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A COMPARISON OF THE SPELLING ACHIEVEMENT OF GROUPS OF SCOTTISH AND AMERICAN CHILDREN.

The University of Michigan, Ph.D., 1963
Education, psychology

University Microfilms, Inc., Ann Arbor, Michigan

A COMPARISON OF THE SPELLING ACHIEVEMENT OF GROUPS OF SCOTTISH AND AMERICAN CHILDREN

by

Carl Richard Personke

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in the
University of Michigan
1963

Doctoral Committee:

Professor Irving H. Anderson, Co-chairman
Assistant Professor Geraldine T. Scholl, Co-chairman
Professor Paul S. Dwyer
Professor Claude A. Eggertson

ACKNOWLEDGMENTS

The writer wishes to express his thanks to the members of his doctoral committee for their advice and assistance in conducting this investigation. Special thanks are due Professor Irving Anderson, who obtained for the writer a position as research assistant on the Cooperative Research Project which made possible the trip to Scotland to conduct the testing program. In addition, the writer is especially indebted to Dr. Geraldine Scholl, who gave him the benefit of her experience on a similar project during this investigation.

The writer also wishes to acknowledge the invaluable assistance rendered to him by educationists on both sides of the ocean: to Dr. David A. Walker, Director of the Scottish Council for Research in Education, to Mr. Andrew V. Ewing, Depute Director of the West Lothian County Education Authority, to Dr. William Katzenmeyer, Director of Pupil Personnel Services in Jackson, Michigan, and to all of the teachers, principals, and headmasters who assisted in the administration of the tests. Thanks are also due to Mr. Ray Peterson who assisted in many ways during the processing of the data for this report.

Most of all the writer owes a debt to his wife and boys who gave up husband and father for so many days and nights during the past year.

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CHAPTER I

Introduction

Problem

Practices in Scottish primary schools differ in several respects from practices in the primary grades of American schools. Chief among these differences are:

1. Children begin primary school in Scotland at the age of five and are introduced to reading soon after. American children begin their primary education around the age of six. This means that Scottish children are introduced to reading about a year earlier than American children (Inglis, 1956, p.69). Formal spelling instruction is also usually started about a year earlier in Scotland.

2. Reading instruction in Scotland generally incorporates phonics from the beginning (Inglis, 1956, p.65). In the United States the whole word method is commonly used at the start, with phonics introduced after the sight words have been learned (Anderson and Dearborn, 1952, p.194).

3. In Scotland spelling words are usually introduced in groups according to phonetic or structural similarities (Boyd, 1956; Schonell, 1960). These similarities are stressed when the new words are presented to the pupils. Most American spellers group words around interest units.

4. Scottish primary schools tend to retain the traditional emphasis on the three R's and instruction tends to be more concentrated in these areas than is the case in American schools. One indication of

the difference in this regard is that Scottish primers tend to move at a more rapid pace than American primers and are more advanced all around, including the provision for phonics.

5. Scottish children sit for a qualifying examination for entrance to secondary school. This selection ultimately affects opportunities for university entrance. As these examinations typically test English and arithmetic, teachers tend to stress these areas (Anderson, 1958, p. 141).

6. The school year in Scotland lasts 40 weeks. In the United States, 36 or 37 weeks is typical.

Some observers have claimed that these differences work in favor of Scottish children. Estimates have given Scottish children as much as a two year advantage in achievement over their American counterparts. However, these writers rarely offer any acceptable evidence to support their claims. The present study is designed to discover whether such differences actually occur, with specific reference to spelling achievement.

Specific Objectives

Measures of spelling achievement were obtained by testing children in selected schools in West Lothian County, Scotland, and in Jackson, Michigan. Samples of 300-plus children were tested with the Metropolitan Spelling Test, 1947 Edition at the approximate ages 7, 11, and 14.

The specific questions investigated included:

1. How do the Scottish samples compare with the American norms on the spelling tests employed?

2. How do the Scottish samples compare with the groups of American children who were included in the testing program?

3. How do the Scottish and American samples compare in variability on the spelling tests employed?

4. How do the boys and girls in each national sample compare in spelling achievement?

5. How do the boys and girls in each national sample compare in variability?

6. Will examination of the spelling errors of the samples in each country reveal any differences which might reflect different practices in spelling instruction?

Significance of the Study

It has been noted that there are a number of differences between school practices in Scotland and the United States. These differences have been assumed by observers to give Scottish children an advantage over American children in school achievement, particularly in reading. Since spelling is commonly developed along with reading, the same argument might be applied to spelling achievement.

Flesch, for example, has contended that the practice of commencing reading instruction at age 5 gives British children a year of advantage over their American counterparts, and that the failure to use phonic methods retards American children another year (Flesch, 1955, p.105). At least one writer has asserted that the kindergarten year is wasted because reading instruction is not introduced at that time (Simmons, 1960). Many writers have pointed to five-year-olds who learned to read on their own as evidence that children of this age can learn to read.

There seems to be little doubt, in fact, that five-year-olds can learn to read. Those who have learned on their own, however, have typically been mentally superior children. Vernon, O'Gorman, and McLellan (1955) have demonstrated that children of normal intelligence can also achieve success at this age. Even so, it remains to be demonstrated that any lasting benefit will accrue to children who are taught to read at this age.

The impact of renewed efforts to promote phonic instruction in reading has been felt in recent years. While the proponents of phonic instruction generally concern themselves with the reading program, the inference is generally that such instruction will also improve spelling ability (Bark, et. al., 1960, p.22). However, the amount and kind of transfer which occur between reading and spelling remain to be demonstrated. For the purposes of this study, it is sufficient to say that some amount of transfer from reading to spelling does occur (Horn, 1960, p.1342). The present study is more concerned with the impact of the method used in formal spelling instruction, including the role of phonetics in spelling.

The subject of teaching spelling according to phonetic and structural similarities has received increased attention in recent years. The work of Hanna and Moore (1953) is typical of these efforts. At least one recent spelling series incorporates phonetic generalization into an instructional scheme (Kottmeyer and Ware, 1960). However, the principle of grouping spelling words according to phonetic similarities is still ignored by large numbers of writers primarily on the grounds that generalizations for English spelling are cumbersome, replete with exceptions, and not productive in spelling instruction. This position was recently summarized by Ernest Horn (1957). Those who hold this view

prefer to approach the teaching of spelling in terms of the discovery of which words are most useful and the most effective way to teach them. As practices in Scottish schools typically stress the method of grouping according to similarities and American methods are for the most part dominated by the single word approach, comparison of achievement in this study might shed some light on the debate over methods of instruction.

