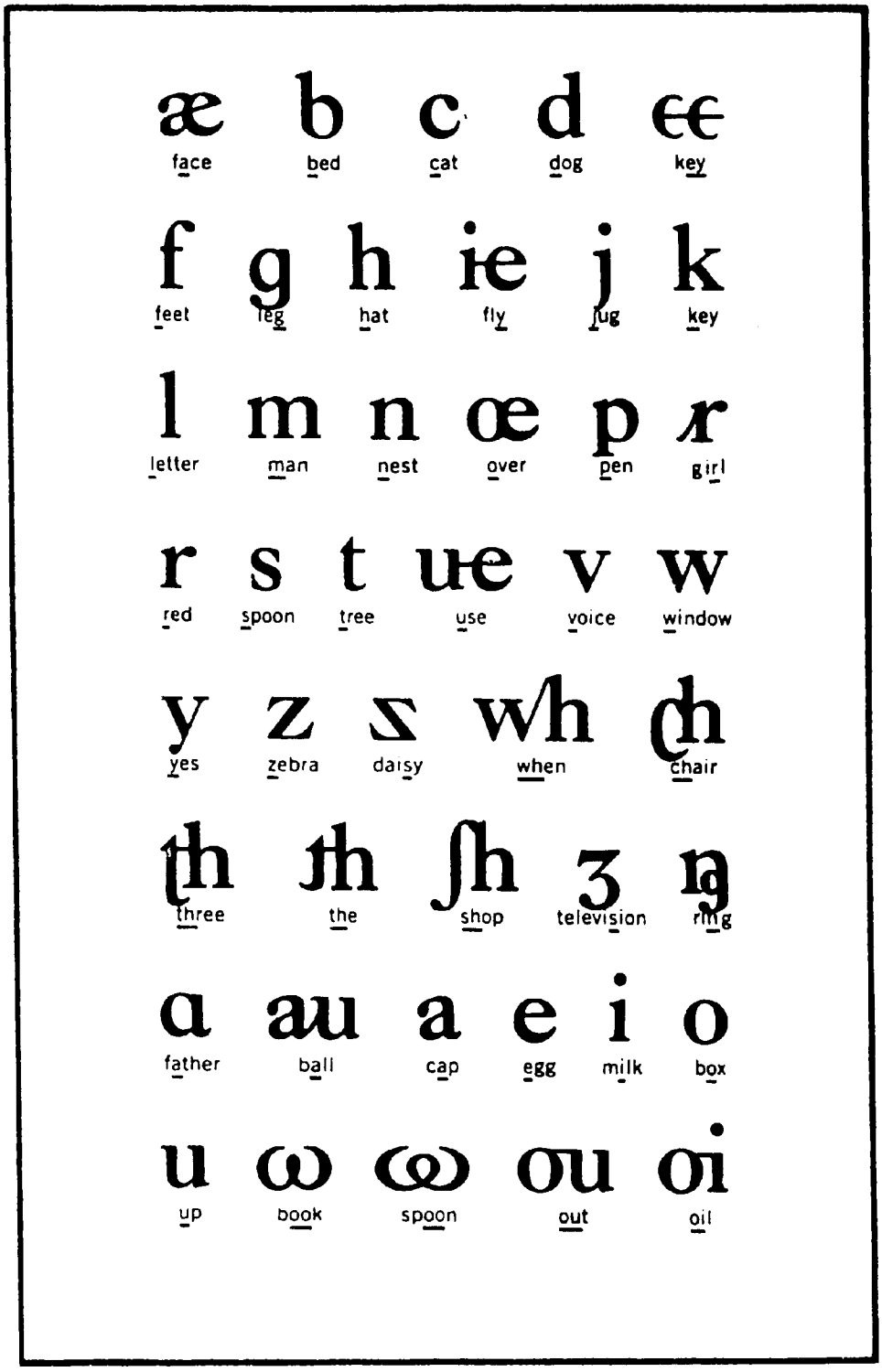
Introduction

Recently a lot of interest has been shown in Pitman's Augmented Roman Alphabet, known also as the Initial Teaching Alphabet or ITA, for introducing beginners to reading. Created by Sir James Pitman of England, ITA is a phonemic alphabet of 44 characters. Phonemes are the basic sound elements found in spoken words. For practical purposes, the English language may be reduced to 40 phonemes, Soffietti (1964, pp. 61-63). ITA furnishes a code for these phonemes, with each character representing only one sound. The conventional 26-letter alphabet lacks this consistent relationship between letter and sound. In traditional orthography or TO, different signs may be used to represent the same sound (met, sweat, any, said, says) or the same sign may be used to represent different sounds (sour, pour, would, tour, couple). ITA is designed to remove the complexity of traditional English spelling by providing greater consistency between letter and sound.

ITA utilizes 24 letters of the conventional alphabet, plus 20 new characters. The traditional letters

omitted are q and x. The loss of these letters is no tragedy, since their sounds can be represented by other letters even in traditional orthography. The exhibit on the following page displays the ITA alphabet with words illustrating the sounds of the various characters. Note that most of the new characters are formed by joining two familiar letters. Unlike traditional orthography, ITA does not require different forms for capital letters. When a capital is needed in ITA, a larger version of the same lower-case form is used. Although there are 44 characters in ITA, it is said that ITA actually presents fewer characters than the 26-letter alphabet, since the latter requires two forms of most letters. There is only one form for each character in ITA. The elimination of different forms for capital letters is said further to lighten the burden of learning to read by ITA. The characters of ITA are not given names, but only sounds. Silent letters do not occur in ITA.

It should be noted from the exhibit that in four cases two characters are used to represent the same phoneme: (1) the initial consonants in the words cat and key, (2) the first consonant in zebra and the second consonant in daisy, (3) the first vowel in father and the vowel sound in box, and (4) the vowel sounds in use and spoon. These cases explain why there are 44 characters for only 40 phonemes. These variations from the phonemic principle were made to



Pitman's Initial Teaching Alphabet, with its 44 symbols and words illustrating the sounds these symbols represent.

Exhibit 1 - Pitman's Initial Teaching Alphabet

avoid unduly distorting the appearance of certain TO words when spelled in ITA.

ITA is not designed as a substitute for the conventional alphabet, but only as an initial teaching medium to lighten the burden of learning to read. That is, by eliminating the confusion of different sounds for the same letter and eliminating different forms of the same letter, it is expected that ITA will make the initial reading experience more successful and hence develop confidence in the child. Because of this greater confidence, it is alleged that the child will be better able to cope with the complexities of traditional orthography or TO when the transfer from ITA to TO is made. This transition to the regular alphabet normally occurs around the end of the 1st year.

Purpose

One of the major problems regarding ITA concerns the question of transfer to TO after children have learned to read by ITA. Holmes (1967) has stressed that the transfer problem gets at the very heart of any technique which would launch children on the road to reading through a modified alphabet. Sheldon and Gans (1964), Gates (1964), Southgate (1965), Heilman (1965), and Gillooly (1966) are among the writers who have expressed concern about the wisdom of teaching children to read by one alphabet, only to discard it later in favor of another alphabet. The problem that concerns these writers is that there may be interference between the two alphabets. On the other hand, there are those, including

Figurel (1963), Boutwell (1964), Harrison (1966), and McKee (1966) who have reported that the transfer problem has not turned out to be as difficult as was anticipated. Although not as concerned as other writers, Alpert (1966) stresses that the transition process and what actually occurs when it is taking place is still a mystery and recommends further research in this area.

The fact that children can pick up TO rather readily after first learning to read by the ITA method, does not mean that a transfer problem does not exist. Because of certain nuisance variables, problems in transfer are not always discernible.

One of the nuisances is that you cannot hide TO from children who are being taught to read by ITA. While they may not be exposed to TO in the ITA class, they have unlimited opportunities to become familiar with TO outside the ITA class. Hence, when children transfer from ITA to TO, there is no way to learn how much of the transfer may be attributed to previous knowledge of TO.

Another nuisance variable is that, while children are learning to read by ITA, they are maturing. Since the transfer from ITA to TO is made around the end of the first year, the greater maturity of the children at the time the transfer is made would help them to learn to read TO more readily, apart from any previous exposure to ITA.

Finally, there is the problem of the Hawthorne Effect and the ballyhoo surrounding ITA. With respect to

this problem, Malone (1966, pp. 306-07) states:

> Excessive zeal and publicity has ruined much of our test so far - particularly the involvements with i.t.a., where great national publicity has caused local boards and teachers to show off their charges on the pages of the newspapers. Last winter one teacher brought to the school-board a child in mid-year to show how he could read his i.t.a. books beautifully. She neglected to point out that the child was the brightest in class with a 97th percentile ranking. Equivalent children in every class in town were doing as well without substitute orthography. Nationwide publicity was given the University of Chicago Lab School children reading; these children averaged in the 98th percentile on a reading readiness test and could as well have been reading classical Greek.
>
> As a consequence such publicity oversells, destroys results and fails to understand that class "means" with broad spectrum choices of classes over a wide range of socio-economic ranks are the important elements in such appraisal work - if we are serious about testing - furthermore, we must have time - three or four years - at least to look at a matter such as this before publishing results like those reported here under irresponsible short term Federal support, or later in September at the American Psychological Association meetings.

Chall (1967, p. 120) makes very much the same point when she writes:

> I should note that it has been difficult to be objective about ITA. Leading newspapers and magazines have judged the English experiment a success almost from the very beginning. A newsletter designed to keep interested people informed about the experiments has become a collection of testimonials and praises; facts are reported too, but it is not always easy to identify them. It will indeed be embarrassing to the investigators to report any negative findings. At present, however, this problem seems non-existent; most of the research results so far reported (although not all) have been positive for ITA as compared with the traditional alphabet.

Appropos of the last sentence in the above quotation, much of the research on ITA has been conducted by people who are already committed to ITA.

One way to avoid the difficulties indicated above would be to investigate the transfer from TO to ITA rather than from ITA to TO. The possibility that something might be learned about the transfer problem by testing TO populations with ITA versions of reading tests has previously been suggested by Dolmatch (1966). The assumption would be that if significant transfer occurs from TO to ITA, the same factors would promote transfer from ITA to TO. This approach has the additional advantage that it would spare the investigator of first having to teach a group of children to read ITA, since there would already be a ready-made pool of subjects who could read traditional orthography.

This investigation was primarily designed, therefore, to measure the transfer from TO to ITA, with the thought that a reverse effect would exist from ITA to TO. Ancillary questions investigated included:

1. How does the ability to read ITA depend on the subject's ability to read TO?

2. How does the ability to read ITA depend on the intelligence of the subjects?

3. What age effects are discernible?

4. To what extent is the sex of the subjects a factor in relation to the transfer problem? Since it is known that girls tend to be better readers than boys, does it follow that girls will show greater transfer from TO to ITA than will boys?

5. To what extent is socio-economic status a factor in relation to the transfer problem? It is well known that there is a close relationship between reading achievement and the socio-economic background of the child. Does it follow that children from a high socio-economic background will show greater transfer from TO to ITA than the children from a low socio-economic background?

6. How does the amount of transfer vary according to the nature of the word? What sources of confusion may be identified? What factors facilitate transfer?

CHAPTER II

REVIEW OF RELATED LITERATURE

History

The idea of ITA originated over a century ago when Sir Isaac Pitman, schoolmaster from Somerset, England, the inventor of Pitman shorthand, developed a system of printing by sound called Phonotopy, which was based on an alphabet of 43 characters. This work of Sir Isaac was continued by his son, but it was Sir James Pitman, a grandson, who developed ITA as it is known today. It was not the purpose of Sir James to change the alphabet per se but rather to develop an easier approach to beginning reading.

Although the idea of ITA is not new, serious interest in exploring its possibilities is recent. In October, 1960, Mr. John Downing, a reading research official at the University of London Institute of Education, was appointed to make an inquiry into the use of ITA in England. The experiments, under the direction of Mr. Downing, are still being conducted in English schools. Both Sir James and Mr. Downing have cautioned against accepting the claims for ITA at face value. Both have recognized the need for further research before arriving at final conclusions. Sir James Pitman's desire to make

a contribution to the reading field is demonstrated by his generosity in making the system available without charge to any who may wish to use it. No copyright has been applied to restrict its use.

Since the introduction of ITA in England, interest in this approach has mushroomed and spread to other countries. In the United States ITA was first tried by the Unita Metzger School at Ventner in New Jersey. The system has since spread rapidly in the United States, the most notable experiments being the ones conducted at Bethlehem, Pennsylvania, and those by the Educational Research Council of Greater Cleveland. The interest is not restricted to England nor to the United States, but has spread to other English speaking countries as well. The use of ITA for teaching English as a second language has also been explored in a number of non-English speaking countries.

ITA Projects

ENGLISH STUDY

The most extensive research with ITA was undertaken in England in 1961 under the direction of Mr. John Downing, Head of the Reading Research Unit at the University of London. The major purpose of Downing's (1964 and 1965) study was to ascertain whether or not ITA would be advantageous during the early stages of learning to read. Central to the investigation was the question concerning transfer from ITA to TO.

The subjects of Downing's investigation were 4 and 5 year olds selected from schools in various areas of the country representing a cross-section of the school community. Comparison was made between an overall sample of about 2,000 children who learned to read by ITA and a control sample who learned to read by TO. The matching criteria were age, sex, social class, and intelligence. The same basal reading series was used by both the ITA and TO groups except for the alphabet. The series used was Janet and John which is a very popular English series of basal readers. In fact, Janet and John are as well known in the British Commonwealth as Dick and Jane are in the United States. The testing program was set up to compare the reading progress of the experimental group using the reading series printed in ITA and of the control group using the version printed in TO.

Not all of the children in Downing's investigation started the experiment at the same time. One group of 413 ITA pupils, together with 687 control pupils, started in September, 1961; additional groups joined in 1962, but the results reported here concern the group under investigation the longest, the 1961 group.

Downing found that after 1 year the children in the experimental group could read ITA significantly better than the control group could read TO, indicating that the irregular nature of conventional English spelling probably is a source of difficulty in beginning reading. The test used was the Schonell Graded Word Reading Test. Eighteen months after

the experiment started, children in both groups were tested on a test printed in TO. At this time only a half of the pupils in the ITA group had been introduced to books printed in TO. A comparison of the ITA and TO groups on the Neale Analysis of Reading Ability printed in TO showed that the ITA pupils significantly excelled the TO pupils in reading rate, accuracy, and comprehension. At the start of the 3rd year, 24 months after the experiment started, when the children averaged 7 years of age, the 1961 group of ITA children was tested in TO on the Schonell Graded Word Reading Test. Some of these children were still reading in ITA readers. The ITA and TO subjects were again tested at the end of their 3rd year of schooling on the Neale Analysis of Reading Ability printed in TO. In these additional comparisons, the ITA pupils remained significantly superior to the TO pupils in reading speed, accuracy, and comprehension, although the superiority of the ITA group was most notable among the highest achieving segment of the sample.

During the transition stage from ITA to TO, test results between the middle of 2nd and beginning of the 3rd year showed a regression in TO achievement, indicating the problem of transition is a real one in that the gains produced by the ITA approach are offset considerably by losses during the transition from ITA to TO. In a later report, Downing (1967) presents evidence to show that this regression is of a temporary nature.

Similar comparisons of the groups who joined the experiment later in 1962 confirmed the results of the comparisons of the original 1961 groups.

Criticisms of the experimental design and of the lack of control of variables led the English group to launch another ITA study in September, 1963. In this experiment, each participating school had one experimental and one control unit. Pupils admitted were randomly placed in these classes with sex and age distributions constant. In each school the same teacher handled the reading lesson in both the ITA and TO classes, although another teacher in each school shared equally in the overall instructional time. The same basic text, Janet and John, was again used with both groups. The methods and the amount of time were held constant. A total of 548 experimental and 554 control pupils from 16 schools made up the population for this second study. There were no significant differences between the experimental and control groups relative to age, sex, social class (father's occupation), intelligence, and vocabulary. The TO classes had some advantage because more materials were available to them.

To offset the Hawthorne Effect, attempts were made to equalize meetings and publicity. Downing expressed concern about the same person teaching reading to both the ITA and TO groups because of the possibility of the teachers developing attitudes favorable to one over the other. A

questionnaire to teachers in the experiment indicated that they preferred the ITA approach.

As in the 1961 study, the children in the 1963 study were tested first by means of parallel versions of the same test, i.e., ITA version with the experimental group and TO version with the control group. Both groups were later tested on TO versions of the same test administered several months after the experiment started. Because of the short length of time between the beginning of the experiment and this testing, only 17 per cent of the children in the experimental group had transferred to TO by the time the tests were administered.

The results of the second experiment were generally similar to those of the first. ITA children tested on the tests printed in ITA significantly excelled TO children tested on the TO version. When both groups were tested on the TO version, the ITA children excelled the TO group, although the differences in favor of the ITA sample tended to be smaller in the second investigation than in the first investigation. In fact, in a few comparisons on the TO test, the TO pupils excelled the ITA pupils but not significantly so. In general, however, the results confirmed those of the earlier study with the exception that the loss which the ITA pupils suffered during the transition period was not recovered as in the original study of 1961.

Downing and others involved in the English work with ITA are not satisfied that all the answers are at hand. The English studies are continuing and the reports from the Reading Research Unit have urged caution in drawing conclusions until more evidence is available.

The English experiment was not without its critics. Southgate (1965) was one of the most critical. She has expressed concern over the lack of evidence of this early stage, the Hawthorne Effect, effects of visitors to classes, publicity, and other sources of bias.

Although not a criticism of the English studies, it should be kept in mind that those experiments were conducted with 4 and 5 year olds while in this country the beginning reading process is not expected to begin until an age of about 6. The results of the English experiment may not be as meaningful with older children, inasmuch as they would be more mature and hence perhaps better equipped to cope with TO.

AMERICAN STUDIES

Lehigh-Bethlehem Project. Perhaps the most extensive research which has been done in the United States to the present time was that conducted in the schools of Bethlehem, Pennsylvania, in cooperation with Lehigh University, under the direction of Dr. Albert J. Mazurkiewicz (1967).

This experiment was launched in September, 1963, with 1st grade pupils entering the Bethlehem schools. Pupils

were assigned to classes on the basis of the results of the Lee-Clark Reading Readiness Test. An attempt was made to obtain representative populations in both the ITA and TO groups; even so, a somewhat larger proportion of ITA pupils came from the lower socio-economic group. There were 454 pupils in the ITA group and 875 pupils in the TO group. Comparisons based on age, IQ, reading readiness, and personality showed no significant differences between the ITA and TO groups. The groups, therefore, were assumed to be comparable.

Preparation for the ITA teachers consisted of two and a half days of orientation. The workshop emphasized the experience and language-arts approach to beginning reading instruction. Mr. Downing participated in the workshop and described procedures designed to facilitate transition to TO. The ITA teachers continued to meet informally for purposes of creating ITA materials and translating existing classroom materials into ITA.

In the Bethlehem study the materials used with the experimental and control groups were comparable in level but different in content. The report stated that the ITA children were under a handicap because of the dearth of ITA materials at that time.

The teachers were free to select the teaching methods they preferred. The experience approach combined with group activity and/or individualized instruction was the most popular.

The California Reading Test in TO print was administered to both the ITA and TO 1963-64 groups at the end of the 1st year. A significant difference was not found between the groups on this test; however, only a small proportion of the ITA subjects had made the formal transition to TO. When the comparison on the California Reading Test was limited to ITA pupils who were in the transitional reader, a significant difference was found favoring the ITA group. Informal transition was begun first by an estimated 5 to 8 per cent of the children of the middle-to-upper socio-economic segment after the 3rd and 4th month of instruction. Formal transition was started in the 8th month by able learners in the 1963-64 group. Teachers reported 64 per cent of the ITA group from average-to-high socio-economic backgrounds were reading library materials in TO. Slightly over a fourth of the group had made the transition to the traditional alphabet by mid-May.

It was concluded from the Bethlehem study that children have no difficulty transferring from ITA to TO materials if allowed first to develop sufficient confidence and efficiency with ITA.

The experiment was continued into the 1964-65 school year when 15 additional classes were added to the study. This was approximately two-thirds of the 1st grade pupils in the Bethlehem schools. There were 917 pupils in the ITA group and 462 in the TO group. Generally, the procedures and methodology employed the previous year were followed

during the 2nd year of the experiment. During the 2nd year more ITA materials were available although still not comparable in quantity to TO materials.

This experiment was designed to measure the achievement of 1st grade children divided into ITA and TO groups at three points in the school year. The comparisons made at the end of the 1st year, after 140 days of instruction,were of the most significance to the present investigator's study. These comparisons were based on matched samples selected from the ITA and TO groups. There were 164 pairs matched for IQ, sex, and socio-economic status. Children without kindergarten experience, repeaters, and those with bilingual problems were eliminated. Because not all of the cases completed the testing program, only 118 pairs, 63 girl pairs and 55 boy pairs, were included in the final comparisons.

The Stanford Achiement Test was administered in TO at the end of 140 days of instruction. On the subtests, a significant advantage in word reading appeared in favor of the ITA group and a significant advantage in spelling occurred in favor of the TO group. Otherwise, no significant differences were found. The difference in favor of the ITA group on the word reading subtest was largest in the case of children in the above average socio-economic class.

Barrett (1967) has questioned the design of the Lehigh-Bethlehem study. Open to question is the comparability of ITA and TO teachers, the comparability of materials and method, the amount of time devoted to reading

instruction in the two groups, and finally the manner in which the ITA children who had made the transition to TO were matched with their TO counterparts. The best TO readers may very possibly not have been pitted against the best ITA readers. Gillooly (1967) expresses similar doubts about this study.

Greater Cleveland Study. A second large scale American study was that conducted by the Educational Research Council of Greater Cleveland. There are 31 member schools in the Cleveland area of which 21 participated in this study.

The Greater Cleveland study was planned as a longitudinal investigation. The study was launched at the beginning of the 1964-65 school year. The present summary is based on the 1st year results. The Council report prepared by Shapiro (1967) was based on a population of 2,343 subjects, 1,044 TO and 841 ITA pupils in 1st grade and 458 ITA kindergartners. The study included a comparison of the reading achievement of ITA and TO groups, both of whom were introduced to reading in the 1st grade, plus a comparison of two ITA groups, one introduced to reading in the 1st grade and the other introduced to reading in kindergarten.

A kindergarten pilot program preceded the research study of 1964-65. During the 1963-64 school year, over 500 children were introduced to ITA reading. The program was kept informal and, because reading was not normally taught in kindergarten at the participating schools, the evaluation

was largely subjective that year. A variety of techniques was used. There was no control group. The evaluation was limited to teacher observations and subjective judgments. This evaluation was very favorable to ITA as related to such things as the ability to read a variety of materials, word recognition skills, comprehension, interest in reading, and behavior.

The comparisons for the 1964-65 study were based on performance on the Stanford Achievement Tests. One form was administered after 5 months in both ITA and TO versions and another form after 8 months in a TO version only. The report calls attention to the difficulty in controlling variables, but an effort was made to statistically control such variables as intelligence, reading readiness, teacher experience, and time spent in reading instruction. The statistical control involved adjusting the mean scores for these variables.

The test administered at the end of the 5th month showed that the ITA group tested in ITA significantly out-performed the TO group tested in TO on all of the subtests of word reading, paragraph meaning, vocabulary, spelling, and word study skills. On the second test administered to both groups after 8 months when only a TO version was used, differences again favored the ITA group on all subtests but significantly so only on the word reading section. It was pointed out, however, that only

8 per cent of the ITA pupils had made the transition to TO by the 8th month.

The effect of the transition from ITA to TO on the achievement test scores was measured by the mean scores for three ITA sub-groups. The sub-groups were divided according to the degree of transfer which they had made from ITA to TO: complete, partial, none. The mean scores were again adjusted for intelligence, reading readiness, teacher experience, and time spent in reading instruction. In addition, a fifth variable, reading achievement as measured on the Stanford test 3 months previously, was controlled statistically because the tests were in TO and only those children who had previously done quite well had at this time made the transition to ITA.

The results showed that the higher the degree of the transfer which the pupil had made, the higher the mean score on the achievement test, thus indicating that transfer is not automatic.

The ITA classes used the same basal reader program, but the TO classes used a variety of reading materials. Five reading programs were selected for a special study to ascertain if the results would vary according to the program used by the TO pupils. This special study was limited to a random sample of 75 pupils for each of the five different TO programs plus a random sample of 75 to represent the ITA program. The results of this special study were in general agreement with those reported for

the entire population. No matter what TO program was used, the results were essentially the same.

The comparison of the children who started ITA in the kindergarten and continued it in 1st grade with the children who started ITA in the 1st grade showed significant differences in favor of the former on all relevant sections of the Stanford Achievement Test except for the section on vocabulary.

In general, the results of the Cleveland study are favorable to ITA although again the practical difficulty of controlling all of the variables which might influence the results must be recognized. This is a factor which must be taken into account in all comparisons of methodology.

U.S. Office of Education Studies. A series of studies supported by grants from the U.S. Office of Education were conducted to compare different approaches to beginning reading. This series of studies included five in which ITA was one of the approaches compared. Only four of these studies will be reviewed here since the other, the Lehigh-Bethelehem study, was covered earlier in this chapter. These four were the studies of Nemeth and Hayes (1965), Hahn (1965), Tanyzer and Alpert (1965), and Mountain (1966). The principal investigator of the study reported by Mountain was Edward Bernard Fry of Rutgers University. The above reports are based on the results of the 1st year and they should, therefore, be regarded as preliminary since follow-up studies are contemplated.

Comparisons were based on tests printed in TO. The investigators in each study pointed out that some of the subjects, varying from 20 to 50 per cent, instructed by the ITA approach had not made the transfer to TO at the time the tests were administered in TO. The Stanford Achievement Test consisting of sections on word reading, paragraph meaning, vocabulary, and word recognition was the primary instrument used as a post-test in all four studies. Analysis of variance was employed to test the main effects of the approaches being tried in all of the experiments.

Nemeth and Hayes compared four methods: Scott, Foresman basal readers supplemented by My Practice Pad, workbook sheets, and My Little Pictionary; the Scott, Foresman basal reader program which was basically the same as described above but with supplemental training in phonics added; the phonics oriented Lippincott readers; and the program using ITA.

The results, based on adjusted mean raw scores, were concerned with four dependent variables: word reading, paragraph meaning, spelling, and word recognition. No significant differences were found between ITA and either Lippincott or the Scott, Foresman supplemented with phonics on any of these measurements. ITA was significantly superior to the regular Scott, Foresman basal reader program in word reading and word recognition, but both of the other two approaches compared were significantly superior to the

regular Scott, Foresman program on all four of the dependent variables. The overall advantage appeared to be with the Lippincott program.

Hahn's study compared three approaches to beginning reading: a modified language-arts approach with ITA as the medium, modified language-arts with TO as the medium, and a basal reader program supplemented by a phonics book. The dependent variables again were word reading, paragraph meaning, spelling, and word recognition as measured by subtests of the Stanford Achievement Test.

In Hahn's study, the language-arts approach with both ITA and TO as the media of instruction proved significantly superior to the basal reader approach supplemented by phonics on the test of word reading. The language-arts with TO as the medium and the basal reader approach supplemented by phonics proved significantly superior to the language-arts approach with ITA as the medium on the test of spelling. Finally, pupils exposed to the language-arts approach with ITA as the medium of instruction significantly excelled the pupils taught by the other two approaches on the test of word recognition. The latter finding applied only to words presented in isolation and not in context.

Hahn also examined the relationship between intelligence and achievement and found that the language-arts approach with TO as the medium yielded a significantly higher correlation between intelligence and paragraph meaning than the other two approaches. The language-arts

approach with both ITA and TO as the media yielded a significantly higher correlation between intelligence and word recognition scores than the basal reader approach supplemented with phonics. In the comparisons of achievement where intelligence, reading readiness, and socio-economic status were controlled, no definite trend developed although the children using the language-arts approach with both ITA and TO as the media continued to excel the children using the basal reader approach supplemented with phonics in word recognition and the pupils using the language-arts approach with TO and the basal reader approach supplemented with phonics continued to excel the ITA pupils in spelling. The total population of boys and girls were comparable in intelligence, but the girls exceeded the boys significantly in word recognition in all three reading approaches.

Hahn concluded that in a language-arts approach, ITA has no significant advantage over TO. It was indicated that both the ITA and TO language-arts approach have an advantage over the basal reader program and that the language-arts provided the finest balance in developing reading skills.

Tanyzer's experiment was for the purpose of studying the effects of three different basal reader systems on year-end reading achievement. The systems compared were the Scott, Foresman; Lippincott; and Early-to-Read ITA series. The results were broken down according to level of intelligence and sex.

The findings of Tanyzer's study indicate that the children taught with the ITA series and Lipincott series scored significantly higher on word reading, paragraph meaning, and word recognition than did those taught with the Scott, Foresman series. No significant differences appeared on these same variables between the ITA series and the Lippincott series, but a significant difference on the vocabulary subtest was observed in favor of the Lippincott group. Tanyzer's results were generally the same for high, medium, and low intelligence groups. Sex did not produce any differential results between any of the three basal reader programs used; however, girls achieved higher mean scores than the boys with all of the three systems.

Mountain reported on an investigation which compared three methods of 1st grade reading instruction consisting of the Sheldon basal program with ITA as the medium, the Sheldon basal program with TO as the medium, and the Diacritical Marking System (DMS). The DMS is a new system developed by Edward Bernard Fry, who was the principal investigator of this study. This system does not change the spelling of the words in TO, but increases the phonetic regularity by the addition of diacritical marks. The basal reader series used in this experiment was also new to the classes concerned. The design, therefore, tended to control the Hawthorne Effect automatically since there was something novel about all three reading approaches.

No significant difference in overall reading achievement was found in favor of any of the three methods compared. The results also indicate that no method was better for boys or for girls or for younger 1st graders or older 1st graders. No difference was found in the spelling ability of the children if the ITA group was permitted to spell in ITA. However, when the ITA children were required to spell in TO they were significantly inferior to the children taught by the other two methods. On the other hand, the ITA children did significantly better on a phonetically regular word pronunciation test. On the whole, there were no consistent differences in favor of any of the three approaches used. In fact, the variation between classrooms was much greater than the variation between approaches.

In general, the results of the U.S. Office of Education Studies were not as favorable to ITA as the findings of the English study, the Lehigh-Bethlehem study, and the Greater Cleveland Study.

Transfer Effects from TO to ITA

The studies reviewed above show clearly that children can be taught to read material printed in ITA. In fact, children taught by the ITA medium appear to be able to read ITA more efficiently than children who are taught by the TO medium can read materials printed in TO. As for the transfer from ITA to TO, the evidence suggests

that it can be done without undue difficulty. Indeed, some studies show that ITA trained pupils can, after transfer, read TO better than TO trained children. Even so, for reasons brought out in Chapter I, it is still felt that something can be learned about the transfer problem by testing TO trained children on materials printed in ITA. These reasons concerned the ages of the children at the time the transfer is made, the exposure to TO which occurs apart from the ITA classes, and the Hawthorne Effect. Testing TO children on ITA eliminates these problems.

The only previous study of the sort reported in the present investigation was done by Robert A. McCracken (1966). The primary purpose of McCracken's study was to discover if children taught by TO could transfer to ITA automatically, without instruction in ITA, and at what level or levels such transfer would take place, if at all. It was assumed that if transfer from TO to ITA occurred without instruction in ITA, then transfer in the other direction should be equally automatic. A secondary purpose was to investigate the relation of mental age, chronological age, grade level, and reading ability in TO to the ability to transfer from TO to ITA.

The subjects for this study consisted of 149 pupils enrolled in Grades 1 through 6 at the Washington State College Campus School and 24 pupils from a combined 2nd and 3rd grade in a public school. Tests were administered to the subjects over a 3-month period from late February

through May, 1965. The principal tests used were the Stanford Reading Inventory, Form A in TO and the Stanford Reading Inventory, Form B in ITA. There was a median time lapse of about 8 weeks between the administration of Form A in TO and the administration of Form B in ITA which probably favored the ITA group in the final results. The children were grouped seven ways for comparisons on the subtests of the SRI: class placement and school, SRI minimum instructional level, SRI maximum instructional level, IQ, mental age, paragraph meaning, and word meaning. Chronological age was not included because it corresponded to grade placement. Comparisons were made for each level of the SRI, pre-primary through the seventh reader. In the ITA version of the SRI, approximately 80 per cent of the words at each level used one or more of the ITA characters or required a spelling change when transliterated to ITA. The other 20 per cent were the same in ITA as in TO.

The results showed that transfer did occur from TO to ITA without instruction. In general, however, the average performance in each grade on the ITA test was about a year below the average achievement on the TO test. The largest losses on the ITA test occurred in speed of oral and silent reading, in the ability to read orally without error, and in the ability to pronounce words in context and in isolation. The smallest loss occurred in comprehension. This latter finding applied to both oral and silent reading.

In general, the loss was greater at the lower reading levels than at the higher reading levels as measured by the SRI. For example, pupils in Grades 1 through 3 recognized significantly fewer words in context when they read from ITA as compared to TO than the pupils in Grades 4 through 6. This investigation indicates that an ITA reading level of at least the 2nd or 3rd reader and/or a mental age of 99 months appears to be desirable before expecting transfer. Pupils achieving at lower reading levels and/or with mental ages of 80 to 99 months probably will be unable, or at least have more difficulty, in making the transition.

McCracken also made a word study in which he found that the transfer was hardest on basic words. Monosyllabic words seemed to be more difficult than polysyllabic or bisyllabic words when transferring from TO to ITA.

McCracken's study appeared after the proposal for the present investigation had been approved. Generally speaking, the objectives are the same, but the design of the two studies is not the same and the experiment described in this dissertation cannot be regarded as a mere repetition of McCracken's study.

The investigation reported in this dissertation differed from McCracken's study in the following respects:

1. The present study used identical words, with one exception, in both the ITA and TO test versions making the alphabet the only independent variable. Similar

control of the test was not exercised in McCracken's investigation.

2. The present study used a test of the word recognition type in order to eliminate context clues as a variable. The primary instrument used by McCracken was the Stanford Reading Inventory, which is not as free of context.

3. A larger sample was used in the present study, 456 subjects compared with McCracken's sample of 173.

4. The time between the administration of the ITA and TO test in the present study was 8 days. There was an average period of 8 weeks between the TO and ITA test in McCracken's investigation.

5. In the present study, the same examiner was assigned to test the same child on both versions of the test. The same does not apply to McCracken's study.

6. The present study included a comparison of boys and girls as well as an investigation of the socio-economic factor. McCracken did not include a study of sex or of the socio-economic factor.

7. Both studies investigated the transfer problem according to the nature of the word but the present investigation went far beyond McCracken's efforts in this area.

CHAPTER III

SUBJECTS AND PROCEDURE

Source of Samples

The subjects for this study were obtained from the Maumee Public Schools. This chapter begins with a description of the community of Maumee and of the Maumee School District as the source of these subjects.

MAUMEE SCHOOL DISTRICT

Maumee is a suburb of Toledo with a population estimated at 15,000. The school district population is larger by about 2,500 as its boundaries are not coterminous with the municipal boundaries. A portion of the school district extends into the city of Toledo. The difference in boundaries has resulted from population growth and annexations. The city has experienced a relatively rapid growth, increasing from a population of 5,521 in 1950 (U.S. Census, 1950) to the present 15,000 estimated by the Maumee Chamber of Commerce. Although the rapid growth has changed somewhat the composition of the population, the Maumee school district is still inhabited predominately by professional and white collar workers. Maumee is often referred to as a bedroom community of Toledo. According

to data furnished by the Toledo Chamber of Commerce, the average annual income per family in Maumee in 1966 was $10,020.00. This compares with $9,091.00 for Toledo and $8,303.00 for Ohio as a whole.

Maumee has a rich history which is reflected by many historical landmarks, including the Anthony Wayne Trail named after General Mad Anthony Wayne, and Fort Meigs, the site of a British fortress. It is chiefly a residential community with many churches and civic organizations, although a drive is currently in progress to encourage industry to locate within its boundaries. Perhaps more important than creating jobs, new industry would raise the tax base which is currently quite low. The residents have compensated for the low tax base by voting one of the higher tax rates in the Toledo metropolitan area to support schools and municipal services.

Table 1 compares the school tax rates and per pupil tax valuations of the school districts in the Toledo metropolitan area (OEA Research Report, 1966).

Per pupil expenditures for the same school districts for the 1965-66 school year are shown in Table 2 (State Department of Education, Ohio, 1966).

The Maumee Public Schools, like the city, experienced a growth, increasing from an enrollment of 1,183 in 1950 to the present 4,217 enrollment. This growth is reflected in the expansion of physical facilities. In 1955, there were three elementary schools and a high school. Presently, there

TABLE 1

COMPARISON OF TOLEDO METROPOLITAN SCHOOL DISTRICTS' TAX RATES AND PER PUPIL VALUATION

School District	School Tax in Mills	Per Pupil Valuation
*Adams	27.2	$16,408
Anthony Wayne	27.7	9,971
Maumee	30.0	11,942
Oregon	19.9	27,886
Ottawa Hills	31.7	23,038
Perrysburg	34.2	13,407
Rossford	21.2	29,793
Spencer Sharples	33.4	3,367
Springfield	30.4	7,443
Sylvania	31.2	10,661
Toledo	22.6	17,211
Washington	26.3	15,830

*Annexed to Toledo City School District September, 1966.

are five elementary schools, a middle school housing Grades 7 and 8, and a high school consisting of Grades 9 through 12. In addition, the school district is a member, with 18 other school districts, in a joint vocational high school district. At the present time, 92 juniors and seniors from the Maumee district attend this school. The continued growth of the school population has resulted in

TABLE 2

COMPARISON OF TOLEDO METROPOLITAN SCHOOL DISTRICTS' PER PUPIL EXPENDITURES

School District	Per Pupil Expenditure
*Adams	$490.74
Anthony Wayne	388.25
Maumee	444.37
Oregon	503.42
Ottawa Hills	691.54
Perrysburg	489.40
Rossford	573.46
Spencer Sharples	375.37
Springfield	360.65
Sylvania	443.48
Toledo	412.30
Washington	382.55

*Annexed to Toledo City School District September, 1966.

a survey, just recently completed, outlining the future school building needs. Another building program is imminent in the near future. The future growth of the community and the schools is somewhat limited because of the physical limitations of boundaries. The community is becoming saturated, helped along considerably by the change in zoning from residential to commercial and

industrial. The total growth of the school population in the future will probably not exceed 2,500 to 3,000 pupils if the present general pattern of zoning is followed.

EDUCATIONAL PROGRAM

Maumee's educational program meets or exceeds in nearly all instances the minimum standards established by the State Department of Education. There is a professional staff of 195 people: 4 hold less than a bachelor's degree, 126 hold the bachelor's degree, 63 the master's degree, and 2 staff members have doctoral degrees. All are certified under state certification laws; however, 12 hold a temporary certificate which requires the holder to obtain additional credits before being eligible for the regular certificate known in Ohio as the 4-year provisional certificate.

The elementary school program is organized on a K - 6 basis. The Riverside Elementary School, owned by Lucas County and located at the county children's home, but operated by the Maumee City Board of Education, does not have a kindergarten. This school is operated as a special education school for emotionally disturbed and slow-learning children. The few children from the home who can adjust to the normal educational setting attend one of the other four elementary schools in the city. Students from the children's home in Grades 7 through 12 attend the middle school and the high school in the city.

The educational offerings are geared to the individual pupil. In the elementary schools the classrooms

are self-contained with specialists in art, music, physical education, reading, psychology, and speech and hearing therapy augmenting the regular staff. Grouping is heterogeneous; however, principals and teachers do have the option of assigning students to specific classes if they feel it will be beneficial to the students. In addition to the regular program, there is special education for slow-learners from primary through high school and for emotionally disturbed pupils on a limited basis. Pupils with hearing, visual, and orthopedic defects attend special schools in Toledo. Grades 7 through 12 offer advanced placement programs in some academic areas. The interest in the joint vocational high school mentioned previously is growing.

Approximately 47 per cent of the 1966 graduates attend a 4-year college, 9 per cent attend a 2-year college, another 7 per cent are in some type of post graduate training. The high school dropout rate in 1966 was just slightly over 1 per cent.

Reading. Reading is the most emphasized program in the elementary schools. The aim of the kindergarten is to build a background of experiences which will provide a firm foundation for formal reading instruction in the 1st grade. All elementary teachers use a basal series to insure consistency and to provide sequential skill development. The latest revision of Scott, Foresman is used as

the basic text. A three-track program, as developed by the Maumee staff, is especially designed to meet the reading needs of the below average, the average, and the above average reader at each grade level.

Supplementary materials, many chosen on the basis of individual teacher preferences, are available in the classrooms. Some small groups use materials specially chosen to reteach word analysis techniques, build comprehension skills or challenge the superior reader.

A core program in English, reading, and spelling is taught in the middle school. Several senior high school classes, scheduled with the less able reader in mind, stress the integration of reading with the content areas in English, World History, and American History. Instruction in reading is individualized to a considerable degree.

Selection of Samples

SCHOOLS INVOLVED

As reported previously, there are five elementary schools in the district. Children from two of the schools were eliminated from the study because ITA had been used in the 1st grade. The Riverside School students were not included because of the uniqueness of this situation. Riverside pupils are not representative of the socio-economic status of the general population in Maumee. They are placed in the home by either the county welfare department or the juvenile court. The children are, for the most

part, placed in the home because of delinquency, non-support, unfit homes, or abandonment. Very seldom is a child resident a true orphan.

The subjects were chosen from the two remaining elementary schools. Neither of these schools had been exposed to ITA previously and both were representative of the general socio-economic background of the school community. A survey of the population of the two schools, consisting of slightly more than 900 pupils, was conducted by the respective building principals to ascertain if any children had ever been exposed previously to the ITA method. Those few who were discovered to have had previous experience with ITA were excluded from the study. With these few exceptions, all of the children in the two schools enrolled in Grades 1 through 6 inclusive were included in the pool from which the final samples were obtained.

The two elementary schools were treated as one population, with no attempt made to equalize the number of pupils coming from each school in the choice of subjects. The distribution of the combined population by grade and by sex is shown in Table 3.

It was deemed not to be necessary to test all of the children; therefore, a sample was chosen from the population in Table 3, consisting of approximately a half of the children available. The design of the study made it desirable that the numbers from each grade be equal and that the sex factor be balanced. The pupils were

selected with the help of a table of random numbers (Senders, 1958, pp. 557-65). The sample consisted of 480 pupils, 40 girls and 40 boys, from each of Grades 1 through 6. The final sample was reduced to 456 pupils, 38 girls and 38 boys, for reasons explained later in this chapter.