Of further significance is the controversy concerning the curriculum and goals of American schools. Articles by Dorothy Thompson (1953) and Hyman Rickover (1959), among others, stress the need to return to emphasis on the three R's. Other writers have deplored the lack of grade standards and competition in achievement. One school board in southeastern Michigan recently adopted a statement of policy to the effect that such practices would be instituted in the schools of that district. The San Francisco Curriculum Survey Committee (Bark, et. al., 1960, p. 11) incorporated similar suggestions in their report. Expressions of interest in a longer school year have been another aspect of the same point of view. Comparisons of achievement might be relevant in light of proposals that American schools adopt these practices.

Another aspect of this study will involve comparison of the variances of the national samples. It is expected that American children will exhibit greater variability in scores attained on the tests used. It has been demonstrated in the United States that individualized instruction and the readiness approach to reading tend to maximize differences in achievement which might be attributable to maturation (Anderson, Dixon, and Hughes, 1957). While it cannot be supposed that

all American schools individualize instruction in spelling, especially in view of the wide-spread popularity of spelling workbooks, it is probably true that American schools attend to individual differences to a greater degree than do Scottish schools. Thus, comparisons of the variability of the samples might offer evidence concerning the relationship between instructional and developmental factors in spelling achievement.

Analysis of the data according to sex may offer additional insight into this problem. Research in the United States has consistently demonstrated the superiority of girls over boys in the early stages of language development, including spelling. American writers have generally attributed this superiority to the more rapid maturation of the girls. It has already been noted that individualized teaching tends to exagerate differences in achievement owing to differences in maturation. Hence, it might be expected that achievement differences between boys and girls in the American samples will be greater than those between boys and girls in the Scottish samples.

On the other hand, there is the possibility that a cultural variable may also be involved. Studies in Great Britain have not revealed a pattern of female superiority in language learning as consistent as that found in the United States. British writers have generally taken the position that in some cases test content may have favored the boys (Morris, 1959, p.37). However, it is possible that sex differences in achievement are not the same in Great Britain as in the United States. Sex differences in achievement may be influenced by factors other than maturity. Preston (1961) found that German boys in the 4th and 6th grades tend to be better readers than girls. This suggests a cultural expectation which identifies reading with the male

role. The same factor may be found in Scotland. At any rate, as test content is held constant in this investigation, analysis of sex differences in achievement may offer some information regarding the presence of a cultural variable.

Comparisons of the variances of the boys and girls in each of the national samples on the spelling test are included in the investigation. It is expected that the boys will be more variable than the girls, although it will be interesting to see if the results vary in this regard from country to country.

Finally, a comparison of the spelling errors between the national samples should be instructive in terms of the differences in teaching method. While it is impossible to determine what method of attack was used in spelling a word correctly, errors made in attempting to spell unknown words often indicate the attack used. To the extent that the favorite method of attack may reflect the instructional methods used, an analysis of the misspellings may offer further evidence on the role of instruction in learning to spell.

CHAPTER II

Source of Scottish Samples

West Lothian County

General Information. The 33 counties and four main cities of Scotland comprise 35 local administrative units. These are determined by county lines except for the cities of Glasgow, Edinburgh, Aberdeen, and Dundee and two units consisting of two counties each. None of the four cities is representative of Scottish intelligence and attainments since three are above the British norms on mental and attainment test performance and one is below. Furthermore, the majority of the fee-paying and private institutions are located in these cities. These considerations led to the choice of a county unit as the source of the Scottish samples. The county chosen was West Lothian County. West Lothian combines four large communities with a number of smaller settlements and considerable rural area. It thus presents an opportunity to test in different situations within the same administrative unit.

Location. West Lothian is located on the southern shores of the Firth of Forth, between Glasgow and Edinburgh. It is in the Central Lowlands, a belt extending across Scotland from the Firth of Forth to the Firth of Clyde. This is the industrial heart of Scotland. To the north are the Highlands, where mountain and moor limit the population to the small amount of arable land available. To the south are the Southern Uplands, rolling hills noted for sheep farming and textile manufacturing. But the Central Lowlands, representing only one-tenth of the land area of Scotland, support approximately two-thirds of the

population. West Lothian, then, is located in the most densely populated and highly industrialized part of Scotland.

Population. West Lothian, with a 1961 population of 92,764, represented 1.8 per cent of the 5,178,480 people living in Scotland at the time. From 1951 to 1961 the population of West Lothian County increased by 4.7 per cent, as contrasted to a 1.6 per cent increase for Scotland as a whole. In fact, the population of Scotland has risen only very little over the past half century. This condition is generally attributed to a high emigration rate rather than a declining birth rate (Reid, 1959, p.22). It appears that fewer people leave West Lothian than is true for the rest of Scotland. On the other hand, the 1951 census indicated that the birth rate for women aged 15-45 was high in West Lothian, where it stood at 157.5 per thousand. For Scotland as a whole the rate was 148.4 per thousand. Native born Scots in West Lothian, comprising 94.7 per cent of the population, also represent a higher proportion than for Scotland as a whole, where the figure is 92.1 per cent.

Social Class. The Scottish census assigns persons to social classes based on type of occupation. On this basis, West Lothian is strongly lower middle class. This is not surprising in view of the fact that it is a highly industrialized county and most of its people are laborers. More than a fourth of the population work in the coal and oil shale mines (West Lothian County Council, 1958, p.21). For Scotland as a whole, only about 5 per cent of the population is engaged in mining industries. A recent decline in mining activities has resulted in some unemployment in West Lothian.

About 31 per cent of the West Lothian population is engaged in the local industries, chiefly iron, steel, and brass foundries, hosiery

making, fire clay works, and distilleries. In all Scotland, the percentage employed in manufacturing is about 39 per cent.

Of the total male population of Scotland about 16.1 per cent is employed in white collar or professional positions. The figure in West Lothian is considerably smaller, being about 9.4 per cent. Undoubtedly the total figure is swelled by heavy representation in the four main cities, which comprise about 38 per cent of the total population.

A large part of the rural area of West Lothian is not under cultivation. Only 3 per cent of the population is engaged in agricultural pursuits. This compares with a 5 per cent figure for all of Scotland.