TABLE 3

DISTRIBUTION OF TOTAL POPULATION BY GRADE AND BY SEX

Grade	Girls	Boys	Total
1	73	64	137
2	60	83	143
3	74	75	149
4	87	76	163
5	74	89	163
6	70	78	148
Totals	438	465	903

CHARACTERISTICS OF SAMPLES

Ages. Table 4 reports information on the ages of the samples by grade and by sex. The Maumee school's retention rate is low; therefore, the age distribution within grade is not exceptionally large. The average of children in the Maumee schools is higher than several districts in the metropolitan area because the birth date required for entrance in the kindergarten and 1st grade is

earlier. In Maumee the pupil must be 5 on or before October 31 to enter kindergarten or 6 by October 31 to enter 1st grade. This compares with the age requirements of January 1 to enter kindergarten or Grade 1 in several of the surrounding districts.

TABLE 4

MEAN AGES AND STANDARD DEVIATION OF AGES OF THE SAMPLES BY GRADE AND BY SEX

Grade	Sex	Number	Mean Age	SD
1	M	38	85.16	5.04
	F	38	85.45	4.02
	M & F	76	85.30	4.53
2	M	38	97.34	5.37
	F	38	98.68	4.36
	M & F	76	98.01	4.91
3	M	38	110.00	5.11
	F	38	108.82	4.51
	M & F	76	109.41	4.83
4	M	38	122.53	6.20
	F	38	120.47	4.45
	M & F	76	121.50	5.46
5	M	38	133.55	5.98
	F	38	134.45	7.09
	M & F	76	134.00	6.53
6	M	38	146.95	6.08
	F	38	144.37	5.03
	M & F	76	145.66	5.70
Totals		456	115.65	21.29

Intelligence. Information on the IQs of the samples, by grade and by sex, is reported in Table 5. These IQs are based on the California Test of Mental Maturity, administered at the time of the investigation. The table shows that the mean IQs were reasonably comparable from grade to grade. This statement applies to both boys and girls and to total subjects.

Social Class. The occupation of the chief wage earner in each family was categorized to make possible a study of the relationship between social class and the results on the ITA and TO test scores. The information was obtained from the pupil's card file. The occupations were listed according to the categories established by Warner and his associates. The primary criteria used by the authors (Warner, et al, 1949, p. 133) in establishing the occupational categories were the level of skill the job required and the prestige value attached to the job.

The school psychologist and the investigator independently classified the occupation of the chief wage earner of the families concerned according to Warner's scheme. The judgments were then compared and where differences occurred, a discussion followed until mutual agreement was reached. Some occupational listings, such as engineers, are ambiguous. When these situations arose, the building principals were consulted for clarification. A copy of the occupational scale is reproduced in Appendix A.

TABLE 5

MEAN IQS AND STANDARD DEVIATIONS OF IQS OF THE SAMPLES BY GRADE AND BY SEX

Grade	Sex	Number	Mean IQ	SD
1	M	38	110	11
	F	38	108	11
	M & F	76	109	11
2	M	38	108	9
	F	38	108	11
	M & F	76	108	10
3	M	38	111	12
	F	38	115	12
	M & F	76	113	12
4	M	38	109	13
	F	38	112	13
	M & F	76	110	13
5	M	38	116	11
	F	38	113	15
	M & F	76	115	13
6	M	38	110	15
	F	38	109	10
	M & F	76	110	13
Totals	M	228	111	12
	F	228	111	12
	M & F	456	111	12

Table 6 shows the results of the classification by socio-economic status. The number and percentage of chief wage earners in each category as labelled by name are found by reading the columns vertically. Reading the

table horizontally tells the number and percentage of chief wage earners rated according to the prestige and skill attached to the occupation. This rating is shown by number: 1 is the highest and 8 the lowest rating assigned to an occupation. Each occupational category, except 7 and 8, has at least three levels of prestige and skill, e.g., Professionals are rated on levels 1, 2, and 3. The ratings for prestige and skill, as indicated by the numbers 1 through 8, were used in the interpretation and analysis of the data. The Professionals rated 1 were, therefore, assigned the same weight as Proprietors and Managers, Business Men, and Clerks and Kindred Workers with the same rating. Professionals rated 2 were equal to other occupations rated on this level, and so on through the remainder of the table.

The Testing

TEST INSTRUMENTS

The testing program called for the administration of a mental test, plus a word recognition test printed both in ITA and TO. Since no suitable test was available in ITA, one was constructed by the investigator and then duplicated in TO. The Botel Word Recognition Test served as a model. The following features were incorporated into the construction of the test.

1. The ITA test was constructed so that each student would be exposed at least once to each of

TABLE 6

GROUPING OF FAMILIES OF SUBJECTS
BY SOCIAL CLASS

Rating	Professionals		Proprietors and Managers		Business Men		Clerks and Kindred Worker		Manual Workers		Protective and Service Worker		Farmers		** Miscellaneous		Totals	
	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total
1	47	10.30	3	.66	3	.66	2	.44									55	12.06
2	24	5.26	6	1.32	44	9.65	19	4.17									93	20.40
3	8	1.75	4	.88	6	1.32	48	*10.52	19	4.17							85	18.64
4			3	.66			24	5.26	29	6.36	7	1.54					63	13.82
5							5	1.10	95	*20.82	10	2.19					110	24.11
6									32	7.02	12	2.63					44	9.65
7																		
8															6	1.32	6	1.32
Totals	79	17.31	16	3.52	53	11.63	98	21.49	175	38.37	29	6.36	0		6	1.32	456	100%

* One hundredth of 1% dropped so as to equal 100% total. All other figures in individual categories and ratings rounded to nearest hundredth.

** Added by the investigator to place six pupils of parents unemployed, deceased, or under welfare.

the 44 characters making up the ITA alphabet. Construction was such that in Columns 1 and 2 combined, all 44 characters were represented at least once; the same was true of Columns 3 and 4 as well as Columns 5 and 6. This means that a student who completed the entire test was exposed a minimum of three times to each ITA character. The students could be, and in most instances were, exposed to most of the characters more often than the minimum.

2. The words were graded for Grades 1 through 6 inclusive, with one column of 22 words for each level, a total of 132 words for the complete test. The number of the column indicated the level of difficulty. The words were selected from the Reading Vocabulary for the Primary Grades by Arthur I. Gates, A Basic Vocabulary for Elementary School Children by Henry D. Rinsland, and from words in the vocabulary of the Ginn and of the Scott, Foresman Basic Reading Series.

3. Three forms of each the ITA and TO tests were constructed. The same words were used in each form, only the word order was changed. The word order was determined by writing each word on a card and then shuffling the cards to determine the order in which these words would be placed for each column of each form of the ITA and TO tests.

The words used in the ITA and TO tests are identical except for one word. On Level 6 the word judge was used on the ITA test and the word sponge on the TO

test. This discrepancy was the result of a word change which was required to gain the needed ITA characters on Level 6 of the ITA test. Through an oversight, the change from sponge to judge was not made on the TO test. The oversight was not detected until after the test had been administered.

4. The size of the print and other aspects of the format were the same for all forms of the tests, thus eliminating any possible variables in this respect.

5. Although there are degrees of difference between the ITA spelling and the identical word in TO, there is only one instance, the word grant, in the entire test of 132 words in which the ITA and TO spelling is identical. This happened by chance. Grant was the only satisfactory word with the required ITA character "a" which could be found.

6. The spellings of the words in ITA were checked by two reading specialists and by the investigator to verify their correctness. An ITA dictionary and published ITA reading materials were used as the sources for checking the spellings. There are, in several instances, close similarities in the sounds of some ITA characters which cause doubt as to the use of appropriate characters in some words. This was the cause for the exception cited above involving the words sponge and judge.

For verification of the spellings, the list of 132 words spelled in ITA was sent to the Initial

Teaching Alphabet Publications, Inc. in New York. The list was returned with five corrections. The list was further authenticated by Sir James Pitman when Dr. Irving Anderson, who was in England in the summer of 1966, had Sir James review the words for their accuracy. The list, as finally certified by the ITA Publications, Inc., was used for the testing program.

The California Short Form Test of Mental Maturity, 1963, was used to measure the intelligence of the pupils in the sample. The test yields a language and non-language IQ, as well as an IQ based on a combination of the language and non-language items.

TEST ADMINISTRATION

All tests were administered in May, 1966. The word recognition tests were administered first. The ITA test was administered on May 12, 1966, and the TO test on May 20, 1966. The ITA test was given first because it was believed that there would be less memory effect from ITA to TO than there would have been from TO to ITA. It is also believed that the interval of 8 days between the administration of the ITA test and the TO test served further to minimize the memory effect.

A word recognition test, in which all levels were completed, required about 20 minutes. Since many students did not complete the six levels, the average time required was less. So that all like tests could be administered

on the same day, arrangements were made with Professor William E. Harrington, Bowling Green State University, for 33 senior students in a Tests and Measurements course to come to Maumee to administer the tests to the 456 subjects.

Every effort was made to standardize the test procedure. An orientation program was arranged on campus for the university class and conducted by the reading specialist on the Maumee staff and by the investigator. All of the testers were present. The purpose of the study was thoroughly discussed and the importance of their part in the experiment stressed. A packet was distributed to each tester consisting of the three forms of each of the ITA and TO tests, the scoring sheets for all forms of both tests, and a test administrator's guide. The contents of this packet are reproduced in Appendix B.

Two elementary pupils from Maumee not participating in the experiment were then used by the reading specialist to demonstrate to the testers the actual administration of the tests. After the demonstration ample time was allowed for further discussion and questions. The response of the testers indicated a strong positive interest in the project. Their interest was due in part to the requirement of the testing course in which they were enrolled that each administer an individual test.

A second orientation session was conducted for the testers at the elementary schools prior to, but on the same day, of the administration of the ITA test. Each tester

was given a packet which contained the list of the names of the children he would be testing, the tests, and the tabulation sheets. Each tester was assigned two additional students, a boy and a girl, to provide a practice session. This was done under the actual test conditions on the same day of the ITA test just prior to testing the subjects. Immediately following the practice session, a question and answer period followed to eliminate any last minute confusion. Arrangements were made to have each subject immediately available for the test when his turn came. Ample time was allowed so that the tester would become acquainted with each child to be tested.

Preparations were also made for the teachers, the students participating in the study, and their parents to reduce any anxieties which might develop. Not one parent objected to their child's participation in the project. The teachers were familiarized with all the aspects of the study through staff meetings. The role of the children under their tutelage was explained so that they in turn could explain to the children the nature of the study in which they would be participating.

The principals of the two schools involved were entirely familiar with the program and were in a position to help in any phase of the orientation. They made the necessary physical arrangements for the testing in their respective buildings. Testing stations were set up in multiple purpose rooms.

In an effort to control the consistency of the individual tester, as well as the testers as a group, each tester was required to tape record three test situations while giving the ITA tests and two with the TO tests. The differences among the 35 individuals testing were minimized by means of the orientations, discussions, practice sessions, and the tape recordings. It is felt, therefore, that the administration of the tests was basically consistent among the testers.

It was deemed to be desirable that the same tester test the same children on both the ITA and the TO tests. On the day on which the ITA test was administered, 21 students were absent. These students were tested the following day by the reading specialist and by the investigator. Immediately after the ITA test was administered on May 12, the investigator emphasized to the testers the importance of their presence at the second testing session. On May 20, all 33 testers were again present to administer the TO test to the same children each had tested previously. The reading specialist and the investigator tested the same children on the TO test as they had previously tested on the ITA test. There were 15 absentees on May 20, 1966. These pupils were eliminated from the study because the testers were unable to return to administer the TO test at a later date. So that the number of girls and boys within and between each grade level was equal, 9 more pupils were randomly eliminated, making a final sample of 456 pupils,

38 girls and 38 boys on each grade level.

The administration of the word recognition tests was not a complicated task. The most important job the tester had was to establish rapport with the children. A test, consisting of six columns of 22 words each, graded for difficulty from Level 1 through Level 6, was given to each student by the tester. Each tester explained to each student about the test thus reinforcing the orientation already given by the teachers. The tester worked with only one child at a time. The student was instructed to read from the test handed to him. The test could have been one of any three forms on either the ITA or the TO test. The tester merely handed to the first student Form 1, the second Form 2, the third Form 3, the fourth Form 1, and continuing this rotation for each pupil tested. The purpose of different test forms was to wash out the effect of word order on the test results.

As the student read or attempted to read each word, the tester recorded his response on the tabulation sheet which was provided for each student. The ITA tabulation sheet was yellow, the TO tabulation sheet white. The purpose of the distinction was to eliminate confusion in recording and scoring the results. The tester marked each word in one of three ways: if the word was mispronounced or a different word was substituted for it, the tester wrote out the response as he heard it; R was used to refer to no response or refusal; if the word

was pronounced correctly, a (c) or check (✓) was placed in the blank space next to the word. The tester was required to make a recording for each word in the columns completed. A time limit of five seconds was allowed for each word before an R was recorded on the tabulation sheet.

When the student missed eight or more words on two consecutive columns or levels, he was instructed to stop. Once a column was begun the student was required to finish it regardless of the number of words that were missed in the final column attempted. Every student completed at least a minimum of two columns of the test. A student could miss eight or more words in three columns if after failing in one column, he was successful in the next. There were a few instances in which this occurred. Although a few children showed some frustration under the actual test conditions, every pupil was able to complete at least two levels of the test.

So that the IQs of the participants would be current with the word recognition tests, the California Short Form Test of Mental Maturity, 1963, was given on May 25 and 26, 1966. This is a group test administered by the teachers. Level 1 was administered to Grades 1 and 2, Level 1-H to Grade 3, and Level 2 to Grades 4, 5, and 6. Although the teachers administering the mental tests were familiar with the instrument, an orientation period was conducted by the principals of the two schools involved just prior to the date the tests were given.

SCORING THE TESTS

Word Recognition Tests. Scoring the word recognition tests was done by each tester for those tests which he administered. This scoring merely required that the number of correct responses be counted for each column of the test completed and the total correct responses recorded at the bottom of each column. Each tabulation sheet was double-checked for accuracy by the investigator or the reading specialist.

As noted previously, the testers recorded a marking for each word attempted. It was observed during the testing that the testers were not generally adept at recording the mispronounciations; therefore, using these recordings for any analysis of phonetic responses would have been questionable. The recording of the mispronounciations was nevertheless useful because it did make the tester more alert to the student's response. The fact that the tester may not have written the accurate response made by the student did not necessarily mean that the tester did not hear what the child said, but likely did not know how to record the answer phonetically when the word was mispronounced.

Intelligence Test. The mental tests were machine scored for students in Grades 4, 5, and 6. Since machine scoring was not available for the primary level, the tests at this level were scored by the investigator.

RECORDING RESULTS

Word Count. Each word to which each student made a response on both the ITA and TO tests was tabulated to establish the number of correct responses, mispronounciations, substitutions, and refusals. The mispronounciations and substitutions were combined in the scoring under the category of missed. The tabulation was done manually. Identical words and groups of words on the ITA and TO tests were then compared to measure the difference in the percentage of responses. An analysis of the word count is presented in Chapter IV. This procedure was followed to ascertain if any particular characters in the ITA print were giving the pupils considerably more trouble than others and to find out if some words were likely to present more problems than others when transferring from reading in TO to reading in ITA.

Coding Information. The vital information relating to the pupils and their test scores was coded on IBM cards. These data were then put through an appropriate computer program. The results obtained from this statistical analysis are reported in the next chapter. The individual scores are reported in Appendix C.

CHAPTER IV

RESULTS

As stated earlier, the primary objective of this study was to ascertain the amount of transfer from TO to ITA at each grade level from Grades 1 through 6 inclusive. This investigation was conducted in each of these grades in order to find out how the extent of transfer varied according to the maturity of the subjects. The results divide themselves into three parts: (1) comparison of mean scores on the ITA and TO tests, (2) correlations between ITA and TO scores, and (3) comparison of the word scores on the ITA and TO tests. The results will be reported accordingly, beginning with the comparisons between mean scores.

Comparison of Mean Scores

GENERAL COMPARISONS

Comparisons of the mean scores on the ITA and TO tests by grade, sex, and total subjects are presented in Table 7. In all comparisons the mean TO scores were higher and all differences are significant at the .01 level or better. It is clear that the children who served as subjects in the investigation found TO much easier to

TABLE 7

COMPARISON OF THE MEAN ITA AND TO SCORES BY GRADE, SEX, AND TOTAL SUBJECTS

Grade	Sex	Number	ITA		TO		Diff.	t*
			Mean	SD	Mean	SD		
1	M	38	13.58	9.88	23.42	13.71	9.84	3.59
	F	38	12.45	4.05	22.74	7.21	10.29	7.67
	M & F	76	13.01	7.52	23.08	10.89	10.07	6.63
2	M	38	39.45	28.17	64.74	35.15	25.29	3.46
	F	38	43.61	23.29	76.39	31.30	32.79	5.18
	M & F	76	41.53	25.76	70.57	33.57	29.04	5.98
3	M	38	66.89	29.40	102.47	24.78	35.58	5.70
	F	38	79.34	27.08	112.92	20.71	33.58	6.10
	M & F	76	73.12	28.76	107.70	23.28	34.58	8.15
4	M	38	78.66	29.61	116.45	12.67	37.79	7.23
	F	38	84.92	29.47	119.66	15.42	34.74	6.44
	M & F	76	81.79	29.51	118.05	14.11	36.26	9.66
5	M	38	93.45	22.73	121.45	15.83	28.00	6.23
	F	38	97.05	21.53	122.39	14.91	25.34	5.96
	M & F	76	95.25	22.07	121.92	15.28	26.67	8.66
6	M	38	97.32	26.69	125.63	11.93	28.32	5.97
	F	38	95.29	24.92	127.03	5.93	31.74	7.64
	M & F	76	96.30	25.67	126.33	9.38	30.03	9.58
1 - 6	M & F	456	66.83	38.76	94.61	41.77	27.77	10.41

*All significant at the .01 level.

read than ITA, hardly a surprise, inasmuch as they had learned to read with TO as the medium. Grade by grade the mean scores on the ITA test were between 22 per cent and 44 per cent lower than the mean TO scores. However, it is also apparent that a considerable amount of transfer occurred. In no case were the mean ITA scores less than half as high as the mean TO scores.

The data presented in Table 7 are portrayed graphically on Figure 1. This graph shows that the mean scores on both tests, with the exception of the mean ITA score for girls in Grade 6, increased with grade level, but that the TO scores remained higher than the ITA scores throughout. The finding that the mean scores on both tests increased with grade level may be related to the greater maturity of the subjects as they grow older. These age changes began to level off in Grade 3, especially on the TO test. The differences between the mean scores on both tests from grade to grade are reported in Table 8. This table clearly shows how the differences tended to decline with increase in grade. This leveling off seems to be attributable to the increased reading ability being proportionately greater as the grade level increases, especially in the upper elementary school years. Pupils in Grade 4, for instance, would be expected to know more words on Levels 5 and 6 than would pupils in Grade 1 be expected to know the words on Levels 2 and 3. The closed end design or ceiling effect of the test contributes to

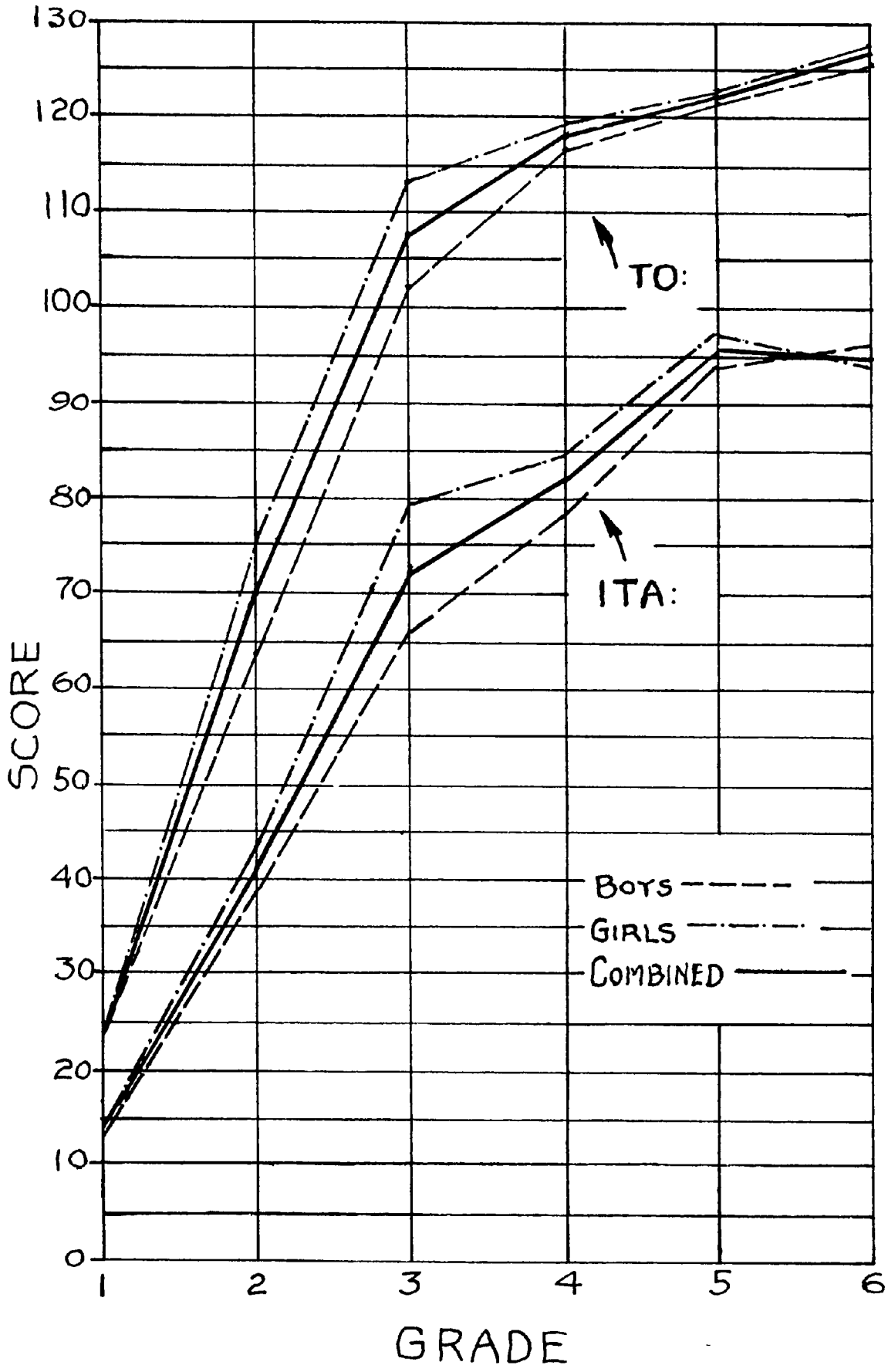


Figure 1 - Comparison of Mean ITA and TO Scores by Grade, Sex, and Total Subjects

this trend also, because the nearer the grade level approaches the top, or Level 6, the greater the student's chances of previous exposure to more of the words on the tests and the greater his ability to attack new words. These effects are not so pronounced on the ITA test, perhaps because of the unfamiliarity of the medium which left a higher ceiling throughout.