West Lothian County Education Authority

Education in Scotland. Scotland has a long tradition of public education and academic excellence. School is compulsory for all children between the ages of 5 and 15. Responsibility for the educational system is a function of the Scottish Education Department, under the direction of the Secretary of State. This functionary is directly responsible to Parliament. Local authority is vested in the County Council, acting as Education Authority, which is charged with making adequate provision for the educational needs of their area under a plan approved by the Scottish Education Department. The Schools (Scotland) Code regulates the conduct of the schools in such matters as class size, teacher qualifications, and the education to be provided (British Information Service, 1960, p.26). In curriculum and method the Scottish Education Department is generally limited to an advisory role. However, considerable uniformity is achieved as a result of the practice of

sitting for the Scottish Leaving Certificate upon completion of the secondary school studies. Passes on these examinations are required for entrance to universities and training colleges.

Schools in West Lothian. In general, the educational system of West Lothian County conforms to the accepted pattern of organization in Scotland. There were 47 schools in West Lothian during the 1961-62 session. All were coeducational, although boys and girls were taught in separate classes in some secondary schools. The schools ranged in size from two one-teacher primary schools to schools offering a complete range of educational experience to several hundred students. Seven of the primary schools did not offer a complete primary program. Altogether there were 31 primary schools, 10 primary-junior secondary, one primary-junior secondary-senior secondary, 4 junior secondary-senior secondary, and one senior secondary school. In addition, there was one small independent primary school. Although there were no facilities for further education, the West Lothian Education Authority has a working arrangement with the Edinburgh and other nearby authorities to provide for this need.

Two main types of secondary programs are offered. The junior secondary is a terminal program which takes the child to the school leaving age of 15. The senior secondary program is for children desiring a fourth or fifth year of secondary education and is usually culminated by sitting for the Scottish Leaving Certificate. Entrance to either program is determined by the child's ability to profit from the courses offered.

Transfer Examination. This ability is measured by the transfer examination given to each child during the last year of primary school, and by other measures. Decisions are made by the Promotion

Board appointed by the Education Authority. Parents have the right to request a particular program for their child. This includes the right of appeal to the Secretary of State in case of dissatisfaction with the board's decision (Scottish Education Department, 1962, p.29).

Transfer examinations are a function of the local Education Authority and vary somewhat from county to county. In most cases, however, the practices are generally similar. West Lothian County administers the Moray House Test of Verbal Reasoning, Moray House Attainment Tests in English and Arithmetic, and two papers in problem arithmetic and composition. To these scores are added the head teacher's scaled estimates of each child's ability based on past performance.

Approximately one-third of the children in West Lothian are assigned to senior secondary places on the basis of the transfer examinations. This is comparable to the national rate of transfer to similar programs.

School Year. The length of the school year is set by the Scottish Education Department at 200 days, or 40 weeks. Within this limitation local authorities are free to establish their own structure. West Lothian adheres to the usual pattern with a school year consisting of three terms: the autumn term running from the first week of September to Christmas; the spring term, which offers more variation but generally extends to mid-April; and the summer term which ends in late June or early July. Certain holidays are set by law and the local authority has the option of allowing a limited number of local holidays.

School Day. The school day in West Lothian varies somewhat from school to school as each head teacher establishes the hours for his school. However, although the actual times vary, the length of the school day is 5-1/2 hours for all children except for the infant

division (Primary I and II), where it is 4-1/2 hours. This is typical of practices throughout Scotland.

School Operation. Children are assigned to schools according to geographical location of their homes. Although the Scottish Education Department allows admission of children at the beginning of each term, West Lothian has elected to admit only twice a year. Children who are five by December 1 enter school in September; those who attain this age by the beginning of the third term enter at that time. Again, the Scottish Education Department establishes the number of times during the year when children may leave after attaining the school leaving age, but the actual dates are set by the local authority.

The primary school is divided into grades numbered from Primary I to VII. Primary I and II were formerly designated separately as Infant School and this division tends to persist in fact and name within the schools. Large schools will generally have an infant mistress. Children in the primary schools have one teacher for all subjects. Usually the teacher stays with the class for the entire year.

The secondary divisions, as noted above, are streamed into different programs. Although these may be conducted within the same school building, class structure remains homogeneous. In the secondary schools subjects are taught by different teachers according to specialization.

Teacher Certification. Primary teachers are certificated after three years of satisfactory work in a training college. Secondary teachers must be university graduates with one additional year of training college work. Male teachers in either division must be university graduates. Because of the teacher shortage, West Lothian, like many Education Authorities, has had to employ a number of uncertificated

teachers. During the 1960-61 session, 8.5 per cent of West Lothian teachers were uncertificated. The figure for Scotland as a whole was 5.5 per cent (Scottish Education Department, 1962, p.141). At the same time, West Lothian could boast a favorable pupil-teacher load. The ratio in 1960-61 was 22.9 to 1 in West Lothian and 23.1 to 1 in all of Scotland.

School Leavers. It was noted above that West Lothian is composed predominantly of working class families. This condition is reflected in statistics which indicate a high drop-out rate at the school leaving age of 15. During the 1959-60 session, 70.9 per cent of West Lothian children left school at this age, compared to a national figure of 66.9 per cent (Scottish Education Department, 1962, p.141). Only 11 per cent of West Lothian children completed the 5 year secondary program during the same session, while across the nation the figure was 14 per cent.

Teaching of Reading, Writing, and Spelling

Reading. West Lothian teachers are urged to postpone reading for at least one month after the child first enters school. This is to allow him time to adjust to the school situation. However, the syllabi offered by the Education Authority are suggestive and are not binding on the head teacher in any way. It is probably safe to say that for most children introduction to reading occurs in the first few weeks of school.

The amount of time devoted to reading during the week is very difficult to determine with any degree of exactness. Reading pervades a great deal of the school day and occurs in weekly schedules under a

number of different titles. It is probable, however, that 5 to 6 hours of reading instruction a week would not be far from the truth.

Most teachers in Scotland rely to some extent on phonics in the teaching of reading (Inglis, 1956, p.65). The trend recently has been to introduce reading by look-and-say methods, deferring systematic phonic instruction until later (Scottish Education Department, 1955, p. 8). West Lothian teachers are urged to adopt this method. While they do, in general, begin with the look-and-say method, the point at which phonics is introduced varies considerably from school to school. Among schools visited this variation extended from pre-reading phonics instruction to deferment of phonics until Primary II. In general, primary teachers in West Lothian are likely to introduce some systematic instruction in phonics during the first year of school.