TABLE 8

DIFFERENCES BETWEEN MEAN ITA AND TO TEST SCORES FROM GRADE TO GRADE BY SEX AND TOTAL SUBJECTS

Grade	Differences Between Mean ITA Scores			Differences Between Mean TO Scores		
	Boys	Girls	Total	Boys	Girls	Total
1 (Base)	0	0	0	0	0	0
2	25.87	31.16	28.51	41.32	53.66	47.49
3	27.45	35.74	31.59	37.74	36.53	37.13
4	11.76	5.58	8.67	13.97	6.74	10.36
5	14.79	15.26	12.13	5.00	2.74	3.87
6	3.87	-1.76*	1.05	4.18	4.63	4.41

*Only negative score in table.

The between test differences increased with the grade level in absolute terms. However, the ratios in Table 9 indicate that the relative difference decreased through Grade 5. These ratios were obtained by dividing the mean ITA score by the mean TO score at each grade level. A ratio

of 1.00 would indicate no difference between the ITA and TO mean scores since the means in that case would be identical. It is apparent that this stage of correspondence was not reached in any of the grades included in this study. If anything, a plateau seems to have been reached at Grade 5.

TABLE 9

RATIO OF DIFFERENCES BETWEEN MEAN ITA AND TO SCORES BY GRADE, SEX, AND TOTAL SUBJECTS

Grade	Sex	Ratio
1	M	57.98
	F	54.75
	M & F	56.37
2	M	60.94
	F	57.09
	M & F	58.85
3	M	65.28
	F	70.26
	M & F	67.89
4	M	67.55
	F	70.97
	M & F	69.28
5	M	76.95
	F	79.30
	M & F	78.13
6	M	77.47
	F	75.01
	M & F	76.23
Total	M & F	70.64

SEX AND GRADE DIFFERENCES

Figure 1 may also be examined with reference to the sex factor. As the figure shows, both boys and girls exhibit the same trends in general. However, it may also be observed that the mean scores of the girls tend to excel those of the boys on both tests in each grade, except in Grade 1, where there is virtually no difference on either test, and in Grade 6, where the mean score of the boys was above that of the girls on the ITA test, probably a chance fluctuation.

A two-way analysis of variance was applied to the mean ITA and TO scores with comparisons made between sexes and grades. The results of these analyses are presented in Tables 10 and 12.

Table 10 reveals that the F ratio for testing the main effects of scores on the ITA test between grades proved significant at the .01 level. The differences between the sexes, and the sex by grade interaction, were not significant in the comparison of the ITA scores. The evidence, therefore, indicates that the latter two factors have no effect except by chance on the ability to read ITA for pupils never before trained in this alphabet.

Table 11 applies Duncan's New Multiple Range Test (1965) to the differences between the mean ITA scores from grade to grade. According to this test, the only differences which were not significant were those between Grades 3 and 4 and between Grades 5 and 6.

TABLE 10

ANALYSIS OF VARIANCE SUMMARY FOR ITA SCORES

Source	Sum Squares	d.f.	Mean Square	F
Sex	1721.50	1	1721.50	2.906
Grade	416190.40	5	83238.08	140.548*
Sex x Grade Interaction	2645.60	5	529.12	.893
Error	262953.90	444	592.12	
Total	683511.40	455		

*Significant at the .01 level.

TABLE 11

COMPARISON OF MEAN ITA SCORES BETWEEN GRADES

Grade		1	2	3	4	5	6	Shortest Significant Ranges
	Means	13.01	41.53	73.12	81.79	95.25	96.30	
1	13.01		28.52	60.11	68.78	82.24	83.29	R_2 = 10.16
2	41.53			31.59	40.26	53.72	54.77	R_3 = 10.59
3	73.12				8.67	22.13	23.18	R_4 = 10.88
4	81.79					13.46	14.51	R_5 = 11.10
5	95.25						1.05	R_6 = 11.27
Grade		1	2	3_____4		5_____6		

Any two treatment means not underscored by the same line are significantly different at .01 level.

Any two treatment means underscored by the same line are not significantly different at .01 level.

Table 12 presents the results of the analysis of variance applied to the TO test. Again, there is a significant difference at the .01 level in the comparison of mean scores between grades. Unlike the findings on the ITA test, the comparison between sexes for the TO mean scores was significant at the .05 level in favor of the girls. The comparison for sex by grade interaction is not significant. Grade interaction for sex refers to the relationship of sex between grades, e.g., would boys or girls in any one grade be expected to do better or worse than those in another grade?

TABLE 12

ANALYSIS OF VARIANCE SUMMARY FOR TO SCORES

Source	Sum Squares	d.f.	Mean Square	F
Sex	2304.10	1	2304.10	6.081**
Grade	620740.50	5	124148.10	327.672*
Sex x Grade Interaction	2610.10	5	522.02	1.377
Error	168222.30	444	378.88	
Total	793877.00	455		

*Significant at the .01 level.

**Significant at the .05 level.

Table 13 applies Duncan's New Multiple Range Test (1965) to the differences between the mean TO scores from grade to grade. According to this test, the only differences

which were not significant were those between Grades 4 and 5, 4 and 6, and 5 and 6.

TABLE 13

COMPARISON OF MEAN TO SCORES BETWEEN GRADES

Grade	1	2	3	4	5	6	Shortest Significant Ranges
Means	23.08	70.57	107.70	118.05	121.92	126.33	
1 23.08		47.49	84.62	94.97	98.84	103.25	$R_2 = 8.12$
2 70.57			37.13	47.48	51.35	55.76	$R_3 = 8.47$
3 107.70				10.35	14.22	18.63	$R_4 = 8.70$
4 118.05					3.87	8.28	$R_5 = 8.87$
5 121.92						4.41	$R_6 = 9.01$
Grade	1	2	3	4	5	6	

Any two treatment means not underscored by the same line are significantly different at .01 level.

Any two treatment means underscored by the same line are not significantly different at .01 level.

Since the analysis of variance applied to the TO scores also yielded a significant F ratio for sex, t tests were applied to the differences between the mean TO scores by sex in each grade. Table 14 reveals that only one of the differences in favor of the girls on the TO test was statistically significant. This difference occurred at the 3rd grade level.

TABLE 14

COMPARISON OF MEAN TO SCORES OF BOYS AND GIRLS

Grade	Boys		Girls		Diff.	t
	Mean	SD	Mean	SD		
1	23.42	13.71	22.74	7.21	.68+	.272
2	64.74	35.15	76.39	31.30	11.65	1.526
3	102.47	24.78	112.92	20.71	10.45	1.994*
4	116.45	12.67	119.66	15.42	3.21	.992
5	121.45	15.83	122.39	14.91	.94	.269
6	125.63	11.93	127.03	5.93	1.40	.645

*Significant at the .05 level.

+ Favors boys.

There was no evidence that girls transferred more readily to ITA than did boys. Table 7 showed that the mean scores of both the boys and girls were significantly higher on the TO test than on the ITA test in all six grades. In some grades the boys showed a slightly larger difference in favor of TO while in other grades the girls showed a slightly larger difference in favor of TO. No consistent pattern emerged with reference to the sex factor insofar as readiness to transfer to ITA is concerned.

GROUPING BY OCCUPATION

Previous research has demonstrated that there is a close positive relationship between reading achievement

and socio-economic background. This finding raises a question as to whether socio-economic background might have a bearing on the child's readiness to transfer from TO to ITA. An investigation was consequently made of this question.

Table 15 compares the mean ITA and TO scores by the occupation of the chief wage earner of the families concerned. The mean TO scores are significantly higher at all occupational levels except at Level 8 where the small number of cases tends to void the comparison. As far as these data show, occupation does not appear to be a factor with respect to the ability to transfer from TO to ITA.

TABLE 15

THE MEAN ITA AND TO SCORES FOR EACH OF THE OCCUPATION GROUPS

Occupation	Number	ITA		TO		Diff.	t
		Mean	SD	Mean	SD		
1	55	69.47	40.49	94.02	43.37	24.55	3.04*
2	93	71.91	38.03	99.33	40.51	27.42	4.73*
3	85	72.71	37.00	99.48	37.92	26.77	4.63*
4	63	60.11	38.55	88.71	43.81	28.60	3.86*
5	110	63.80	37.59	93.11	41.07	29.31	5.50*
6	44	62.30	39.58	93.36	42.03	31.06	3.53*
8	6	40.17	40.26	56.17	51.51	16.00	.55

*Significant at .01 level.

A one-way analysis of variance was used to compare the variance between the ITA and TO scores in order to find out if the differences in the mean scores between occupations were significant. Tables 16 and 17 show that the obtained F ratio was not significant for either test. As one looks at the differences between the means, some of these differences would appear to be quite large. However, because of the internal variation within these groups also being quite large, a non-significant F ratio is obtained. The internal variation is unavoidable because if the data were divided further into occupations by grade, then several occupations may not occur in each of the grades or if they did the small number of cases would make the comparisons meaningless.

TABLE 16

SUMMARY OF ANALYSIS OF VARIANCE
FOR ITA SCORES FOR OCCUPATION

Source	Sum Squares	d.f.	Mean Square	F
Occupation	14746.88	6	2457.81	1.650
Error	668764.52	449	1489.45	
Total	683511.40	455		

TABLE 17

SUMMARY OF ANALYSIS OF VARIANCE
FOR TO SCORES FOR OCCUPATION

Source	Sum Squares	d.f.	Mean Square	F
Occupation	15485.18	6	2580.86	1.488
Error	778391.62	449	1733.61	
Total	793876.80	455		

Correlational Analysis

In addition to the comparisons between the mean scores already presented, coefficients of correlations were computed between the ITA and TO tests. As we all know, correlations measure relationships. It was felt, therefore, that the correlation technique constituted another way of studying relationships between the ability to read TO and ITA by a group of children who have been taught to read by TO.

CORRELATIONS BETWEEN ITA AND TO SCORES

Comparisons Between Tests. As shown in Table 18, correlations between the ITA and TO scores for each grade, sex, and total subjects were consistently high and significant at the .01 level or better in all instances. Table 19 shows the correlations between the ITA and TO test scores and IQ. With few exceptions, all of these correlations are significant. The correlations between the ITA and TO test

scores with IQ held constant are reported in Table 20. Even with IQ held constant, the correlations between the ITA and TO test scores remained significant. It is clear that IQ alone does not account for the high correlations between the ITA and TO test scores.

TABLE 18

CORRELATIONS BETWEEN ITA AND TO SCORES BY GRADE, SEX, AND TOTAL SUBJECTS

Grade	Sex	Number	Correlation*
1	M	38	.926
	F	38	.766
	M & F	76	.893
2	M	38	.870
	F	38	.868
	M & F	76	.867
3	M	38	.751
	F	38	.800
	M & F	76	.783
4	M	38	.802
	F	38	.764
	M & F	76	.780
5	M	38	.763
	F	38	.898
	M & F	76	.826
6	M	38	.817
	F	38	.767
	M & F	76	.762

*All significant at .01 level.

TABLE 19

CORRELATIONS BETWEEN ITA AND TO SCORES AND IQ
BY GRADE, SEX, AND TOTAL SUBJECTS

Grade	Sex	Number	Correlations Between ITA and IQ	Correlations Between TO and IQ
1	M	38	.275	.198
	F	38	.401**	.606*
	M & F	76	.294*	.324*
2	M	38	.587*	.572*
	F	38	.440*	.463*
	M & F	76	.506*	.508*
3	M	38	.501*	.592*
	F	38	.588*	.654*
	M & F	76	.557*	.630*
4	M	38	.642*	.658*
	F	38	.544*	.413**
	M & F	76	.599*	.529*
5	M	38	.642*	.646*
	F	38	.637*	.548*
	M & F	76	.616*	.575*
6	M	38	.641*	.699*
	F	38	.602*	.630*
	M & F	76	.621*	.664*

*Significant at .01 level.

**Significant at .05 level.

TABLE 20

PARTIAL CORRELATIONS BETWEEN ITA AND TO SCORES BY GRADE, SEX, AND TOTAL SUBJECTS WITH IQ HELD CONSTANT

Grade	Sex	Number	Partial Correlations*
1	M	38	.924
	F	38	.717
	M & F	76	.882
2	M	38	.805
	F	38	.835
	M & F	76	.821
3	M	38	.651
	F	38	.679
	M & F	76	.669
4	M	38	.658
	F	38	.705
	M & F	76	.682
5	M	38	.595
	F	38	.852
	M & F	76	.732
6	M	38	.672
	F	38	.625
	M & F	76	.596

*All significant at the .01 level.

Comparison Between Grades. A comparison of the correlations was made between grades with Fisher's z-test (Ferguson, 1959, p. 150) applied to test the significance of the differences. The results of these comparisons are

presented in Table 21. Since these comparisons apply to the differences between grades, the table is to be read horizontally only.

TABLE 21

COMPARISONS OF CORRELATIONS BETWEEN GRADES BY SEX AND TOTAL SUBJECTS

Sex	Grade 1	2	3	4	5	6
M	.926[a]	.870	.751	.802	.763	.817
F	.766	.868	.800	.764	.898	.767
M & F	.893[b]	.867	.783	.780	.826	.762

a - Significant at the .05 level from Grades 3 and 5.

b - Significant at the .05 level from Grades 3, 4, and 6.

The only correlations which differed significantly from any of the rest occurred in Grade 1 and concerned the boys and total subjects.

Table 22 makes a similar comparison of the partial correlations between the ITA and TO scores with IQ held constant.

In this case, the only correlations which differed significantly concerned the boys and total subjects in Grade 1 and the total subjects in Grade 2.

The data reported in Tables 21 and 22 show that generally the highest relationships existed in the lower

grades, especially in the case of the boys, although there appears to have been no clear cut nor consistent trend developed beyond that point.

TABLE 22

COMPARISONS OF PARTIAL CORRELATIONS BETWEEN GRADES BY SEX AND TOTAL SUBJECTS WITH IQ HELD CONSTANT

Sex	Grade					
	1	2	3	4	5	6
M	.924[a]	.805	.651	.658	.595	.672
F	.717	.835	.679	.705	.852	.625
M & F	.882[b]	.821[b]	.669	.682	.732	.596

a - Significant at the .05 level from Grades 3, 4, 5, and 6.

b - Significant at the .05 level from Grades 3, 4, and 6.

Comparison of Word Scores

The results reported to this point indicate that transfer occurs from TO to ITA and that high positive relationships exist between ability to read ITA and TO. However, the transfer was not complete and the relationships were less than perfect. A comparison of the word scores on the ITA and TO tests was made, therefore, in an effort to identify the factors which interfere with transfer and reduce the relationship. The other side of the coin was to find factors which contribute to compatibility.

The data in Table 23 compare the word scores on the ITA and TO tests for all 456 subjects of this study. The words were arranged according to the number of correct ITA responses, by level, beginning with the fewest correct responses. All subjects were required to complete Levels 1 and 2 on both the ITA and TO tests. Thereafter, on both the ITA and TO tests, subjects were eliminated from further testing when they missed eight or more words on two consecutive columns. Therefore, on Levels 3, 4, 5, and 6 there were progressively fewer total attempts on the ITA and TO tests because as the words became more difficult, more subjects were eliminated. The total attempts on Levels 3, 4, 5, and 6 were not the same for the ITA as for TO because the subjects were not able to handle ITA as well as TO and were thus eliminated sooner on the ITA test. At these levels, therefore, there were fewer attempts on the words of the ITA test than those of the TO test.

The percentage of correct responses to the total attempts on each word was then calculated to indicate the degree of difficulty for each word on each test. A ratio of ITA to TO was then computed for each word by dividing the per cent of correct ITA responses by the per cent of correct TO responses. This procedure was followed because such a ratio would give an indication of the relative difficulty of each word on each test apart from the number of attempts. The smaller the ratio the larger the difference in favor of the TO medium. As Table 23 shows,

TABLE 23

COMPARISON OF ITA AND TO WORD SCORES

Level 1

Word		ITA			TO			Ratio of ITA Per Cent to TO Per Cent
ITA	TO	Total Correct	Total Attempts	Per Cent Correct	Total Correct	Total Attempts	Per Cent Correct	
ʃhee	she	41	456	9.0	445	456	97.6	9.2
fiend	find	137	456	30.0	421	456	92.3	32.5
hou	how	223	456	48.9	433	456	95.0	51.5
ried	ride	279	456	61.2	439	456	96.3	63.6
træn	train	292	456	64.0	446	456	97.8	65.4
wauk	walk	304	456	66.7	440	456	96.5	69.1
nue	new	306	456	67.1	436	456	95.6	70.2
cum	come	312	456	68.4	446	456	97.8	70.0
baul l	ball	312	456	68.4	451	456	98.9	69.2
jumpt	jumped	335	456	73.5	433	456	95.0	77.4
zω	zoo	346	456	75.9	454	456	99.6	76.2
ʧhaŋk	thank	362	456	79.4	400	456	87.7	90.5
gess	guess	370	456	81.1	418	456	91.7	88.4
nevɛr	never	378	456	82.9	384	456	84.2	98.5
frend	friend	396	456	86.8	411	456	90.1	96.3
az	as	397	456	87.1	416	456	91.2	95.5
hav	have	403	456	88.4	446	456	97.8	90.4
muʧhɛr	mother	409	456	89.7	454	456	99.6	90.1
about	about	425	456	93.2	431	456	94.5	98.6
faʧhɛr	father	437	456	95.8	444	456	97.4	98.4
out	out	438	456	96.1	445	456	97.6	98.5
littl	little	444	456	97.4	454	456	99.6	97.8

TABLE 23--Continued

Level 2

Word		ITA			TO			Ratio of ITA Per Cent to TO Per Cent
ITA	TO	Total Correct	Total Attempts	Per Cent Correct	Total Correct	Total Attempts	Per Cent Correct	
woʃh	wash	22	456	4.8	379	456	83.1	5.8
garɑʒ	garage	158	456	34.6	310	456	68.0	50.9
flœ	flew	177	456	38.8	365	456	80.0	48.5
cær	care	183	456	40.1	357	456	78.3	51.2
jœi	joy	241	456	52.9	381	456	83.6	63.3
suet	suit	243	456	53.3	336	456	73.7	72.3
nauty	naughty	265	456	58.1	284	456	62.3	93.3
stœd	stood	273	456	59.9	361	456	79.2	75.6
plæt	plate	274	456	60.1	350	456	76.8	78.3
mœst	most	274	456	60.1	381	456	83.6	71.9
claun	clown	291	456	63.8	445	456	97.6	65.4
kiet	kite	295	456	64.7	392	456	86.0	75.2
bækery	bakery	296	456	64.9	327	456	71.7	90.5
ʧeck	check	321	456	70.4	348	456	76.3	92.3
rœf	roof	338	456	74.1	392	456	86.0	86.2
lœv	leave	342	456	75.0	375	456	82.2	91.2
whisl	whistle	345	456	75.7	364	456	79.8	94.9
stroŋ	strong	349	456	76.5	370	456	81.1	94.3
gon	gone	351	456	77.0	394	456	86.4	89.1
jœk	joke	353	456	77.4	379	456	83.1	93.1
visit	visit	369	456	80.9	381	456	83.6	96.8
catʧ	catch	372	456	81.6	391	456	85.7	95.2

TABLE 23--Continued

Level 3

Word		ITA			TO			Ratio of ITA Per Cent to TO Per Cent
ITA	TO	Total Correct	Total Attempts	Per Cent Correct	Total Correct	Total Attempts	Per Cent Correct	
ʃʍt	shoot	83	344	24.1	342	441	77.6	31.1
uɛʒueally	usually	114	344	33.1	290	441	65.8	50.3
hʍp	hoop	144	344	41.9	302	441	68.5	61.2
edʒ	edge	151	344	43.9	323	441	73.2	60.0
raŋ	rang	154	344	44.8	320	441	72.6	61.7
bʊns	bounce	173	344	50.3	313	441	71.0	70.8
siɛs	size	176	344	51.2	355	441	80.5	63.6
eksept	except	210	344	61.0	281	441	63.7	95.8
miend	mind	211	344	61.3	352	441	79.8	76.8
taʊt	taught	262	344	76.2	315	441	71.4	106.7
clœvɛɾ	clover	263	344	76.5	275	441	62.4	122.6
blæm	blame	266	344	77.3	350	441	79.4	97.4
dubl	double	277	344	80.5	352	441	79.8	100.9
fellœ	fellow	277	344	80.5	318	441	72.1	111.7
leðheɾ	leather	303	344	88.1	322	441	73.0	120.7
θum	thumb	304	344	88.4	338	441	76.6	115.4
æbl	able	306	344	89.0	355	441	80.5	110.6
gœlden	golden	310	344	90.1	355	441	80.5	111.9
helθ	health	314	344	91.3	339	441	76.9	118.7
gaðheɾ	gather	319	344	92.7	345	441	78.2	118.5
silveɾ	silver	323	344	93.9	351	441	79.6	118.0
zæbra	zebra	332	344	96.5	365	441	82.8	116.5

TABLE 23--Continued

Level 4

Word		ITA			TO			Ratio of ITA Per Cent to TO Per Cent
ITA	TO	Total Correct	Total Attempts	Per Cent Correct	Total Correct	Total Attempts	Per Cent Correct	
næld	nailed	100	282	35.5	338	356	94.9	37.4
crωked	crooked	135	282	47.9	212	356	59.6	80.4
whœ	whoa	136	282	48.2	201	356	56.5	85.3
couϱh	couch	139	282	49.3	225	356	63.2	78.0
rωl	rule	145	282	51.4	339	356	95.2	54.0
wiep	wipe	150	282	53.2	309	356	86.8	61.3
jau	jaw	181	282	64.2	327	356	91.9	69.9
poliʃh	polish	182	282	64.5	290	356	81.5	79.1
saus	sauce	196	282	69.5	297	356	83.4	83.3
coil	coil	212	282	75.2	261	356	73.3	102.6
wæd	wade	216	282	76.6	317	356	89.0	86.1
ϱhærman	chairman	224	282	79.4	348	356	97.8	81.2
swiŋiŋ	swinging	233	282	82.6	327	356	91.9	89.9
agrœd	agreed	249	282	88.3	303	356	85.1	103.8
spaŋkiŋ	spanking	251	282	89.0	315	356	88.5	100.6
magazœn	magazine	261	282	92.6	306	356	86.0	107.7
cort	court	262	282	92.9	299	356	84.0	110.6
hœrœ	hero	262	282	92.9	327	356	91.9	101.1
juenior	junior	265	282	94.0	328	356	92.1	102.1
wurry	worry	266	282	94.3	340	356	95.5	98.7
sərvant	servant	274	282	97.2	329	356	92.4	105.2
kiŋdom	kingdom	281	282	99.6	350	356	98.3	101.3

TABLE 23--Continued

Level 5

Word		ITA			TO			Ratio of ITA Per Cent to TO Per Cent
ITA	TO	Total Correct	Total Attempts	Per Cent Correct	Total Correct	Total Attempts	Per Cent Correct	
hierd	hired	63	249	25.3	260	327	79.5	31.8
lunʒ	lunge	67	249	26.9	171	327	52.3	51.4
whiend	whined	104	249	41.8	205	327	62.7	66.7
ouns	ounce	114	249	45.8	286	327	87.5	52.3
goŋz	gongs	117	249	47.0	282	327	86.2	54.5
duteɛz	duties	132	249	53.0	277	327	84.7	62.6
hæl	hail	139	249	55.8	312	327	95.4	58.5
undaunted	undaunted	145	249	58.2	202	327	61.8	94.2
ʃhuddɛr	shudder	154	249	61.8	255	327	78.0	79.2
scrɷ	screw	169	249	67.9	297	327	90.8	74.8
siŋgl	single	170	249	68.3	287	327	87.8	77.8
mæor	mayor	185	249	74.3	295	327	90.2	82.4
pleʒuer	pleasure	192	249	77.1	305	327	93.3	82.6
pledʒ	pledge	192	249	77.1	310	327	94.8	81.3
faun	fawn	200	249	80.3	299	327	91.4	87.9
ʃheriff	sheriff	206	249	82.7	286	327	87.5	94.5
uthɛrwiɛz	otherwise	209	249	83.9	319	327	97.6	86.0
harth	hearth	210	249	84.3	178	327	54.4	155.0
hardʃhip	hardship	231	249	92.8	316	327	96.6	96.1
boiliŋ	boiling	233	249	93.6	293	327	89.6	104.5
fœvɛr	fever	236	249	94.8	268	327	82.0	115.6
grant	grant	238	249	95.6	288	327	88.1	108.5

TABLE 23--Continued

Level 6

Word		ITA			TO			Ratio of ITA Per Cent to TO Per Cent
ITA	TO	Total Correct	Total Attempts	Per Cent Correct	Total Correct	Total Attempts	Per Cent Correct	
yœkt	yoked	69	210	32.9	268	309	86.7	37.9
siets	sites	78	210	37.1	215	309	69.6	53.3
brœd	brood	80	210	38.1	122	309	39.5	96.5
whens	whence	115	210	54.8	210	309	68.0	80.6
operæʃhon	operation	120	210	57.1	274	309	88.7	64.4
toŋ	tongue	137	210	65.2	285	309	92.2	70.7
boihœd	boyhood	139	210	66.2	307	309	99.4	66.6
fasinæt	fascinate	151	210	71.9	219	309	70.9	101.4
ʃhack	shack	153	210	72.9	235	309	76.1	95.8
aŋkl	ankle	160	210	76.2	283	309	91.6	83.2
væs	vase	163	210	77.6	290	309	93.9	82.6
cluŋ	clung	171	210	81.4	246	309	79.6	102.2
matœrial	material	172	210	82.0	214	309	69.3	118.3
ʧhaʧh	thatch	175	210	83.3	285	309	92.2	90.3
vœt	vote	175	210	83.3	305	309	98.7	84.4
ræzor	razor	180	210	85.7	275	309	89.0	96.3
puɾpos	purpose	181	210	86.2	236	309	76.4	112.8
moist	moist	188	210	89.5	255	309	82.5	108.5
captuer	capture	190	210	90.5	302	309	97.7	92.6
juʤ	sponge	198	210	94.3	231	309	74.8	126.1
reɹult	result	198	210	94.3	266	309	86.1	109.5
weddiŋ	wedding	207	210	98.6	290	309	93.9	105.0

there was a wide range of difference in percentage ratios among the words on the tests. Although considerable evidence of transfer was apparent overall, the fact that the ratio was low in certain instances indicates that a transfer problem exists on some words. The principal purpose of the comparison of the word scores was to identify the sources of difficulty in these cases.

In order to identify the factors which interfered with transfer from TO to ITA, as well as those factors which facilitated transfer, a further analysis was made of the 132 words making up the tests. It appeared that the best procedure was to group the words according to level of difficulty, using the percentage ratio and the percentage of correct responses to TO words as indicators of difficulty. Therefore, words were identified which fell into the following categories: (1) a low ITA to TO percentage ratio, (2) a high ITA to TO percentage ratio, and (3) a low percentage of correct responses to the TO word.

WORDS WITH THE LOWEST TRANSFER FROM TO TO ITA

The words with the lowest ITA to TO percentage ratio would, of course, be the ones showing the lowest transfer from TO to ITA. The words which were placed in this category were those showing an ITA to TO ratio of less than 60 per cent. The substitutions which the children made on these words when read in ITA were then studied in

an effort to identify the reason why the transfer was low. Refusals to answer and mispronunciations, as well as substitutions, were scored as incorrect responses. However, only substitutions provided enough information to be used for the purposes of this analysis. Table 24 shows the most common substitutions for the 18 words in which the ITA to TO ratio was less than 60 per cent. The substitutions made for these words revealed considerable consistency although the consistency was greater in the later grades than in the early grades.

The three most difficult words on the ITA test were woʃh (wash), ʃhɛɛ (she), and ʃhʊt (shoot). It should be noted that all three words contain the character ʃh. The inference is that this character may have caused the trouble. An examination of the most common substitutions made on these words lends support to this interpretation. Take the word woʃh, for example. Note that wolf was the most common substitution on this word. Now compare the shape or form of the words concerned. The shape or form of woʃh is more like that of wolf than it is like that of wash. Thus, if shape or form is used as a cue, it is easy to understand how woʃh may be read as wolf rather than wash. By the same token, ʃhɛɛ looks more like the or thee than it looks like she, and even the external configuration of ʃhʊt resembles the outline of thought and hoot as much as it does the outline of shoot. The substitution of he for ʃhɛɛ and of hoot for ʃhʊt suggests

TABLE 24

ANALYSIS OF SUBSTITUTIONS MADE ON
THE MOST DIFFICULT ITA WORDS

Word		Level	Ratio	Total	Most Common	Frequency of
ITA	TO		ITA to TO	Substitutions	Substitutions	Substitutions
woʃh	wash	2	5.8	342	wolf	237
ʃhæ	she	1	9.2	274	the he thee	60 57 47
ʃhɷt	shoot	3	31.1	191	thought hoot	30 24
hierd	hired	5	31.8	167	heard	159
fiend	find	1	32.5	230	friend fiend	141 51
næld	nailed	4	37.4	88	kneeled	29
yœkt	yoked	6	37.9	25	yoke	18
flɷ	flew	2	48.5	219	flow fly	94 62
uezueally	usually	3	50.3	110	unusually unusual	31 21

TABLE 24--Continued

Word ITA	Word TO	Level	Ratio ITA to TO	Total Substitutions	Most Common Substitutions	Frequency of Substitutions
gara3	garage	2	50.9	101	grade graze	26 18
cær	care	2	51.2	231	car	200
lun3	lunge	5	51.4	130	lungs lung	52 44
hɑu	how	1	51.5	143	who hoe	47 40
ɑun s	ounce	5	52.3	75	owns	59
siets	sites	6	53.3	108	seats suits	38 25
rɷl	rule	4	54.0	112	roll	85
goŋs	gongs	5	54.5	51	gone	8
hæl	hail	5	58.5	102	heal	65

that the subjects recognized the h but not the forepart of the character ʃh and, therefore, ignored the forepart and reacted as if the word started with h. The substitution of the or thee for ʃhæ and the substitution of thought for ʃhɑt suggests that children tended to give the th (ð) sound rather than the sh (ʃ) sound for that character in those cases where decoding was a factor. In any case, the ʃh character seemed to be the fly in the ointment.

The influence of word shape or form is also apparent in the case of hɨrd (hired) on which the most common substitution was heard. Heard has the shape as hɨrd; thus, a child reacting to shape or form could easily come up with heard for hɨrd because of this similarity. It is true that hired also has the same shape as hɨrd but heard is a more familiar word. Such an error also suggests that the children did not assign the ī sound to the ɨe. The substitution of seats and suits for sɨts (sites) would appear to be another example of the failure of ɨe to suggest the long ī sound. It may also be an additional example of a mistaken reaction to word shape or form since both seats and suits conform to the configuration of sɨts.

Younger children tended to substitute friend for fɨnd (find)while older children tended to substitute fiend for fɨnd. fɨnd looks so much like friend that it is easy to understand how young children would have difficulty telling the difference between the word pictures. Nor is it surprising that older children would substitute fiend

for fiend. After all, the spelling is the same except that the i and e are connected in fiend. In a sense, they are identical words.

flω (flew) was commonly misread as flow. It is clear that the difficulty with this word was caused by the character ω since the subjects did respond correctly to the fl sound as is indicated by the fact that fly was substituted so frequently. Other less frequent substitutions also included the same initial sound, e.g., flunk, flower, flee, flute, floor, and flat. The ω character also seemed to have been the source of difficulty with rωl (rule).

Another ITA character which caused difficulty was ʒ. It is clear from the most common substitutions made on garaʒ (garage) and lunʒ (lunge) that the children were uncertain as to what sound to attach to the ʒ. Hence, this is another ITA character which may be classified with those which caused the most difficulty. The same character also appeared in the word ueʒueally (usually), another of the words in the most difficult list of ITA words. However, the most common substitutions on this word seem more to reflect the influence of word structure than a failure to assign the correct sound to ʒ. This explanation would seem to apply especially to the substitution of unusually for ueʒueally.

In the case of næld (nailed) and hæl (hail) it appears from the most common substitutions that for one who has learned to read by TO, the æ character tends to

be given the ē sound. However, this analysis does not apply to the substitution of car for cær (care). Here, the appearance of the word as a whole seems to be involved. The pattern cær may simply be more suggestive of car than care, especially since car is more familiar to children than care.

The substitution of who and hoe for hœu (how) suggests a failure to associate the correct sound with œu. The same may be said for the substitution of owns for œuns. However, the influence of word shape or structure is also apparent in the latter mistake.

In the case of yœkt (yoked) 18 of the 25 substitutions were yoke. The unconventional use of the t at the end of the word as printed in ITA may have caused the difficulty. œ is an unfamiliar character, but the eight other words in the test containing this symbol did not cause the same degree of difficulty as yœkt. It is doubtful, therefore, that the œ character was the source of difficulty with yœkt.

The substitutions for gonɡs (gongs) were too diversified to identify the most probable cause of difficulty. Neither the ɡ nor s character was a particular source of difficulty in the other words in the test in which they appeared. It is possible that a combination of the two ITA symbols appearing in the same word was bothersome to the subjects.

WORDS WITH THE HIGHEST TRANSFER FROM TO TO ITA

The words with a high correct response rate and a high percentage ratio between ITA and TO are shown by level in Table 25. The criteria employed to select these words were a correct response rate of 75 per cent or above on both ITA and TO tests and an ITA to TO ratio above 90 per cent. Words with a low correct response rate but with a high ITA to TO percentage ratio were not included here because such words will be discussed in the next section dealing with the difficult TO words. Otherwise only the judge - sponge combination was eliminated. Forty-eight words satisfied the criteria applied. This is a high number as compared with words of a very low ITA to TO ratio. Nearly all of the words in Table 25 exhibited one of two characteristics: (1) the total structure of these words in both prints is practically the same or at least very similar, or (2) the ITA word is similar to the word as it would be spelled phonetically in TO, e.g., friend (frend). The implication is that one or the other of these factors accounts for the high transfer rate from TO to ITA on these words.

As shown in Table 25, there was a total of 24 words on Levels 3, 4, 5, and 6 in which the percentage of correct ITA responses was greater than the percentage of correct TO responses. These are the words with a percentage ratio greater than 100 per cent. These words actually appear to give ITA an advantage. However, this effect is

TABLE 25

WORDS WITH THE HIGHEST TRANSFER
FROM TO TO ITA

Word		Level	Per Cent of Correct Responses		Ratio
ITA	TO		ITA	TO	
thaŋk	thank	1	79.4	87.7	90.5
nevɚ	never	1	82.9	84.2	98.5
frend	friend	1	86.8	90.1	96.3
az	as	1	87.1	91.2	95.5
hav	have	1	88.4	97.8	90.4
muðɚ	mother	1	89.7	99.6	90.1
about	about	1	93.2	94.5	98.6
faðɚ	father	1	95.8	97.4	98.4
out	out	1	96.1	97.6	98.5
littl	little	1	97.4	99.6	97.8
lɛv	leave	2	75.0	82.2	91.2
whisl	whistle	2	75.7	79.8	94.9
stroŋ	strong	2	76.5	81.1	94.3
gon	gone	2	77.0	86.4	89.1
jœk	joke	2	77.4	83.1	93.1
vizit	visit	2	80.9	83.6	96.8
catʃ	catch	2	81.6	85.7	95.2
blæm	blame	3	77.3	79.4	97.4
dubl	double	3	80.5	79.8	100.9
θum	thumb	3	88.4	76.6	115.4
æbl	able	3	89.0	80.5	110.6
gœlden	golden	3	90.1	80.5	111.9
helθ	health	3	91.3	76.9	118.7
gaðɚ	gather	3	92.7	78.2	118.5
silvɚ	silver	3	93.9	79.6	118.0
zœbra	zebra	3	96.5	82.8	116.5
agrɛd	agreed	4	88.3	85.1	103.8
spaŋkiŋ	spanking	4	89.0	88.5	100.6
magazœn	magazine	4	92.6	86.0	107.7
cort	court	4	92.9	84.0	110.6
hɛrœ	hero	4	92.9	91.9	101.1
juɛnior	junior	4	94.0	92.1	102.1
wurry	worry	4	94.3	95.5	98.7
sɚvant	servant	4	97.2	92.4	105.2
kiŋdom	kingdom	4	99.6	98.3	101.3

TABLE 25--Continued

Word		Level	Per Cent of Correct Responses		Ratio
ITA	TO		ITA	TO	
ʃeriff	sheriff	5	82.7	87.5	94.5
hardʃip	hardship	5	92.8	96.6	96.1
boiliŋ	boiling	5	93.6	89.6	104.5
fɛvɚ	fever	5	94.8	82.0	115.6
grant	grant	5	95.6	88.1	108.5
cluŋ	clung	6	81.4	79.6	102.2
ϑatʃ	thatch	6	83.3	92.2	90.3
rɛzor	razor	6	85.7	89.0	96.3
puɹpos	purpose	6	86.2	76.4	112.8
moist	moist	6	89.5	82.5	108.5
captuɚ	capture	6	90.5	97.7	92.6
rɛsult	result	6	94.3	86.1	109.5
weddiŋ	wedding	6	98.6	93.9	105.0

largely an artifact, caused by the greater number of attempts by the subjects on the TO test as compared with the ITA test. The large majority of incorrect responses for these words on the TO test was committed by subjects in the lower grades who had already been eliminated from the ITA test. Although there was this artificial effect, all of the words in this category had a very high rate of correct responses on the ITA test, thereby indicating that transfer from TO to ITA was nevertheless easy on these words for the reasons brought out above.

TRANSFER TO ITA ON THE MOST DIFFICULT TO WORDS

A high ITA to TO ratio did not necessarily mean that the number of correct responses on the words was high. High percentage ratios always resulted when the correct

responses on both the ITA and TO words were equal or nearly equal. Therefore, equally or nearly equally low scores on a word in both tests resulted in a high percentage ratio just as a high correct response rate to a word on both tests resulted in a high percentage ratio.

Since the whole idea of ITA is to make word recognition easier by having but one sound for each of the 44 characters in the ITA alphabet, a study was made of those TO words on which the percentage of correct responses was less than 75 per cent, with the judge - sponge combination excepted. As shown in Table 26, each of these words was then compared with their ITA counterpart to see if the ITA medium appeared to be advantageous in decoding the more difficult TO words in the tests.

Hearth, which had the highest ITA to TO ratio, was the only word in the entire test in which the actual number of correct ITA responses exceeded the correct TO responses. It was also the only word in which the ITA showed a distinct advantage over the TO medium on all levels. In the case of this particular word, the ITA spelling conforms better to pronounciation than does the TO spelling, which may account for the higher scores on the ITA spelling.

Table 26 indicates that the ITA medium offers no distinct advantage over the TO medium with the one exception of the word hearth (harθ). Generally, the words which were difficult in TO were also difficult in ITA. In fact, the percentage of correct responses on the ITA spellings

TABLE 26

COMPARISON OF THE ITA AND TO RESPONSES ON THE MOST DIFFICULT TO WORDS

Word		Level	ITA			TO		
ITA	TO		Correct	Attempts	% Correct	Correct	Attempts	% Correct
garɑʒ	garage	2	158	456	34.6	310	456	68.0
suet	suit	2	243	456	53.3	336	456	73.7
nauty	naughty	2	265	456	58.1	284	456	62.3
bækery	bakery	2	296	456	64.9	327	456	71.7
uəʒuəally	usually	3	114	344	33.1	290	441	65.8
hʊp	hoop	3	144	344	41.9	302	441	68.5
edʒ	edge	3	151	344	43.9	323	441	73.2
raŋ	rang	3	154	344	44.8	320	441	72.6
bʊns	bounce	3	173	344	50.3	313	441	71.0
eksept	except	3	210	344	61.0	281	441	63.7
tɑut	taught	3	262	344	76.2	315	441	71.4
clœvəɾ	clover	3	263	344	76.5	275	441	62.4
fellœ	fellow	3	277	344	80.5	318	441	72.1
leʃheɾ	leather	3	303	344	88.1	322	441	73.0
crʊked	crooked	4	135	282	47.9	212	356	59.6
whœ	whoa	4	136	282	48.2	201	356	56.5
coʊʧ	couch	4	139	282	49.3	225	356	63.2
cɔil	coil	4	212	282	75.2	261	356	73.3
lunʒ	lunge	5	67	249	26.9	171	327	52.3
whiend	whined	5	104	249	41.8	205	327	62.7
undaunted	undaunted	5	145	249	58.2	202	327	61.8
haɾθ	hearth	5	210	249	84.3	178	327	54.4
siets	sites	6	78	210	37.1	215	309	69.6
brʊd	brood	6	80	210	38.1	122	309	39.5
whens	whence	6	115	210	54.8	210	309	68.0
fasinæt	fascinate	6	151	210	71.9	219	309	70.9
matœrial	material	6	172	210	82.0	214	309	69.3

of the words in Table 26 was also less than 75 per cent on all but a few words. Even these cases, except for the word hearth, are subject to the artificial effect discussed earlier.