The most commonly used beginning readers in West Lothian include the Happy Venture Reading Books, Vanguard Readers, and Janet and John. These titles would be recognized by any Scottish primary school teacher. It is notable that these include phonic exercises almost from the start. The Janet and John books are adaptations of the Alice and Jerry books used in many American schools. The fact that the initial consonants in the names of the characters are the same in the British version may not be an accident.

Retarded readers are taught in the regular classroom, generally in small groups with simpler material. In some cases, the head teacher will work with remedial readers. At present, no special facilities are provided for remedial readers although an experimental plan is being tried in one school. In larger schools, adjustment classes are common for pupils who are generally backward.

Spelling. The most commonly used spellers in West Lothian are the Essential Spelling List (1960) and New Standard Spelling List (1956). It should be noted that in both of these lists words are grouped for teaching certain phonetic or structural generalizations. At times, additional words are taken from other lessons or from the children's own written work. The children do not themselves have spellers, but copy the words from the blackboard.

Formal spelling instruction is usually started in Primary III, at about age 7, although this practice, too, may vary. At any rate, informal spelling is conducted prior to this time, especially in conjunction with writing activities.

The usual plan is to present new words each day and test for these words on the following day. Five or six words a day are common at first, while 10 or 15 are offered at the upper class levels. The words are written on the blackboard by the teacher and copied by the children. Emphasis is placed on phonetic and structural generalizations, and on hard spots, during the presentation. A part of the class period is used for practice, but the children are also expected to study the words at home. In view of the fact that the normal period is 20 minutes, during which time old words are tested and new words introduced, it might be fairly assumed that much learning is done at home.

Writing. West Lothian schools, like most Scottish schools, use writing to a considerable extent in the teaching of reading and spelling. Formal instruction begins in reading and writing at about the same time and one is used to support the other. Usual practice is to devote time each day to copying work, either from the blackboard or from books. This is thought to improve the child's habits of studying words, in addition to providing gains in handwriting skills.

Copybook work is also very common in other subjects in the curriculum. Considerable stress is placed on accurate spelling and good handwriting in these copybooks. As many errors in spelling are really handwriting errors, Scottish emphasis on good handwriting might also be manifested in improved spelling. In addition, children get the habit of looking closely at words and, perhaps, develop a "spelling conscience." Integration of the language arts skills is most apparent in the extensive amount of writing practice offered in the primary school.

Intelligence and Attainment of West Lothian Children

Mental Survey of 1947. In 1947 the Scottish Council for Research in Education tested virtually every eleven-year-old child attending schools in Scotland (Scottish Council for Research in Education, 1958). The test included verbal and picture items. As the picture items were primarily used to spread out the group scoring low on the verbal test, the verbal items are most important here. A maximum score of 76 was possible on these items. Table 1 demonstrates that the mean score obtained by West Lothian children did not differ significantly from the all-Scottish mean (Dixon and Massey, 1957, p. 112).[1]

In an earlier assessment (Scottish Council for Research in Education, 1933) the mean West Lothian score was similarly close to the all-Scottish mean. At that time the difference was .17 points in favor of the West Lothian children.

In order to compare scores on the verbal tests with Stanford-Binet IQ's, a representative sample of 1215 children from the 1947 group

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[1]In this report statistical tests will be cited the first time they are used. Subsequent uses of the same test will not be cited.

Table 1

Comparison between West Lothian and Scotland on 1947 Scottish Mental Survey

West Lothian		Scotland			
Number	Mean Verbal Score	Mean Verbal Score	sd	Difference	z
1000	36.80	36.70	16.04	0.10	.20

was selected for testing with the Stanford-Binet Scale, 1937 Revision. Application of a suitable regression equation to these results made it possible to express the scores on the verbal tests in Stanford-Binet equivalents. These equivalents were supplied for West Lothian County and for Scotland as a whole by Dr. David A. Walker, Director of the Scottish Council for Research in Education, and are reported in Table 2. It is quite clear that the West Lothian children might be considered a normal group.

Table 2

Mean Estimated IQ's of West Lothian and Scottish Children in 1947 Scottish Mental Survey

	Mean Verbal Score	Mean Estimated Stanford-Binet IQ's	
		Boys	Girls
West Lothian	36.80	100.9	98.9
Scotland	36.70	100.8	98.7

Scholastic Survey of 1953. Ten-year-old children were tested for attainment in 1953 by the Scottish Council for Research in Education. The results of that investigation have not yet been published

but were made available for this study. Tests were administered in mechanical arithmetic, arithmetical reasoning, English usage, and English comprehension. The results for West Lothian and all Scotland are compared in Table 3. In all four tests West Lothian was somewhat above the Scottish mean, but in only the English usage test was the difference significant at the .05 level (Dixon and Massey, 1957, p.123). This difference, while statistically significant, was very small. In general, West Lothian is very close to the national average in attainment.

Table 3

Comparison between West Lothian and Scotland on 1953 Scottish Scholastic Survey

Test	West Lothian			Scotland			Difference	z
	Number	Mean Score	sd	Number	Mean Score	sd		
Mechanical Arithmetic	1412	13.01	7.93	72491	12.61	7.94	0.40	1.90
Arithmetic Reasoning	1412	10.20	8.97	72487	10.02	8.95	0.18	.75
English Usage	1399	53.95	23.34	72416	52.50	23.73	1.45	2.31*
English Comprehension	1399	21.46	13.53	72407	21.13	13.57	0.15	.41

Summary

The following statements offer a summary of the essential facts needed to evaluate West Lothian County as the source of the Scottish samples:

1. West Lothian is located in the most densely populated and highly industrialized area of Scotland.

2. The populace of West Lothian is predominantly lower middle class.
3. Current unemployment is the result of a decline in work opportunities in the mining industry.
4. Organizational features of the West Lothian Education Authority conform generally to the Scottish pattern.
5. The percentage of uncertificated teachers is somewhat higher than the national figure.
6. The pupil-teacher ratio in West Lothian is favorable.
7. The transfer examination for secondary promotion is similar to procedures in other counties of Scotland.
8. A higher percentage of West Lothian children leave school at the legal age of 15 than in Scotland as a whole.
9. Practices in the teaching of reading, writing, and spelling in West Lothian are similar to those employed in other parts of Scotland.
10. Phonics have an important place in the teaching of reading and spelling in West Lothian.
11. Basic readers and spelling lists used in West Lothian are available to all primary schools in Scotland.
12. Mental and scholastic surveys have shown that West Lothian is reasonably representative of Scottish intelligence and attainments.

CHAPTER III

Procedure

Selection of Samples

Ages Concerned. Samples in West Lothian were obtained by testing entire classes in a variety of schools. The grade levels tested were Primary III, Primary VII, and Secondary III. These classes represent the approximate ages 7, 11, and 14 and might be considered strategic points at which to test for spelling achievement. It is doubtful that tests in spelling would be of much utility if administered before age 7 or 7-plus as children have not had sufficient exposure to reading or spelling before that time. This is especially true in the United States where instruction begins one year later than in Scotland. At age 11 the children are completing their last year of primary school and, for most, the last year of formal reading instruction. Spelling instruction may, however, be continued for another year or two in the United States. Age 14 is the last practical time to sample a complete age group in Scotland because the school leaving age is 15.

Samples were drawn from schools corresponding to the public schools in the United States. Private institutions were not represented. Denominational schools are a part of the public school system in Scotland. However, as they are not state supported schools in the United States, they were excluded from the samples.

Selection of the Schools. The primary schools were selected by the investigators on the basis of mean I.Q. and school size. The mean I.Q.'s used were those obtained by the Primary VII class of the

previous year on the transfer examinations. The selection was made in this way to avoid a possible bias in I.Q. Size of school was taken into account to ensure that the correct proportion of various sizes of schools would be represented. The number of schools selected was based on a total sample of 300-plus at each age level.

The list of schools thus selected was then presented to the Depute Director of the West Lothian County Education Authority. In general, he concurred with the choices as being reasonably representative of West Lothian schools. In one instance he suggested that a substitution be made for a school where the number of uncertificated teachers was quite large. This substitution was made.

The secondary schools were selected with the aid of the Depute Director. Schools were chosen which represented the same areas as the primary schools already selected and with the same proportion of junior and senior secondary pupils as in the county as a whole. Again, the sample size sought was 300-plus.

Location of Schools. Figure 1 locates the schools in the sample on a map of West Lothian. This map indicates that most areas of the county are represented. Some areas were not included to avoid over-representation by disadvantaged schools.

Characteristics of the Sample

Size of Samples. As was noted above, the samples were obtained by testing entire classes in selected schools, with the intention that there be 300-plus subjects in each sample. The actual sizes of the samples in relation to the total population at each age are reported in Table 4. These figures represent the total number of children

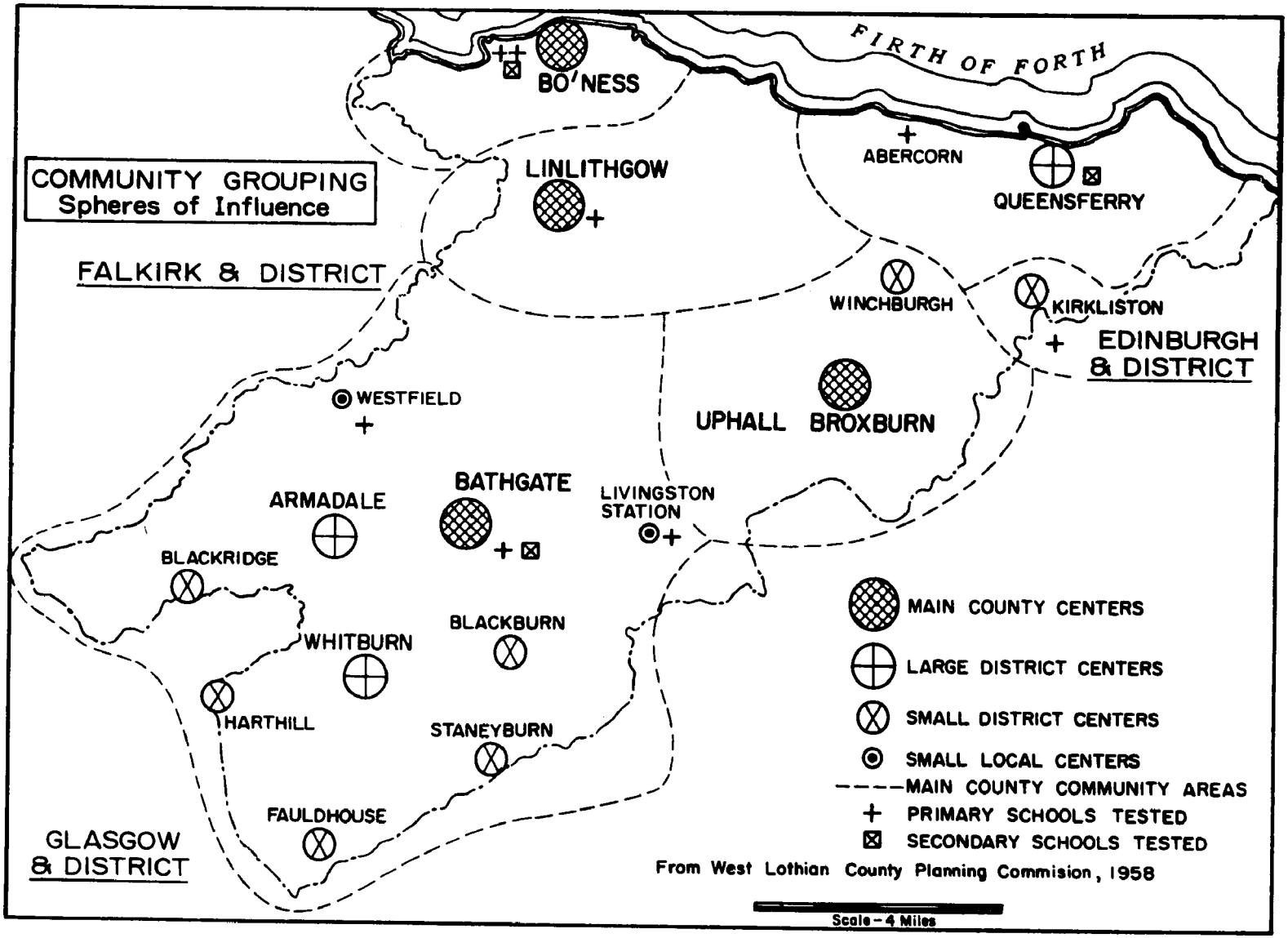


Fig. 1. Locations of schools in West Lothian testing program.

tested. In some instances school records were incomplete or a child missed some of the tests in the series. For this reason, the numbers for other factors may not exactly coincide with these figures.