CHAPTER V

SUMMARY AND CONCLUSIONS

Problem

This study was concerned with an investigation of the compatibility of traditional orthography (TO) and Pitman's Initial Teaching Alphabet (ITA). ITA is a phonemic alphabet created by Sir James Pitman of England for the purpose of making learning to read easier. It consists of 44 characters, each with a single sound. ITA is designed only to serve as an initial teaching medium. A transfer is made to the regular alphabet around the end of the 1st year.

The main objective of this study was to measure the transfer from TO to ITA. This approach to the transfer problem is based on the assumption that if significant transfer occurs from TO to ITA, the same factors would promote transfer from ITA to TO. The usual way in which investigators have tackled the transfer problem in the past has been to test ITA taught children on TO material. However, this approach introduces some nuisance variables which may tend to bias the results. These variables concern the ages of the children at the time the transfer is made,

the exposure to TO which occurs apart from ITA classes, and the Hawthorne Effect. In order to escape these factors, this study investigated the transfer problem from the opposite direction by testing TO taught children on ITA material. This approach is based on the assumption that if significant transfer occurs from TO to ITA, the same factors would promote transfer from ITA to TO.

Additional questions investigated included: (1) How does the ability to read ITA depend on the subject's ability to read TO? (2) How does the ability to read ITA depend on the intelligence of the subjects? (3) What age effects are discernible? (4) To what extent is the sex of the subjects a factor in relation to the transfer problem? (5) To what extent is socio-economic status a factor in relation to the transfer problem? (6) How does the amount of transfer vary according to the nature of the word?

An investigation of these questions is timely in view of the current interest in ITA. A study of the transfer problem is especially significant since it gets at the heart of any technique which introduces children to reading through a modified alphabet.

Procedure

The subjects for this study were obtained from the Maumee Public Schools, Maumee, Ohio, a predominately middle-class suburb of Toledo. There were 38 boys and 38 girls in each of Grades 1 through 6 selected randomly from two

elementary schools. These subjects totaled 456 children. The boys and girls in each grade had comparable IQs. The IQs were also reasonably comparable from grade to grade. None of these pupils had ever been exposed to ITA before.

The investigator developed a word recognition test of 132 words in both an ITA and TO version. A word recognition test was used in order to eliminate context as a clue. The words were grouped according to level of difficulty, 1 through 6, with each level consisting of 22 words. Three forms of each test were constructed. The same words were used in each form, only the word order was changed. A method of systematic serial variation was used to administer the test. The three forms of each test helped to control the effect of word order on the results.

The tests were administered in May, 1966, with the ITA test given 8 days prior to the TO test. The ITA test was given first because it was believed there would be less memory effect from ITA to TO than from TO to ITA. The tests were administered by senior students in a psychology class from a nearby university. In an effort to standardize the testing procedure, a workshop was conducted by the investigator and a reading specialist from the school system to prepare the examiners for the testing. This workshop was followed by additional orientation and a practice session at the schools where the testing was done.

The procedure required the subjects to respond

orally to the words of the test. The examiners recorded these responses on a sheet prepared for this purpose. Each child was tested by the same examiner on both the ITA and TO tests.

For the measurement of intelligence the California Short Form Test of Mental Maturity, 1963, was used. This test was also administered in May, 1966, a few days following the ITA and TO tests. The mental tests were administered by the classroom teachers after a proper briefing.

The socio-economic status of the children was obtained by the use of Warner's Revised Scale for Rating Occupation. The classification was done by the investigator and the school psychologist.

All of the information which the investigation required on each child was coded on IBM cards. These data were then put through an appropriate computer program.

Results

The results may be reported in three parts: (1) comparison of mean scores on the ITA and TO tests, (2) correlations between ITA and TO scores, and (3) comparison of the word scores on the ITA and TO tests.

The comparisons of the mean scores on the ITA and TO tests yielded the following results:

1. In all comparisons by grade, sex, and total subjects, the mean scores on the TO test were significantly higher than the mean scores on the ITA test.

Even so, the mean ITA scores were never less than half as high as the mean TO scores. The ratio of the difference between the mean ITA and TO scores varied between 56 and 78 depending on the grade.

2. The mean scores on both tests generally increased with grade level although the differences between grades tended to decrease as the grade level increased.

3. The absolute differences between the mean scores in favor of TO increased with grade level, but the relative differences tended to decrease at least through Grade 5.

4. A two-way analysis of variance of the ITA and TO mean scores with comparisons made between sexes and grades revealed a significant difference between grades on both the ITA and TO tests and a significant difference on the TO test in favor of the girls. The comparison for sex by grade interaction was not significant on either test.

5. The mean scores of both the boys and girls were significantly higher on the TO test than on the ITA test in all six grades. However, girls tended to have higher mean scores than boys on both the ITA and TO tests but a significant difference in favor of the girls was found only in Grade 3 of the TO test.

6. A comparison of the mean ITA and TO scores by socio-economic status showed significant differences in favor of the TO test at all levels except one where the number of cases was so small as to void the comparison. A

one-way analysis of variance revealed that there were no significant differences in the mean scores on either test between the occupational levels.

The following results were obtained from the correlational analysis:

1. The correlations obtained between the ITA and TO scores by grade, sex, and total subjects were all highly significant.

2. The correlations obtained between the ITA and TO test scores and IQ by grade, sex, and total subjects were significantly high.

3. The correlations obtained between the ITA and TO test scores by grade, sex, and total subjects with IQ held constant remained significantly high without exception.

4. Few significant differences were found between correlations among grades either by sex or total subjects. Generally, the highest correlations were obtained in the lower grades.

The results of the comparisons between word scores were as follows:

1. The ability of the subjects to transfer from TO to ITA varied considerably according to the composition of the words although there were many more words with high transfer from TO to ITA than there were words with low transfer.

2. The three most difficult words in the ITA

test all contained the ʃh character. Other difficult words on the ITA test included the characters ω, iẹ, æ, ʒ, and ɑu.

3. The substitutions made on the most difficult words of the ITA test tended to preserve the word shape or form of the word printed in ITA.

4. The highest transfer from TO to ITA was found on words in which the total structure of the words in both prints was practically the same or in which the ITA word was similar to the word as it was spelled phonetically in TO.

5. ITA was not found to offer an advantage to the subjects when it comes to decoding the most difficult words of the TO test. Generally, the words which were difficult in TO were also difficult in ITA. Hearth was the only word in the test with a higher number of correct responses in ITA than in TO.

Discussion of Results

The comparison of mean scores clearly showed that transfer does take place from TO to ITA without prior experience with ITA. However, the transfer was not complete at any of the ages investigated. While the proportion of transfer increased up to Grade 5, it appeared to level off at that point. The inference to be drawn from these findings is that complete transfer might never be reached without some practice with ITA print. Even adult readers not previously exposed to ITA print, as the investigator learned

from informal tests, cannot read ITA without encountering some difficulty. The presumption is that the transfer from ITA to TO would introduce similar problems.

The high correlations which were found between the ITA and TO scores mean that children who made high scores on the TO test also tended to make comparatively high scores on the ITA test. In other words, ability to perform on the TO test bore a high positive relationship with the ability to perform on the ITA test. This finding may be regarded as further evidence of the compatibility of ITA and TO. The correlations remained high even with IQ held constant indicating that IQ alone does not account for the high relationships between the ITA and TO test scores. The fact that the highest correlations were found in the lower grades may be a function of the fact that the scores were based on a word recognition test. Word recognition is the principal component of reading achievement in the beginning stages. A word recognition test, therefore, might tend to account for a larger share of the variance at those ages.

Downing (1967) has called attention to the need for investigations designed to determine how the forms of ITA characters might be modified to maximize the compatibility of ITA and TO. Insofar as the results of this investigation are concerned, the character which appears to need the most attention in this regard is ʃh. This was clearly the most troublesome of the 44 ITA characters. It was present in all three of the most difficult words in the ITA test. A study

of the substitutions made on these three words suggests that this character makes for a difference between the word form of the ITA and TO spellings and that it also tends to elicit the wrong sound from the children. Changing the character to make it look more like sh would eliminate these sources of confusion. For the same reasons consideration might be given to the redesign of ω, je, æ, ʒ, and ou although these characters were not as troublesome as ʃh.

The influence of word shape or structure as a cue was evident in many of the substitutions made by the children on the ITA test. This finding may result from the fact that ITA was deliberately designed to preserve the pattern of the same words printed in TO. Special attention was given the upper half of the pattern since research has shown that the upper half of the pattern has greater cue value than the lower half, probably because the upper half has a more distinctive coastline than the lower half. This effort to relate the pattern of the ITA spelling to that of the TO spelling of the same word may not be an unmixed blessing since the ITA spelling may suggest a number of different TO words with the same pattern, as a consequence of which confusion results. At least this seems to be the case when children who have learned to read by TO are tried out on a test printed in ITA. It might be well to remember in passing that the Maumee Schools use the Scott, Foresman basal readers to teach reading. This series teaches the first words as sight words by the whole word or look-and-say

method, followed by a gradual introduction to phonics. This approach features the word shape or form as a cue and hence may serve to exaggerate the problem discussed in this paragraph. A decoding approach might have produced different results. The latter approach might create a larger problem with respect to the sound to assign to a particular grapheme when transferring from one alphabet to another.

Sex differences in favor of girls were not as large as might have been expected from previous research. Girls tended to make higher scores than boys on both tests, but the only significant difference in favor of girls was found on the TO test at the 3rd grade level. No solid evidence was found that girls transfer more readily from TO to ITA than do boys. It is not clear from the present results that ITA would give either sex an advantage.

Significant variations according to socio-economic status were also not obtained, contrary to the findings of previous research. The results obtained for each occupational group tended to conform to the total group results. Moreover, occupation did not appear to be a factor with respect to the ability to transfer from TO to ITA.

Conclusions

The results of this investigation appear to warrant the following conclusions:

1. Children are able to transfer from TO to

ITA without previous practice with ITA, but the transfer is not complete.

2. Complete transfer from TO to ITA is not likely to occur at any age level without previous experience with ITA.

3. The highest transfer from TO to ITA occurs on words in which the spelling is virtually the same or in which the ITA word is similar to the word as it is spelled phonetically in TO.

4. The lowest transfer from TO to ITA occurs on 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.

5. Words which are difficult in TO are also likely to be difficult in ITA.

6. The compatibility of the two alphabets might be increased be redesigning certain ITA characters, particularly ʃh.

7. The ability to transfer from TO to ITA is positively related to the ability to read TO.

8. Intelligence alone does not account for the close relationship between the ITA scores and the child's ability to read TO.

9. Sex is not a factor in the ability to transfer from TO to ITA.

10. Socio-economic status is not a factor in the ability to transfer from TO to ITA.

It is recognized that these conclusions are subject to the conditions of this particular investigation and it should be emphasized that there is no intent to generalize beyond these limits.

APPENDIX A

OCCUPATION RATING

SCALE

REVISED SCALE FOR RATING OCCUPATION

Rating Assigned to Occupation	Professionals	Proprietors and Managers
1	Lawyers, doctors, dentists, engineers, judges, high school superintendents, veterinarians, ministers (graduated from divinity school), chemists, etc. with post-graduate training, architects	Businesses valued at $75,000 and over
2	High school teachers, trained nurses, chiropists, chiropractors, undertakers, ministers, (some training) newspaper editors, librarians (graduate)	Businesses valued at $20,000 to $75,000
3	Social workers, grade school teachers, optometrists, librarians (not graduate), undertaker's assistants, ministers (no training)	Businesses valued at $5,000 to $20,000
4		Businesses valued at $2,000 to $5,000
5		Businesses valued at $500 to $2,000
6		Businesses valued at less than $500

REVISED SCALE FOR RATING OCCUPATION--Continued

Rating Assigned to Occupation	Business Men	Clerks and Kindred Workers, Etc.
1	Regional and divisional managers of large financial and industrial enterprises	Certified public accountants
2	Assistant managers and office and department managers of large businesses, assistants to executives, etc.	Accountants, salesmen of real estate, of insurance, postmasters
3	All minor officials of businesses	Auto salesmen, bank clerks and cashiers, postal clerks, secretaries to executives, supervisors of railroad, telephone, etc., justices of the peace
4		Stenographers, bookkeepers, rural mail clerks, railroad ticket agents, sales people in dry goods store
5		Dime store clerks, hardware salesmen, beauty operators, telephone operators

REVISED SCALE FOR RATING OCCUPATION--Continued

Rating Assigned to Occupation	Manual Workers	Protective and Service Workers
3	Contractors	
4	Factory foremen, electricians, plumbers, carpenters, watchmakers who owns business	Drycleaners, butchers, sheriffs, railroad engineers and conductors
5	Carpenters, plumbers, electricians (apprentice) timekeepers, linemen, telephone or telegraph, radio repairmen, medium-skill workers	Barbers, firemen, butcher's apprentices, practical nurses, policemen, seamstress, cooks in restaurant, bartenders
6	Moulders, semi-skilled workers, assistants to carpenter, etc.	Baggage men, night policemen and watchmen, taxi and truck drivers, gas station attendants, waitresses in restaurant
7	Heavy labor, migrant work, odd-job men, miners	Janitors, scrubwomen, newsboys

REVISED SCALE FOR RATING OCCUPATION--Continued

Rating Assigned to Occupation	Farmers
1	Gentleman farmers
2	Large farm owners, farm owners
5	Tenant farmers
6	Small tenant farmers
7	Migrant farm laborers

APPENDIX B

EXAMINER'S KIT

TEST ADMINISTRATOR'S GUIDE

PLAN OF ORIENTATION:

In order to prepare for smooth and correct administration, the following orientation program has been planned:

1. Brief explanation of the initial teaching alphabet, purpose of the testing, general plans and specific directions about administration - establishing rapport, marking responses, terminating testing, etc.

2. Time to examine all i/t/a and t.o. forms, self administration, establishment of a sense of timing.

3. Administration to another student examiner and recording of his responses.

4. Questions

5. Administration of the test to some elementary students. The purpose of this is to become skilled in establishing rapport, marking responses and judging timing. The results will not be tabulated as part of the experiment.

6. Questions

TESTING SCHEDULE:

Each student examiner will spend two full days in testing, first with the i/t/a test, then hearing the same children a week later read the t.o. words. The test sessions for two or three students reading the i/t/a test and another two or three students using the t.o. test will be recorded on tape.

Specific testing dates have not been determined.

BACKGROUND MATERIAL ON I/T/A:

The initial teaching alphabet recently has been the recipient of much attention on the part of educators and lay people alike. In brief, the i/t/a alphabet consists of 44 symbols, including 24 letters of the traditional alphabet. I/t/a has been designed to maintain a consistent relationship between a symbol and a sound. Although it is being used for instruction of slow learners, emotionally disturbed, remedial cases, and adult illiterates, the primary reason for its use is to make reading easier and less confusing for beginners.

PURPOSE OF TESTING:

You have been invited to participate in this program for two reasons:

1. To gain practical experience in administering an individual reading test. You probably have given group tests. Perhaps you watched or helped with the administration of a standardized

test during your student teaching. Experience in administering an individual test may have been lacking, however.

2. Secondly, the data collected will be used to help determine the transfer value of various symbols of the initial teaching alphabet and the ease with which a child who has had no training in i/t/a can read it.

For two years, the Maumee School System has conducted experiments with i/t/a in a few first grade classrooms. These findings, together with other evaluations and test scores, should be helpful in determining whether Maumee's i/t/a program will be expanded or discontinued.

GENERAL PLAN:

As the test administrator, you will ask an elementary school child to read a list of words on two different occasions - once the specially chosen words will be written in the symbols of the initial teaching alphabet; the second time they will be written in t.o. or the regular alphabet. The words on the test have been chosen in regard to the level of basal reader where they are introduced, and word lists by the symbols which are used in writing them.

The test is composed of six levels, grades 1 through 6. The same words are included when the test is printed in i/t/a as when it is in traditional print. Three forms of the i/t/a test and three forms of the t.o. test are available. The same words are found on each form, but the word arrangement is different.

The child will attempt to read the words from a form of the i/t/a test during the first administration. A week later the same child will be asked to read the same form of the test written in t.o. print.

You will test 15 children, each on two different occasions. Each child you examine will be assigned a form of the test. The same form (in the different orthographies) will be used each time.

TEST ADMINISTRATION:

The first requirement of the test administrator is to take the test yourself. Sit down and read all the words on the i/t/a version; then do the same with the t.o. edition. Now you know what is expected of the child. As examiner, however, you must learn to mark the responses so they can be interpreted later by a tabulator. Examine the marking system. Record on a separate sheet of paper what the child says as he reads.

a. Mispronunciations

If the child mispronounces a word, record the phonetic markings or write out what is said.
Example: The word is <u>let</u>: the child calls <u>leet</u>. Write it out like that or put a long mark (-) over the <u>e</u>.

b. Substitutions

If the child substitutes a word for the written one, write that beside the correct one.
Example: The word is count. The child says fifty. Write it beside count.

c. Hesitations and Refusals

If the child hesitates longer than five seconds or does not give any response, put an "R" beside the word, tell him what it is, and ask him to continue.
Example: The word is preparation. The child does not know or attempt to pronounce the word while you are silently counting to five (one thousand one, one thousand two, one thousand three, one thousand four, one thousand five). Tell him the word and say "Now go on to the next word".

Be especially careful to practice this counting with a stop watch or a watch with a second hand prior to the testing. Then try it without the watch and attempt to maintain the same speed.

It is also important to supply the word for the child, and specifically tell him to proceed. Otherwise, he may be trying to figure out the unknown word while you are expecting him to read the next word on the list.

d. Corrections

If the child mispronounces or substitutes a word, but then immediately corrects his error, put a small "C" after the mispronunciation or substitution. This will not be counted as an error in the scoring.

TERMINATION OF TESTING:

Continue testing until the child misses eight or more words (excluding corrections) on two consecutive lists. Thank the child and explain that he will not need to read farther.

ESTABLISHING RAPPORT:

Before beginning the testing, try to establish a friendly relationship with the child. Do this by commenting:

> "Hello, Jane. How are you? What a pretty dress you're wearing today. Do you know what we're going to do? I'd like to have you read a list of words for me".

Prior to the testing, the teacher will have explained to the entire class that:

1. Some children individually will be asked to read a list of words.
2. Some of the words will look quite strange but the children should do the best they can.

3. They won't be expected to know every word.
4. They should try to read all the words, but the teacher and the examiner expect them to make some mistakes.
5. The children will be assured that how well (or how poorly) they read will not affect their grades in school.