Table 4

Size of West Lothian Samples

Age	Population	Sample	Per Cent
7	1612	321	19.91
11	1608	390	24.25
14	1818	339	18.65

Table 5 compares the proportion of senior secondary pupils in the sample with the county-wide proportion. While the per cent is somewhat lower in the sample, the difference is not significant (Garrett, 1958, pp.235-36).

Table 5

Comparison of Proportions of Students in the Third Year of Senior Secondary Courses in the Sample and in West Lothian as a Whole

Population		Sample			
Number	Per Cent	Number	Per Cent	Difference	z[1]
606/1818	33.33	96/339	28.32	5.01	1.81

Distribution by Sex. Table 6 examines the samples for distribution according to sex. At ages 7 and 11 the balance is quite even,

[1]Many of the tests of significance used in this study utilize data obtained from samples. In most cases the samples are large and the "t" distribution is the same as the normal distribution. In all such cases, the degrees of freedom will not be reported in the tables. Where samples are small, degrees of freedom will be reported.

but there are a greater number of girls in the sample at age 14. Although the difference is not significant, it is quite large (Dixon and Massey, 1957, p.99). No reason was found to account for this difference.

Table 6

Division between Boys and Girls in West Lothian Samples

Age	Boys		Girls		z
	Number	Per cent	Number	Per cent	
7	163	50.78	158	49.22	.28
11	197	50.51	193	49.49	.20
14	152	44.84	187	55.16	1.92

Mean Age of Total Samples. Table 7 reports the mean ages of the samples. These ages were used to compute the American norms for making comparisons.

Table 7

Mean Ages of West Lothian Samples

Group	Number	Mean	s
Primary III	320	91.13	3.76
Primary VII	386	139.61	4.92
Secondary III	339	175.68	3.50

It is obvious that the groups were not, in fact, 7, 11, and 14, but 7+, 11+, and 14+. They were closer to the exact ages when school began in September than when testing was conducted in February. However, for convenience they will continue to be referred to as the seven-, eleven-, and fourteen-year-old groups in this report.

Mean Age by Sex. Comparison of the ages of boys and girls in each sample yields the results in Table 8. As none of the differences is significant (Dixon and Massey, 1957, p.124), age will not be a factor when comparing achievement between the sexes.

Table 8

Comparison of Mean Ages of Boys and Girls in West Lothian Samples

Group	Boys			Girls			Difference	t
	Number	Mean Age in Months	s	Number	Mean Age in Months	s		
Primary III	162	90.91	3.91	158	91.35	3.60	-0.44	-1.05
Primary VII	193	140.05	4.39	193	139.17	5.38	0.88	1.76
Secondary III	152	175.95	3.70	187	175.46	3.32	0.49	1.26

Mean IQ's of Total Samples. All West Lothian children take the Moray House Test of Verbal Reasoning in Primary VII. This test was administered to the eleven-year-old sample in March, 1962. Results were available from school records. Results of the Moray House Test were also available for most of the fourteen-year-old group. These results were obtained by those children when they sat for the transfer examination in Primary VII three years earlier.

Moray House IQ's are deviation scores based on a mean of 100 and a standard deviation of 15. This makes them roughly comparable to Stanford-Binet IQ's, although they are not based on mental age (University of Edinburgh, 1957, p.8). Table 9 compares the mean Moray House IQ's of the samples at ages 11 and 14 with the norm. The samples are slightly below the norm, but in neither case is the difference significant.

Table 9

Mean IQ's of West Lothian Samples at Ages 11 and 14 in Relation to Test Norms

Age	Sample		Norm		Difference	z
	Number	Mean	μ	sd		
11	390	99.73	100	15	-0.27	-.36
14	322	98.45	100	15	-1.55	-1.85

Primary III children do not receive intelligence tests in West Lothian. For this reason mean IQ's are not reported at this age. However, county records indicate that there is little variation in the mean IQ of promotion classes from year to year. It is probably not unreasonable to assume that the mean IQ of the Primary III class in any given school will not differ significantly from that of the Primary VII class in the same school.

Since all West Lothian children take the Moray House Test in Primary VII, it is possible to compare the performance of the samples with the performance of the populations on this test. This comparison is reported in Table 10. Differences in favor of the sample are significant at the .01 level (Dixon and Massey, 1957, p.115). However, the object of the selection was not to secure a group representative of West Lothian, but to use West Lothian as a source of subjects whose performance would approximate the test norm of 100. Table 9 indicates that this objective was achieved.

Mean IQ's by Sexes. Table 11 indicates that intelligence will not be a variable when comparing boys and girls in the West Lothian samples.

Table 10

Comparison of Mean IQ's of West Lothian Samples with Mean IQ's of Total West Lothian School Population at Ages 11 and 14

Age	Sample			μ	Difference	t
	Number	Mean	s			
11	390	99.73	11.86	96.6	3.1	5.17**
14	322	98.45	9.10	96.2	2.3	4.51**

Table 11

Comparison of Mean IQ's of Boys and Girls in West Lothian Samples at Ages 11 and 14

Age	Boys			Girls			Difference	t
	Number	Mean	s	Number	Mean	s		
11	197	100.72	12.91	193	98.73	10.62	1.99	1.66
14	147	98.20	9.06	175	98.66	9.15	-0.46	-.45

Testing the Samples

Tests Used. The spelling section of the Metropolitan Achievement Test, 1947 Edition, was used in this investigation. The forms used were the Primary II Battery (Form S) at age 7, the Intermediate Battery (Form V) at age 11, and the Advanced Battery (Form V) at age 14. This test was selected for use because it offers the dictation type of spelling test.

Few American achievement tests use the dictation test for spelling, especially at the higher levels. The recognition test has found current favor, probably because it can be machine scored. This may be considered a weakness as the recognition test is more a test of proofreading ability than of the ability to spell in writing (Gage,

195-, p.25). Brody (1944) investigated different types of spelling tests and found that the list-recall test was of the greatest practical utility. Aside from these factors, a dictation spelling test was necessary in order to carry out the analyses of errors contemplated in this investigation.