I

COLUMN 1	COLUMN 2	COLUMN 3
about	cær	helth
shee	catch	thum
hou	nauty	eksept
cum	check	dubl
thangk	cloun	sies
træn	joi	rang
frend	gon	gœlden
never	garaʒ	miend
zœ	strong	gather
nue	suet	edʒ
fiend	flœ	blæm
littl	bækery	ueʒueally
gess	leev	shœt
out	kiet	zeebra
as	plæt	hœp
wauk	rœf	æbl
hav	visit	lether
jumpt	whisl	bouns
muther	mœst	silver
baull	jœk	cloever
ried	stœd	felloe
father	woʃh	taut

I

COLUMN 4	COLUMN 5	COLUMN 6
ꝯhærman	ʃheriff	yœkt
jau	mæor	cluŋ
næld	uſherwieſ	mateerial
saus	harꝯh	ꝯhatꝯh
whœ	hierd	captuer
crœked	boiliŋ	fasinæt
rœl	grant	operæʃhon
juenior	hardʃhip	siets
wurry	luŋ3	jud3
magazeen	ʃhudder	væs
cort	scrœ	brœd
heerœ	goŋſ	toŋ
wæd	whiend	aŋkl
servant	ple3uer	ræzor
kiŋdom	duetees	whens
agreed	undaunted	moist
wiep	pled3	weddiŋ
poliʃh	ouns	reſult
swiŋiŋ	feever	vœt
couꝯh	siŋgl	ʃhack
spaŋkiŋ	faun	boihœd
coil	hæl	purpos

II

COLUMN 1	COLUMN 2	COLUMN 3
nue	gon	æbl
jumpt	strong	edʒ
cum	jœk	zeebra
hav	kiet	silver
zœ	plæt	dubl
træn	cloun	siez
father	visit	ueʒually
wauk	rœf	fellœ
baull	flœ	lether
az	suet	thum
gess	cær	gather
muther	leev	miend
littl	joi	shœt
thangk	whisl	rang
frend	catch	hœp
fiend	garaʒ	helth
shee	stœd	eksept
ried	check	taut
hou	woʃh	cloever
about	nauty	blæm
out	mœst	bouns
never	bækery	gœlden

II

COLUMN 4	COLUMN 5	COLUMN 6
wurry	faun	vœt
crœked	ʃheriff	ƭhatƈh
magazeen	duetees	siets
wæd	mæor	result
juenior	harƭh	moist
wiep	scrœ	whens
kiŋdom	whiend	weddiŋ
heerœ	goŋs	toŋ
jau	luŋz	cluŋ
coil	boiliŋ	captuer
cort	undaunted	ræzor
swiŋiŋ	utherwies	ʃhack
whœ	hierd	judz
saus	feever	boihœd
næld	ʃhudder	purpos
rœl	siŋgl	fasinæt
ƭhærman	hæl	yœkt
poliʃh	hardʃhip	mateerial
couƈh	grant	aŋkl
agreed	ouns	operæʃhon
spaŋkiŋ	pleʒuer	væs
servant	pledz	brœd

III

COLUMN 1	COLUMN 2	COLUMN 3
træn	gon	zɛɛbra
zœ	ʧeck	eksept
baull	strong	æbl
hœu	plæt	miend
wauk	jœk	rang
ʃhɛɛ	visit	helʧh
ried	cloun	taut
frend	whisl	siez
littl	mœst	hœp
ʧhangk	cær	gœlden
az	woʃh	clœver
out	suet	silver
cum	nauty	fellœ
about	catʧh	ʃhœt
muther	kiet	dubl
hav	lɛɛv	edʒ
gess	flœ	ʧhum
nue	garaʒ	lether
jumpt	bækery	blæm
never	stœd	bouns
fiend	joi	ueʒueally
father	rœf	gather

III

COLUMN 4	COLUMN 5	COLUMN 6
swiŋiŋ	whiend	aŋkl
crœked	ſhudder	⟨hatch⟩
magazeen	duetees	result
juenior	harth	mateerial
cort	boiliŋ	fasinæt
wiep	ſheriff	whens
agreed	utherwies	captuer
heeræ	ouns	ræzor
wæd	scrœ	cluŋ
jau	plezuer	moist
wurry	faun	judʒ
couch	goŋs	siets
servant	hierd	boihœd
spaŋkiŋ	undaunted	væs
coil	mæor	weddiŋ
næld	hæl	ſhack
poliſh	grant	brœd
⟨hærman⟩	pledʒ	operæſhon
saus	feever	vœt
kiŋdom	hardſhip	toŋ
whæ	siŋgl	yœkt
rœl	lunʒ	purpos

I

COLUMN 1	COLUMN 2	COLUMN 3
she	clown	double
father	garage	zebra
ride	kite	leather
find	care	gather
train	leave	mind
how	suit	hoop
mother	bakery	edge
about	catch	size
come	check	able
guess	most	blame
new	strong	thumb
as	joke	health
zoo	plate	taught
walk	whistle	rang
have	stood	silver
never	flew	except
ball	roof	usually
jumped	naughty	bounce
little	visit	golden
out	joy	clover
friend	wash	fellow
thank	gone	shoot

I

COLUMN 4	COLUMN 5	COLUMN 6
magazine	screw	capture
hero	sheriff	sites
couch	duties	thatch
jaw	undaunted	razor
swinging	gongs	clung
junior	hearth	moist
wipe	pleasure	wedding
wade	whined	whence
agreed	boiling	fascinate
whoa	fever	tongue
servant	ounce	operation
crooked	grant	sponge
chairman	hired	vote
kingdom	single	yoked
worry	hail	boyhood
nailed	pledge	vase
rule	otherwise	purpose
court	hardship	ankle
sauce	lunge	shack
spanking	fawn	material
polish	mayor	brood
coil	shudder	result

II

COLUMN 1	COLUMN 2	COLUMN 3
friend	joke	edge
never	whistle	zebra
little	care	size
come	check	health
out	gone	mind
have	clown	able
zoo	strong	except
new	catch	hoop
jumped	joy	double
mother	leave	fellow
train	garage	usually
ball	suit	shoot
guess	plate	gather
about	naughty	thumb
walk	wash	leather
how	most	rang
as	stood	blame
ride	flew	clover
find	kite	bounce
she	roof	taught
thank	bakery	golden
father	visit	silver

II

COLUMN 4	COLUMN 5	COLUMN 6
jaw	pleasure	thatch
polish	screw	whence
court	hail	result
whoa	fever	material
kingdom	gongs	clung
servant	ounce	capture
worry	whined	fascinate
sauce	sheriff	sponge
swinging	duties	razor
chairman	fawn	tongue
coil	lunge	operation
rule	boiling	yoked
junior	undaunted	wedding
agreed	hearth	vote
magazine	single	moist
spanking	otherwise	sites
hero	pledge	brood
wipe	hardship	ankle
wade	hired	purpose
nailed	mayor	boyhood
couch	grant	shack
crooked	shudder	vase

III

COLUMN 1	COLUMN 2	COLUMN 3
she	most	edge
father	gone	hoop
walk	joke	health
ride	catch	double
zoo	joy	size
friend	clown	rang
jumped	leave	able
train	suit	zebra
new	whistle	except
ball	garage	usually
have	care	leather
guess	strong	bounce
how	naughty	gather
come	bakery	shoot
thank	stood	golden
as	kite	mind
about	plate	blame
never	flew	thumb
out	wash	clover
find	visit	silver
little	check	fellow
mother	roof	taught

III

COLUMN 4	COLUMN 5	COLUMN 6
magazine	fever	boyhood
swinging	sheriff	moist
junior	gongs	sponge
whoa	pleasure	fascinate
wade	shudder	razor
jaw	whined	yoked
spanking	hired	thatch
agreed	lunge	clung
crooked	ounce	vase
hero	boiling	whence
worry	duties	vote
sauce	screw	sites
couch	otherwise	capture
court	hearth	wedding
chairman	fawn	tongue
nailed	hail	result
polish	pledge	operation
servant	undaunted	material
kingdom	mayor	purpose
coil	single	ankle
rule	grant	shack
wipe	hardship	brood

NAME _____ DATE _____

TEST - i/t/a 1 GRADE _____

PARENT'S OCCUPATION _____ SEX _____

SCHOOL _____

COLUMN 1		COLUMN 2		COLUMN 3	
about	_____	care	_____	health	_____
she	_____	catch	_____	thumb	_____
how	_____	naughty	_____	except	_____
come	_____	check	_____	double	_____
thank	_____	clown	_____	size	_____
train	_____	joy	_____	rang	_____
friend	_____	gone	_____	golden	_____
never	_____	garage	_____	mind	_____
zoo	_____	strong	_____	gather	_____
new	_____	suit	_____	edge	_____
find	_____	flew	_____	blame	_____
little	_____	bakery	_____	usually	_____
guess	_____	leave	_____	shoot	_____
out	_____	kite	_____	zebra	_____
as	_____	plate	_____	hoop	_____
walk	_____	roof	_____	able	_____
have	_____	visit	_____	leather	_____
jumped	_____	whistle	_____	bounce	_____
mother	_____	most	_____	silver	_____
ball	_____	joke	_____	clover	_____
ride	_____	stood	_____	fellow	_____
father	_____	wash	_____	taught	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

TEST - i/t/a 1

COLUMN 4		COLUMN 5		COLUMN 6	
chairman	_____	sheriff	_____	yoked	_____
jaw	_____	mayor	_____	clung	_____
nailed	_____	otherwise	_____	material	_____
sauce	_____	hearth	_____	thatch	_____
whoa	_____	hired	_____	capture	_____
crooked	_____	boiling	_____	fascinate	_____
rule	_____	grant	_____	operation	_____
junior	_____	hardship	_____	sites	_____
worry	_____	lunge	_____	judge	_____
magazine	_____	shudder	_____	vase	_____
court	_____	screw	_____	brood	_____
hero	_____	gongs	_____	tongue	_____
wade	_____	whined	_____	ankle	_____
servant	_____	pleasure	_____	razor	_____
kingdom	_____	duties	_____	whence	_____
agreed	_____	undaunted	_____	moist	_____
wipe	_____	pledge	_____	wedding	_____
polish	_____	ounce	_____	result	_____
swinging	_____	fever	_____	vote	_____
couch	_____	single	_____	shack	_____
spanking	_____	fawn	_____	boyhood	_____
coil	_____	hail	_____	purpose	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

NAME _____ DATE _____

TEST - i/t/a 2 GRADE _____

PARENT'S OCCUPATION _____ SEX _____

SCHOOL _____

COLUMN 1		COLUMN 2		COLUMN 3	
new	_____	gone	_____	able	_____
jumped	_____	strong	_____	edge	_____
come	_____	joke	_____	zebra	_____
have	_____	kite	_____	silver	_____
zoo	_____	plate	_____	double	_____
train	_____	clown	_____	size	_____
father	_____	visit	_____	usually	_____
walk	_____	roof	_____	fellow	_____
ball	_____	flew	_____	leather	_____
as	_____	suit	_____	thumb	_____
guess	_____	care	_____	gather	_____
mother	_____	leave	_____	mind	_____
little	_____	joy	_____	shoot	_____
thank	_____	whistle	_____	rang	_____
friend	_____	catch	_____	hoop	_____
find	_____	garage	_____	health	_____
she	_____	stood	_____	except	_____
ride	_____	check	_____	taught	_____
how	_____	wash	_____	clover	_____
about	_____	naughty	_____	blame	_____
out	_____	most	_____	bounce	_____
never	_____	bakery	_____	golden	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

TEST - i/t/a 2

COLUMN 4		COLUMN 5		COLUMN 6	
worry	_____	fawn	_____	vote	_____
crooked	_____	sheriff	_____	thatch	_____
magazine	_____	duties	_____	sites	_____
wade	_____	mayor	_____	result	_____
junior	_____	hearth	_____	moist	_____
wipe	_____	screw	_____	whence	_____
kingdom	_____	whined	_____	wedding	_____
hero	_____	gongs	_____	tongue	_____
jaw	_____	lunge	_____	clung	_____
coil	_____	boiling	_____	capture	_____
court	_____	undaunted	_____	razor	_____
swinging	_____	otherwise	_____	shack	_____
whoa	_____	hired	_____	judge	_____
sauce	_____	fever	_____	boyhood	_____
nailed	_____	shudder	_____	purpose	_____
rule	_____	single	_____	fascinate	_____
chairman	_____	hail	_____	yoked	_____
polish	_____	hardship	_____	material	_____
couch	_____	grant	_____	ankle	_____
agreed	_____	ounce	_____	operation	_____
spanking	_____	pleasure	_____	vase	_____
servant	_____	pledge	_____	brood	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

NAME _____ DATE _____

TEST - i/t/a 3 GRADE _____

PARENT'S OCCUPATION _____ SEX _____

SCHOOL _____

COLUMN 1		COLUMN 2		COLUMN 3	
train	_____	gone	_____	zebra	_____
zoo	_____	check	_____	except	_____
ball	_____	strong	_____	able	_____
how	_____	plate	_____	mind	_____
walk	_____	joke	_____	rang	_____
she	_____	visit	_____	health	_____
ride	_____	clown	_____	taught	_____
friend	_____	whistle	_____	size	_____
little	_____	most	_____	hoop	_____
thank	_____	care	_____	golden	_____
as	_____	wash	_____	clover	_____
out	_____	suit	_____	silver	_____
come	_____	naughty	_____	fellow	_____
about	_____	catch	_____	shoot	_____
mother	_____	kite	_____	double	_____
have	_____	leave	_____	edge	_____
guess	_____	flew	_____	thumb	_____
new	_____	garage	_____	leather	_____
jumped	_____	bakery	_____	blame	_____
never	_____	stood	_____	bounce	_____
find	_____	joy	_____	usually	_____
father	_____	roof	_____	gather	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

TEST - i/t/a 3

COLUMN 4		COLUMN 5		COLUMN 6	
swinging	_____	whined	_____	ankle	_____
crooked	_____	shudder	_____	thatch	_____
magazine	_____	duties	_____	result	_____
junior	_____	hearth	_____	material	_____
court	_____	boiling	_____	fascinate	_____
wipe	_____	sheriff	_____	whence	_____
agreed	_____	otherwise	_____	capture	_____
hero	_____	ounce	_____	razor	_____
wade	_____	screw	_____	clung	_____
jaw	_____	pleasure	_____	moist	_____
worry	_____	fawn	_____	judge	_____
couch	_____	gongs	_____	sites	_____
servant	_____	hired	_____	boyhood	_____
spanking	_____	undaunted	_____	vase	_____
coil	_____	mayor	_____	wedding	_____
nailed	_____	hail	_____	shack	_____
polish	_____	grant	_____	brood	_____
chairman	_____	pledge	_____	operation	_____
sauce	_____	fever	_____	vote	_____
kingdom	_____	hardship	_____	tongue	_____
whoa	_____	single	_____	yoked	_____
rule	_____	lunge	_____	purpose	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

NAME _____ DATE _____

TEST - TO 1 GRADE _____

PARENT'S OCCUPATION _____ SEX _____

SCHOOL _____

COLUMN 1		COLUMN 2		COLUMN 3	
she		clown		double	
father		garage		zebra	
ride		kite		leather	
find		care		gather	
train		leave		mind	
how		suit		hoop	
mother		bakery		edge	
about		catch		size	
come		check		able	
guess		most		blame	
new		strong		thumb	
as		joke		health	
zoo		plate		taught	
walk		whistle		rang	
have		stood		silver	
never		flew		except	
ball		roof		usually	
jumped		naughty		bounce	
little		visit		golden	
out		joy		clover	
friend		wash		fellow	
thank		gone		shoot	
TOTAL RIGHT					

EXAMINER _____

TEST - TO 1

COLUMN 4		COLUMN 5		COLUMN 6	
magazine	_____	screw	_____	capture	_____
hero	_____	sheriff	_____	sites	_____
couch	_____	duties	_____	thatch	_____
jaw	_____	undaunted	_____	razor	_____
swinging	_____	gongs	_____	clung	_____
junior	_____	hearth	_____	moist	_____
wipe	_____	pleasure	_____	wedding	_____
wade	_____	whined	_____	whence	_____
agreed	_____	boiling	_____	fascinate	_____
whoa	_____	fever	_____	tongue	_____
servant	_____	ounce	_____	operation	_____
crooked	_____	grant	_____	sponge	_____
chairman	_____	hired	_____	vote	_____
kingdom	_____	single	_____	yoked	_____
worry	_____	hail	_____	boyhood	_____
nailed	_____	pledge	_____	vase	_____
rule	_____	otherwise	_____	purpose	_____
court	_____	hardship	_____	ankle	_____
sauce	_____	lunge	_____	shack	_____
spanking	_____	fawn	_____	material	_____
polish	_____	mayor	_____	brood	_____
coil	_____	shudder	_____	result	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

NAME _____ DATE _____

TEST - TO 2 GRADE _____

PARENT'S OCCUPATION _____ SEX _____

SCHOOL _____

COLUMN 1		COLUMN 2		COLUMN 3	
friend	_____	joke	_____	edge	_____
never	_____	whistle	_____	zebra	_____
little	_____	care	_____	size	_____
come	_____	check	_____	health	_____
out	_____	gone	_____	mind	_____
have	_____	clown	_____	able	_____
zoo	_____	strong	_____	except	_____
new	_____	catch	_____	hoop	_____
jumped	_____	joy	_____	double	_____
mother	_____	leave	_____	fellow	_____
train	_____	garage	_____	usually	_____
ball	_____	suit	_____	shoot	_____
guess	_____	plate	_____	gather	_____
about	_____	naughty	_____	thumb	_____
walk	_____	wash	_____	leather	_____
how	_____	most	_____	rang	_____
as	_____	stood	_____	blame	_____
ride	_____	flew	_____	clover	_____
find	_____	kite	_____	bounce	_____
she	_____	roof	_____	taught	_____
thank	_____	bakery	_____	golden	_____
father	_____	visit	_____	silver	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

TEST - TO 2

COLUMN 4		COLUMN 5		COLUMN 6	
jaw	_____	pleasure	_____	thatch	_____
polish	_____	screw	_____	whence	_____
court	_____	hail	_____	result	_____
whoa	_____	fever	_____	material	_____
kingdom	_____	gongs	_____	clung	_____
servant	_____	ounce	_____	capture	_____
worry	_____	whined	_____	fascinate	_____
sauce	_____	sheriff	_____	sponge	_____
swinging	_____	duties	_____	razor	_____
chairman	_____	fawn	_____	tongue	_____
coil	_____	lunge	_____	operation	_____
rule	_____	boiling	_____	yoked	_____
junior	_____	undaunted	_____	wedding	_____
agreed	_____	hearth	_____	vote	_____
magazine	_____	single	_____	moist	_____
spanking	_____	otherwise	_____	sites	_____
hero	_____	pledge	_____	brood	_____
wipe	_____	hardship	_____	ankle	_____
wade	_____	hired	_____	purpose	_____
nailed	_____	mayor	_____	boyhood	_____
couch	_____	grant	_____	shack	_____
crooked	_____	shudder	_____	vase	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

NAME _____ DATE _____

TEST - TO 3 GRADE _____

PARENT'S OCCUPATION _____ SEX _____

SCHOOL _____

COLUMN 1		COLUMN 2		COLUMN 3	
she		most		edge	
father		gone		hoop	
walk		joke		health	
ride		catch		double	
zoo		joy		size	
friend		clown		rang	
jumped		leave		able	
train		suit		zebra	
new		whistle		except	
ball		garage		usually	
have		care		leather	
guess		strong		bounce	
how		naughty		gather	
come		bakery		shoot	
thank		stood		golden	
as		kite		mind	
about		plate		blame	
never		flew		thumb	
out		wash		clover	
find		visit		silver	
little		check		fellow	
mother		roof		taught	
TOTAL RIGHT					

EXAMINER _____

TEST - TO 3

COLUMN 4		COLUMN 5		COLUMN 6	
magazine	_____	fever	_____	boyhood	_____
swinging	_____	sheriff	_____	moist	_____
junior	_____	gongs	_____	sponge	_____
whoa	_____	pleasure	_____	fascinate	_____
wade	_____	shudder	_____	razor	_____
jaw	_____	whined	_____	yoked	_____
spanking	_____	hired	_____	thatch	_____
agreed	_____	lunge	_____	clung	_____
crooked	_____	ounce	_____	vase	_____
hero	_____	boiling	_____	whence	_____
worry	_____	duties	_____	vote	_____
sauce	_____	screw	_____	sites	_____
couch	_____	otherwise	_____	capture	_____
court	_____	hearth	_____	wedding	_____
chairman	_____	fawn	_____	tongue	_____
nailed	_____	hail	_____	result	_____
polish	_____	pledge	_____	operation	_____
servant	_____	undaunted	_____	material	_____
kingdom	_____	mayor	_____	purpose	_____
coil	_____	single	_____	ankle	_____
rule	_____	grant	_____	shack	_____
wipe	_____	hardship	_____	brood	_____
TOTAL RIGHT	_____		_____		_____

EXAMINER _____

APPENDIX C

INDIVIDUAL DATA

BY GRADE

TABLE 27

INDIVIDUAL DATA BY GRADE

Grade 1 - Girls

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	79	102	6	13	44	22	66
2	86	105	6	6	44	12	44
3	91	87	4	7	44	10	44
4	88	131	1	14	44	37	66
5	85	103	5	11	44	26	66
6	89	119	1	21	66	26	66
7	80	110	2	17	44	25	66
8	97	103	3	22	66	38	66
9	88	106	6	11	44	23	66
10	81	105	1	9	44	21	66
11	90	105	4	9	44	24	66
12	90	98	2	10	44	17	66
13	81	107	2	16	44	28	66
14	89	105	5	10	44	22	66
15	87	112	5	12	44	22	66
16	82	108	4	14	44	19	66
17	87	132	5	20	44	41	66
18	81	114	5	11	44	21	66
19	89	126	1	12	44	19	66
20	80	98	4	12	44	20	66
21	91	99	2	10	44	20	66
22	85	95	1	10	44	19	66
23	82	91	5	12	44	16	66
24	86	93	3	10	44	17	44
25	83	104	2	14	44	28	66
26	82	101	8	3	44	4	44
27	82	102	4	6	44	14	44
28	89	94	2	16	44	20	66
29	83	103	3	15	44	24	66
30	85	120	6	12	44	30	66
31	86	130	5	15	44	25	66
32	84	113	4	11	44	24	44
33	85	116	6	9	44	22	66
34	89	111	3	13	44	21	66
35	86	102	4	15	66	22	66
36	81	118	6	18	44	28	66
37	88	117	2	14	44	32	66
38	80	110	6	13	44	25	66

TABLE 27--Continued

Grade 1 - Boys

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	83	100	1	7	44	18	66
2	81	131	6	16	44	21	66
3	84	108	1	21	66	21	66
4	88	99	4	6	44	13	44
5	93	93	5	9	44	21	66
6	81	97	4	8	44	10	44
7	85	128	1	30	66	42	66
8	91	113	3	14	44	22	66
9	86	100	3	3	44	4	44
10	83	108	1	11	44	20	66
11	81	126	5	14	44	21	66
12	89	100	5	18	44	32	66
13	83	123	3	15	44	23	66
14	83	113	5	8	44	24	66
15	82	111	5	15	44	21	66
16	88	110	8	7	44	12	44
17	80	115	5	6	44	16	44
18	79	109	4	5	44	15	44
19	104	93	1	4	44	17	66
20	80	131	2	16	44	28	66
21	81	111	3	7	44	12	44
22	87	120	2	18	44	31	66
23	85	104	2	9	44	15	44
24	87	105	4	9	44	21	66
25	80	124	2	12	44	19	66
26	82	103	6	11	44	21	66
27	85	124	2	12	44	36	66
28	84	93	2	9	44	20	66
29	81	97	4	12	44	20	66
30	96	99	4	8	44	15	44
31	83	122	2	7	44	16	66
32	85	105	5	19	44	30	66
33	91	111	2	11	44	23	66
34	83	108	5	59	88	91	132
35	91	111	1	12	44	21	66
36	82	123	5	21	66	30	66
37	84	95	3	16	44	34	66
38	85	119	2	31	66	34	66

TABLE 27--Continued

Grade 2 - Girls

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	93	123	1	59	88	115	132
2	96	111	3	73	110	120	132
3	102	109	4	77	110	115	132
4	98	118	3	46	66	101	132
5	101	105	2	51	88	85	110
6	93	132	3	37	66	76	110
7	103	116	5	22	44	53	88
8	97	96	5	20	44	29	66
9	98	101	3	15	44	27	66
10	98	105	3	51	88	70	88
11	98	113	2	74	110	126	132
12	98	121	5	19	44	40	88
13	99	94	3	26	44	51	88
14	103	110	1	53	88	52	88
15	101	95	5	22	44	45	88
16	99	99	2	40	66	111	132
17	112	101	6	28	66	38	66
18	92	111	3	37	66	61	88
19	101	116	2	99	132	126	132
20	99	126	5	68	110	102	132
21	102	122	1	101	132	126	132
22	103	95	5	19	44	32	66
23	97	101	3	48	88	89	132
24	105	102	2	17	44	37	66
25	103	108	3	85	132	112	132
26	99	100	5	41	66	92	132
27	103	97	5	26	44	67	88
28	99	98	6	25	44	84	110
29	99	100	5	15	44	46	88
30	92	116	2	66	110	113	132
31	100	103	6	43	66	83	110
32	102	93	5	40	66	58	88
33	89	127	1	39	66	82	110
34	92	122	5	26	44	66	88
35	98	110	2	33	66	56	88
36	96	107	1	40	66	69	110
37	96	96	4	20	44	40	66
38	93	116	1	56	88	108	132

TABLE 27--Continued

Grade 2 - Boys

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	96	103	3	67	110	93	132
2	102	99	2	18	44	31	66
3	98	104	3	21	44	60	88
4	92	105	5	65	88	109	132
5	92	110	2	18	44	32	66
6	107	95	5	34	66	58	88
7	93	112	4	14	44	27	66
8	98	107	3	34	66	59	88
9	92	109	5	41	66	60	88
10	100	94	1	18	44	41	66
11	94	129	3	119	132	128	132
12	99	95	5	15	44	22	66
13	97	109	1	8	44	16	44
14	101	96	3	22	44	40	66
15	91	114	3	21	44	31	66
16	102	103	6	33	66	46	66
17	101	99	8	11	44	24	66
18	97	115	2	36	66	97	132
19	111	120	4	31	66	56	88
20	92	104	3	34	66	38	66
21	92	117	3	61	88	109	132
22	106	104	3	42	66	80	110
23	97	117	5	113	132	130	132
24	102	115	3	57	88	106	132
25	98	95	1	36	66	65	88
26	94	122	1	103	132	121	132
27	100	109	2	62	110	110	132
28	92	110	3	23	44	48	88
29	96	108	5	24	44	107	132
30	92	102	1	31	66	56	88
31	99	103	5	22	44	34	66
32	96	107	5	42	66	82	110
33	103	98	5	17	44	35	66
34	96	103	5	24	66	32	66
35	99	107	5	11	44	29	66
36	105	110	2	28	66	32	66
37	94	113	3	89	132	112	132
38	83	130	5	54	88	104	132

TABLE 27--Continued

Grade 3 - Girls

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	104	112	2	85	132	123	132
2	109	108	6	72	110	118	132
3	116	114	3	115	132	130	132
4	109	109	6	106	132	123	132
5	110	118	1	59	88	110	132
6	115	87	4	38	66	61	88
7	101	140	2	96	132	126	132
8	108	113	4	69	110	104	132
9	109	123	2	96	132	113	132
10	104	124	5	112	132	129	132
11	106	108	6	71	110	118	132
12	111	112	1	64	110	112	132
13	108	93	3	68	110	102	132
14	103	115	5	27	44	112	132
15	108	114	4	67	110	121	132
16	103	118	6	55	88	112	132
17	102	100	8	28	66	43	66
18	114	118	2	79	110	124	132
19	110	132	2	113	132	132	132
20	112	115	2	104	132	124	132
21	102	133	1	116	132	125	132
22	113	115	1	100	132	121	132
23	113	120	1	93	132	123	132
24	116	116	3	59	88	100	132
25	115	112	2	61	88	114	132
26	114	112	2	105	132	122	132
27	103	134	2	116	132	130	132
28	108	100	5	95	132	120	132
29	103	128	5	76	110	121	132
30	103	97	4	22	44	56	88
31	114	110	5	106	132	128	132
32	105	108	5	61	88	108	132
33	111	126	1	98	132	127	132
34	111	117	2	99	132	125	132
35	111	114	5	94	132	120	132
36	107	104	1	39	66	76	110
37	114	106	4	53	88	111	132
38	110	134	2	98	132	127	132

TABLE 27--Continued

Grade 3 - Boys

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	114	120	3	84	132	112	132
2	112	113	2	66	110	83	110
3	116	89	5	39	66	60	88
4	120	101	4	61	88	117	132
5	111	100	5	108	132	125	132
6	108	110	6	27	44	65	88
7	105	126	2	98	132	128	132
8	113	106	3	100	132	112	132
9	109	119	6	44	66	121	132
10	108	109	5	57	110	78	110
11	104	128	1	103	132	121	132
12	110	110	5	103	132	121	132
13	116	86	5	23	44	88	132
14	105	113	4	67	110	100	132
15	113	106	6	93	132	122	132
16	112	96	6	53	88	107	132
17	111	119	2	50	88	103	132
18	104	118	1	39	66	106	132
19	110	109	5	121	132	130	132
20	106	104	5	39	66	50	66
21	105	123	2	46	66	109	132
22	107	128	6	104	132	129	132
23	113	117	2	75	132	118	132
24	106	126	3	109	132	132	132
25	102	121	4	58	88	110	132
26	107	109	3	73	110	122	132
27	126	79	4	28	44	74	110
28	107	108	2	37	66	80	110
29	107	118	2	74	110	108	132
30	116	99	4	46	88	78	110
31	113	102	4	40	66	82	110
32	109	124	5	89	132	123	132
33	119	98	4	41	66	43	66
34	109	122	2	42	66	117	132
35	107	106	3	41	66	99	132
36	104	109	3	40	66	63	88
37	111	121	4	105	132	128	132
38	105	125	5	119	132	130	132

TABLE 27--Continued

Grade 4 - Girls

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	122	120	2	45	66	109	132
2	123	114	1	65	110	110	132
3	120	111	6	41	66	119	132
4	123	94	4	97	132	127	132
5	121	127	3	115	132	130	132
6	119	117	5	121	132	130	132
7	127	82	6	26	44	107	132
8	119	140	1	114	132	131	132
9	117	105	1	89	132	120	132
10	123	103	6	107	132	123	132
11	117	121	1	111	132	127	132
12	126	113	5	71	110	129	132
13	127	126	3	99	132	127	132
14	121	124	1	115	132	130	132
15	127	99	5	36	66	62	88
16	123	110	5	113	132	131	132
17	126	133	5	112	132	132	132
18	116	103	1	96	132	129	132
19	115	103	3	99	132	127	132
20	118	114	5	42	66	94	132
21	123	108	2	61	88	120	132
22	118	98	4	88	132	119	132
23	119	133	3	98	132	125	132
24	116	111	2	106	132	128	132
25	129	106	3	27	44	72	110
26	115	105	3	99	132	125	132
27	118	111	4	97	132	120	132
28	122	95	6	23	44	118	132
29	121	125	2	107	132	129	132
30	119	94	4	50	88	103	132
31	115	102	5	70	110	121	132
32	123	121	5	101	132	128	132
33	114	114	5	109	132	129	132
34	113	116	6	102	132	122	132
35	118	112	2	93	132	123	132
36	115	135	3	103	132	131	132
37	131	112	4	109	132	131	132
38	119	100	5	70	110	109	132

TABLE 27--Continued

Grade 4 - Boys

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	124	87	5	42	66	121	132
2	124	121	3	113	132	130	132
3	136	93	5	44	66	98	132
4	120	107	5	98	132	123	132
5	126	102	1	26	44	97	132
6	114	113	3	72	110	108	132
7	121	95	6	26	44	86	132
8	125	90	2	68	110	99	132
9	116	117	3	121	132	131	132
10	115	117	2	86	132	118	132
11	124	103	5	45	66	121	132
12	117	104	2	60	88	121	132
13	119	116	3	99	132	125	132
14	127	116	3	65	110	114	132
15	119	109	3	57	88	109	132
16	132	101	5	61	110	112	132
17	123	108	3	116	132	128	132
18	122	126	2	115	132	130	132
19	123	96	2	79	110	109	132
20	125	97	2	66	110	93	132
21	116	111	2	94	132	118	132
22	124	109	2	39	66	97	132
23	143	82	3	57	88	103	132
24	122	119	3	110	132	130	132
25	123	97	2	42	66	101	132
26	117	117	5	97	132	129	132
27	118	139	3	106	132	132	132
28	124	98	5	96	132	119	132
29	113	104	3	90	132	112	132
30	133	102	2	27	44	111	132
31	115	136	2	118	132	129	132
32	121	111	2	113	132	131	132
33	126	114	4	66	110	111	132
34	125	125	2	115	132	129	132
35	119	116	6	106	132	128	132
36	123	133	1	109	132	129	132
37	126	91	2	85	132	121	132
38	116	116	4	60	88	122	132

TABLE 27--Continued

Grade 5 - Girls

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	135	114	6	99	132	129	132
2	158	123	2	119	132	131	132
3	136	103	5	102	132	131	132
4	136	130	1	115	132	131	132
5	132	125	2	119	132	131	132
6	128	134	2	107	132	126	132
7	128	106	5	75	110	122	132
8	142	109	2	83	132	117	132
9	138	96	3	83	132	113	132
10	131	112	1	96	132	124	132
11	130	130	5	100	132	131	132
12	152	80	4	23	44	77	110
13	140	120	5	110	132	130	132
14	132	119	5	83	132	108	132
15	128	116	2	102	132	126	132
16	132	117	3	117	132	132	132
17	131	123	3	111	132	127	132
18	128	124	4	107	132	127	132
19	133	113	2	103	132	127	132
20	127	127	3	108	132	130	132
21	142	92	3	110	132	124	132
22	151	93	5	34	66	57	88
23	132	116	5	96	132	125	132
24	132	103	5	112	132	129	132
25	132	113	3	104	132	131	132
26	137	118	4	104	132	131	132
27	126	125	2	112	132	130	132
28	133	129	1	118	132	131	132
29	129	100	4	103	132	127	132
30	134	133	1	119	132	131	132
31	134	118	5	103	132	127	132
32	135	114	5	81	110	124	132
33	128	105	5	61	88	108	132
34	138	88	5	102	132	124	132
35	128	126	4	102	132	124	132
36	136	131	4	98	132	117	132
37	128	129	2	99	132	129	132
38	137	74	5	68	110	112	132

TABLE 27--Continued

Grade 5 - Boys

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	134	127	3	111	132	131	132
2	135	112	6	90	132	117	132
3	137	104	2	92	132	122	132
4	136	118	1	115	132	128	132
5	132	114	6	106	132	132	132
6	127	116	4	81	132	114	132
7	132	118	5	104	132	125	132
8	125	126	1	110	132	132	132
9	131	130	1	113	132	130	132
10	128	131	2	107	132	128	132
11	142	112	6	44	66	130	132
12	125	126	4	95	132	124	132
13	134	129	3	107	132	125	132
14	139	103	1	77	110	124	132
15	132	119	2	100	132	128	132
16	129	122	5	111	132	130	132
17	129	120	5	102	132	127	132
18	138	117	6	103	132	129	132
19	131	116	3	113	132	130	132
20	128	123	1	95	132	127	132
21	150	104	6	94	132	118	132
22	134	101	3	60	88	109	132
23	130	123	5	103	132	131	132
24	138	111	3	110	132	128	132
25	136	130	4	98	132	128	132
26	129	108	4	39	66	102	132
27	128	114	2	66	110	122	132
28	127	107	6	102	132	117	132
29	136	135	4	101	132	120	132
30	129	123	2	106	132	131	132
31	140	94	5	34	66	57	88
32	133	113	6	118	132	130	132
33	129	101	6	89	132	119	132
34	128	105	4	95	132	127	132
35	136	129	1	107	132	131	132
36	146	109	3	96	132	114	132
37	147	93	6	40	66	67	88
38	135	127	1	117	132	131	132

TABLE 27--Continued

Grade 6 - Girls

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	146	113	2	112	132	130	132
2	150	113	4	123	132	132	132
3	141	97	4	36	66	124	132
4	139	113	3	113	132	132	132
5	139	125	5	99	132	126	132
6	151	113	5	115	132	132	132
7	147	102	5	61	88	126	132
8	148	108	5	95	132	130	132
9	142	127	3	118	132	130	132
10	139	122	5	115	132	131	132
11	144	92	2	101	132	124	132
12	165	96	4	22	44	106	132
13	138	83	3	66	110	114	132
14	142	122	2	106	132	131	132
15	148	116	6	98	132	123	132
16	148	113	2	108	132	128	132
17	142	102	2	101	132	131	132
18	147	108	2	108	132	131	132
19	141	97	5	59	88	118	132
20	148	108	5	86	132	128	132
21	149	120	5	112	132	132	132
22	139	122	6	119	132	132	132
23	140	98	4	86	132	119	132
24	140	120	1	100	132	132	132
25	148	102	3	27	44	122	132
26	146	95	3	111	132	131	132
27	139	93	8	98	132	126	132
28	144	115	3	106	132	130	132
29	144	110	5	99	132	130	132
30	141	104	3	98	132	129	132
31	144	107	3	97	132	130	132
32	143	106	3	95	132	127	132
33	141	117	2	122	132	132	132
34	143	112	4	105	132	126	132
35	148	118	2	111	132	131	132
36	147	102	4	90	132	117	132
37	145	107	1	89	132	122	132
38	140	120	3	114	132	132	132

TABLE 27--Continued

Grade 6 - Boys

Subject	Age	IQ	Social Class	ITA		TO	
				Correct	Attempts	Correct	Attempts
1	145	80	2	109	132	127	132
2	142	119	4	122	132	132	132
3	150	85	4	92	132	126	132
4	143	112	5	113	132	131	132
5	143	121	3	106	132	127	132
6	144	128	2	118	132	132	132
7	141	106	3	88	132	123	132
8	142	104	6	118	132	131	132
9	145	126	6	111	132	130	132
10	147	106	3	105	132	129	132
11	145	126	3	112	132	131	132
12	144	112	5	98	132	125	132
13	144	123	5	115	132	130	132
14	146	118	2	103	132	130	132
15	148	102	4	108	132	132	132
16	155	101	5	72	110	124	132
17	162	119	3	111	132	132	132
18	154	115	5	96	132	125	132
19	154	85	3	25	44	106	132
20	148	109	5	93	132	129	132
21	154	84	5	24	44	94	132
22	150	111	6	116	132	131	132
23	145	100	5	48	66	127	132
24	148	115	4	110	132	131	132
25	143	120	4	114	132	131	132
26	167	65	4	38	66	72	110
27	141	118	1	122	132	132	132
28	141	114	2	114	132	130	132
29	141	124	5	109	132	132	132
30	141	122	4	118	132	132	132
31	149	105	2	119	132	131	132
32	144	116	8	94	132	128	132
33	148	103	5	98	132	129	132
34	155	112	4	51	88	108	132
35	141	122	5	93	132	123	132
36	150	122	1	80	110	129	132
37	145	123	2	118	132	132	132
38	139	121	1	117	132	130	132

BIBLIOGRAPHY

Alpert, Harvey. Needed research in i.t.a. In The Initial Teaching Alphabet and the World of English, Proceedings of the Second Annual International Conference on the Initial Teaching Alphabet, edited by Albert J. Mazurkiewicz, 293-97. Hempstead, New York, 1966.

Barrett, Thomas C. i/t/a: A step forward or sideways? In Reading Instruction - Dimensions and Issues, edited by William K. Durr, 81-85. Boston: Houghton Mifflin Company, 1967.

Boutwell, William D. An easier way to learn to read - i/t/a. The PTA Magazine, 1964, 59, 11-13.

Chall, Jeanne S. Learning to read: the great debate. New York: McGraw-Hill Book Company, 1967.

Division of Computer Services and Statistical Reports. Costs per pupil in average daily membership in Ohio's city, exempted village and county school districts from July 1, 1965 to June 30, 1966. Columbus: Ohio State Department of Education, 1966.

Dolmatch, Theodore B., et al. The promise of i.t.a. is a delusion. Phi Delta Kappan, 1966, 47, 545-53.

Downing, John. The initial teaching alphabet. New York: The MacMillan Company, 1964.

Downing, John A. The initial teaching alphabet reading experiment. Chicago: Scott, Foresman and Company, 1965.

Downing, John. The i.t.a. symposium. England and Wales: The National Foundation for Educational Research, 1967.

Edwards, Allen L. Experimental design in psychological research. New York: Holt, Rinehart and Winston, 1965.

Ferguson, George A. Statistical analysis in psychology and education. New York: McGraw-Hill Book Company, 1959.

Figurel, Allen J. Using the initial teaching alphabet in beginning reading instruction. In New Dimensions in Reading, A Report on the Nineteenth Annual Conference on Reading, edited by Donald L. Cleland, 103-11. Pittsburgh, Pa.: University of Pittsburgh, 1963.

Gates, Arthur I. A reading vocabulary for the primary grades. New York: Teachers College, Columbia University, 1935.

Gates, Arthur I. A look ahead by the reading specialist. In Teaching Young Children to Read, U.S. Department of Health, Education, and Welfare, Office of Education, Bulletin 1964, No. 19 (OE-30014), 105-16. Washington, D.C.: U.S. Government Printing Office, 1964.

Gilooly, William B., et al. The promise of i.t.a. is a delusion. Phi Delta Kappan, 1966, 47, 545-53.

Hahn, Harry T. A study of the relative effectiveness of three methods of teaching reading in grade one. Cooperative Research Project No. 2687. Pontiac, Michigan: Oakland Schools, 1965.

Harrison, Maurice. Beginning reading materials. In The Initial Teaching Alphabet and the World of English, Proceedings of the Second Annual International Conference on the Initial Teaching Alphabet, edited by Albert J. Mazurkiewicz, 317-19. Hempstead, New York, 1966.

Heilman, Arthur W. Phonics emphasis approaches. In Perspectives in Reading No. 5, First Grade Reading Programs, edited by James F. Kerfoot, 56-71. Newark, Delaware, 1965.

Holmes, Jack A. Evaluation - 6. In The i.t.a. Symposium, John Downing, 123-27. England and Wales, The National Foundation for Educational Research, 1967.

Malone, John. i.t.a. versus unifon - a design for study. In The Initial Teaching Alphabet and the World of English, Proceedings of the Second Annual International Conference on the Initial Teaching Alphabet, edited by Albert J. Mazurkiewicz, 303-07. Hempstead, New York, 1966.

Mazurkiewicz, Albert J. The initial teaching alphabet in reading instruction. Lehigh-Bethlehem evaluation - demonstration project on the use of i.t.a., 1967.

McCracken, Robert A. A cross-sectional study to determine the ability of children to transfer in reading from traditional orthography to the new augmented roman alphabet. In The Initial Teaching Alphabet and the World of English, Proceedings of the Second Annual International Conference on the Initial Teaching Alphabet, edited by Albert J. Mazurkiewicz, 101-08. Hempstead, New York, 1966.

McKee, Paul. Reading: a program of instruction for the elementary school. Boston: Houghton Mifflin Company, 1966.

Mountain, Lee Harrison. A comparison of I.T.A., diacritical marking system, and basal reader programs. In The Initial Teaching Alphabet and the World of English, Proceedings of the Second Annual International Conference on the Initial Teaching Alphabet, edited by Albert J. Mazurkiewicz, 281-88. Hempstead, New York, 1966.

Nemeth, Joseph S. and Hayes, Robert B. An attempt to secure additional evidence concerning factors affecting learning to read. Cooperative Research Project No. 2697. New Castle, Pa.: New Castle Area Schools, 1965.

Ohio Education Association. Basic financial data of Ohio school districts 1966. Research Report, March 1966, Volume XX, No. 2, Columbus: Ohio Education Association, 1966.

Rinsland, Henry D. A basic vocabulary for elementary school children. New York: The MacMillan Company, 1945.

Robinson, Helen M., et al. The new basic readers. Chicago: Scott, Foresman and Company, 1962.

Russell, David H. and Ousley, Odille. The Ginn basic readers. Boston: Ginn and Company, 1961.

Senders, Virginia L. Measurement and statistics. New York: Oxford University Press, 1958.

Shapiro, Bernard J. A longitudinal study of i.t.a. Cleveland: Educational Research Council of Greater Cleveland, 1967.

Sheldon, William and Gans, Roma. ITA (initial teaching alphabet). Grade Teacher, 1964, 82, 34-36.

Soffietti, James P., Why children fail to read: a linguistic analysis. In New Perspectives in Reading Instruction, edited by Albert J. Mazurkiewicz, 49-72. New York: Pitman Publishing Corporation, 1964.

Southgate, Vera. Approaching i.t.a. results with caution. Educational Research, 1965, 7, 83-96.

Tanyzer, Harold J. and Alpert, Harvey. Effectiveness of three different basal reading systems of first grade reading achievement. Cooperative Research Project No. 2720. Hempstead, New York: Hofstra University, 1965.

Warner, W. Lloyd, et al. Social class in America. Chicago: Science Research Associates Inc., 1949.