The Primary II Battery offers a test of 24 words. The Intermediate and Advanced Spelling Tests contain 50 words each. Reliability coefficients for these tests are supplied in the manuals. These coefficients are reported in Table 12. Reliability is high for all three tests.

Table 12

Reliability Coefficients* of Metropolitan Spelling Test by Test Level

Battery	Number	Test Reliability
Primary II	363	.936
Intermediate	350	.933
Advanced	280	.943

*Split-half reliability coefficients corrected by Spearman-Brown formula.

Cultural Loading of Tests. Use of an American spelling test in Scotland may be questioned because of the possibility that some American words are not commonly used in Scotland. This matter was checked by comparing the words in the primary and intermediate lists with the Birmingham list of basic words for English children (Burroughs, 1957). On the primary test two words are in the third 500 most frequently used words, three in the second 500, and the remainder in the first 500. The intermediate test contains 24 words not on the

Birmingham list, but only one of these was found in popular American lists. This was vacation, for which the British use the word holiday. The large number of words not found on the Birmingham list or on the lists of Gates, Rinsland, or Thorndike is explained by the fact that these lists were compiled for elementary school children. The more difficult words on the intermediate test go beyond this level. Often the missing word was found to be a derivative of a word on the lists. With the exception of one or two words the spelling tests might be considered to be free of serious cultural bias.

Testing Schedule. The spelling tests were administered as a part of a series of tests in reading, writing, and spelling achievement which paralleled this investigation.[1] They were conducted during the month of February, 1962. Tests were administered in the pupils' regular classrooms during the usual class periods. In the secondary schools some adjustment of schedules was necessary to provide the block of time needed for the tests.

The primary school tests in West Lothian were administered in two sittings, either morning and afternoon or on succeeding days. The method used was determined by suitability to the class schedule. The two reading tests were conducted during one sitting, the handwriting and spelling tests during the other. The spelling and handwriting tests combined took about one hour to administer. In the secondary schools all four tests were given at one sitting, with a rest period in the middle.

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[1]This investigation was conducted as a part of a comparative study of reading, writing, and spelling achievement in England, Scotland, and the United States. The study was made possible by a Cooperative Research grant from the U.S. Office of Education.

No attempt was made, during or after the regular testing program, to test absentees. In their study, Dunsdon and Roberts (1953) demonstrated that the scores of absentees were not significantly different from the total test group. In view of their report, there did not seem to be sufficient reason to interrupt classes a second time to test absentees.

Test Administration. Tests in West Lothian were administered by the classroom teachers. This eliminated any possible effect which a strange accent might have had on test results. Teachers were thoroughly briefed on the purposes of the investigation, the content of the tests, and the details of test administration. They were advised to adhere closely to the directions given in the test manual. One exception was made. The manual offers sentences for use in presenting the words, the purpose being to illuminate the meanings of the words. Some of these sentences were not suitable to the Scottish situation. Teachers were instructed that they might use other sentences of their own invention in such cases.

The words were presented by the word-sentence-word method. Teachers were instructed to repeat any words requested by the children. Words were written in pencil on paper provided for that purpose.

Motivation and interest were high among pupils and teachers. Administration of the tests appeared to be reasonably uniform. There is every reason to believe that the scores obtained by the children are valid indicators of their achievements in the area tested.

The Jackson Sample

In order to carry out some of the objectives of this study, it was necessary to administer the spelling tests to groups of American

children. Jackson, Michigan, served as a source of these subjects. For the sake of economy relevant facts about the Jackson samples will be introduced at the time that the Jackson results are presented. The Jackson results were needed chiefly for the comparisons of spelling errors and for the several comparisons of variances.

CHAPTER IV

Results

Comparison of the West Lothian Samples with the American Norms

The design of this investigation calls for a comparison of the mean scores of the West Lothian samples with the American norms on the Metropolitan Spelling Test, 1947 Edition. These norms were derived by working backwards from tables provided by the test publishers. That is, the mean chronological ages of the samples were computed and these ages were used as "achievement ages" for normal groups of American children. These "achievement ages" were converted into raw scores from tables of age equivalents. Interpolation of the tables was necessary to obtain raw scores at the precise mean ages.

Comparisons were conducted in two ways for each sample. In the first instance, raw scores were obtained at the same point as the mean chronological age of the samples. These comparisons serve to measure differences in achievement at a time when the West Lothian samples were of the same age as their American counterparts, but had received an additional year of instruction. In the second instance, the West Lothian samples were compared with the American norms for children a year older. The same procedures were used to derive the norms, except that 12 months were added to the mean chronological ages of the samples. This comparison serves to equalize years of instruction but at the same time gives the benefit of a year of maturity to American children. The dual comparison is calculated to shed additional light on the relationship of instructional and maturation factors in the learning process.

Comparisons of the mean scores of the West Lothian samples with the norms for American children of the same ages are reported in Table 13. The mean scores of the samples are significantly above the norm at each age. Reduction of the difference at age 14 may reflect an age trend.

Table 13

Comparison of West Lothian Samples with American Norms on Metropolitan Spelling Test

Age	Number	Mean Score	s	Norm	Difference	t
7	313	19.67	4.82	7.13	12.54	46.44**
11	380	41.51	7.93	27.61	13.90	33.90**
14	338	35.43	9.53	29.84	5.59	10.75**

Table 14 compares the mean scores of the West Lothian samples with the norm for American children a year older. The sample means are

Table 14

Comparison of West Lothian Samples with American Norms on Metropolitan Spelling Test at 12 Months above the Mean Ages of the Samples

Age	Number	Mean Score	s	Norm	Difference	t
7	313	19.67	4.82	16.13	3.54	13.11**
11	380	41.51	7.93	34.31	7.20	17.56**
14	338	35.43	9.53	34.56	0.87	1.67

still above the norm at all ages, but the difference at age 14 is no longer significant. The loss at age 14 may be the result of extrapolating beyond the reasonable limits of the test and/or it may reflect an

age trend. Moreover, formal instruction in spelling in American schools commonly extends two years beyond the practice in Scottish schools. This means that the American child at this age would have the benefit of an additional year of maturity and an additional year of formal instruction.

The Jackson Sample

Purpose of the Sample. The large differences in favor of the West Lothian samples, especially at ages 7 and 11, pose a question regarding the adequacy of the test norms. It has already been noted that the 1947 edition of the Metropolitan Spelling Test was used in order to obtain a list-recall test. The norms, then, are old, and it is possible that they no longer represent the spelling achievement of American children. To check this possibility, the tests were administered to children in a variety of schools in Jackson, Michigan.

General Information. Jackson is a city of about 50,000 inhabitants in south-central Michigan. The predominantly industrial and commercial aspect of the city is reflected in a population with a large middle class and a somewhat above average representation in the upper middle class and professional ranks. Jackson enjoys a favorable socio-economic situation and a school system which compares favorably with systems in similarly situated cities in the United States.

Jackson children enter primary school in September if they will be six years old by December 1st of that year. The school year lasts 37 weeks. Reading instruction is usually introduced early in the first year but may be deferred as much as four months. Children may receive some practice in auditory discrimination in prereading activities, but look-and-say methods are commonly used in beginning

reading instruction. Phonics are generally introduced from time to time after an initial sight vocabulary has been developed. Spelling is conducted on an informal basis in Grade 1, primarily in conjunction with writing activities. In Grade 2 a specific period is allotted to spelling instruction, but children are not yet introduced to their spellers. Grades 3 through 6 mark the period of systematic spelling instruction for all pupils. Spelling methods, as determined by the spelling series used (Patton and Johnson, 1959), depend on the individual word approach. Generally speaking, educational practices in the primary grades in Jackson are not unlike those found in most school systems of the same size around the country.

Jackson children are tested periodically with standardized achievement tests and have been found to compare favorably on the average with American norms for these tests. There is no reason to believe that Jackson children spell less well than children of the same ages in other parts of the country.

Description of the Samples. The samples in Jackson were obtained by testing entire classes at Grades 2, 6, and 9. These grades correspond to the levels tested in West Lothian. The sizes of the samples obtained, in relation to the populations, are reported in Table 15. It is evident that the samples represent an ample proportion of the population.

Table 16 indicates that the Jackson samples are older than the West Lothian samples. These differences are significant at the .01 level. One reason for these differences is the West Lothian practice of admitting some children at the beginning of the summer term. The numbers admitted at this time are small, but they serve to depress the mean age. There is nothing that can be done in this investigation to adjust differences caused by this policy.

Table 15

Size of Jackson Samples

Age	Population*	Sample	Per Cent
7	1034	406	39.26
11	923	402	43.55
14	992	418	42.14

*Membership as of fourth Friday following Labor Day, 1961-62 (Jackson Public Schools, 1961, p.33).

Table 16

Comparison of Mean Ages of Jackson and West Lothian Samples

Group	Jackson			West Lothian			Difference	t
	Number	Mean	s	Number	Mean	s		
Primary	406	94.17	4.28	320	91.13	3.76	3.04	10.13**
Intermediate	402	142.32	5.07	386	139.61	4.92	2.71	7.53**
Secondary	418	178.51	4.43	339	175.68	3.50	2.83	9.76**

The second reason for age differences is the presence of repeaters in the Jackson samples. Almost never does a child repeat a grade in Scotland. The mean ages of the Jackson samples could be lowered if repeaters were left out, but this would, at the same time, remove many slow learners from the samples. As slow learners were not excluded from the West Lothian samples, repeaters were not eliminated from the Jackson samples in order to avoid a bias in their favor.

The mean IQ's of Jackson children, not unexpectedly, tend to be above average. This is reflected in the mean IQ's of the samples

reported in Table 17. The mean IQ's reported here were obtained from school records of results on the Lorge-Thorndike Group Intelligence Test. The samples at ages 7 and 11 are significantly above the norm on this test.

Table 17

Mean IQ's of Jackson Samples at Ages 7 and 11 in Relation to Test Norms

Age	Sample		Norm		Difference	z
	Number	Mean	μ	sd		
7	406	105.82	100	16	5.82	7.37**
11	390	109.40	100	16	9.40	11.60**

IQ's were not available for the sample at age 14. However, these children took the Differential Aptitude Test in the eighth grade and results of this test were available from school records. The manual for this test offers norms for the combined scores of the Verbal Reasoning and Numerical Ability subtests. It is suggested that these results represent a reasonable equivalent to an IQ test (Bennett et al., 1959, p.77). Norms are provided in terms of raw scores and are reported separately for boys and girls. Table 16 suggests that the Jackson sample at age 14 may be assumed to be normal in intelligence.

The tests in Jackson were conducted during the same period as the testing program in West Lothian. Tests were administered by assistants procured through the school district Office of Pupil Services. Testing was conducted during regular class periods in the pupils' own rooms. Instructions were the same as those used in West Lothian. Because only the spelling and handwriting tests were administered in Jackson the testing was conducted in one sitting of about one hour.

Table 18

Comparison of Jackson Boys and Girls at Age 14 with the Norms for the Combined Tests of Verbal Reasoning and Numerical Ability

Group	Sample		Norm		Difference	z
	Number	Mean	μ	sd		
Boys	183	35.7	35.0	14.2	0.7	.67
Girls	204	33.3	32.1	13.5	1.2	1.26

Comparisons Dealing with the Spelling Achievement of the Jackson Samples

Table 19 compares the mean scores of the Jackson samples with the West Lothian samples on the Metropolitan Spelling Test. The sample means for West Lothian are significantly above the Jackson means at all age levels. These differences obtain despite the fact that the Jackson samples are older and at ages 7 and 11 have above normal IQ's.

Table 19

Comparison between West Lothian and Jackson Samples on Metropolitan Spelling Test

Age	West Lothian			Jackson			Difference	t
	Number	Mean Score	s	Number	Mean Score	s		
7	313	19.67	4.82	406	17.00	4.80	2.67	7.42**
11	380	41.51	7.93	402	29.83	10.60	11.68	17.43**
14	338	35.43	9.53	418	28.95	12.16	6.48	8.20**

The advantages at ages 11 and 14 are very nearly the same as those found when the West Lothian samples were compared with the norms.

At age 7 the difference is smaller in the present comparison. These results suggest that the norms at ages 11 and 14 are reasonably adequate, but that the norm at age 7 might be questioned.

Table 20 offers further evidence on this point. This table compares the mean scores of the Jackson samples with the American norms. At ages 11 and 14 the differences are quite small, although the difference at age 14 is statistically significant. However, the difference in favor of the Jackson children at age 7 is quite large. In view of the previous comparisons of West Lothian children with the norms, this large difference suggests that the norm at age 7 is rating both the Jackson and West Lothian samples too high. At this age the comparison between the Jackson and West Lothian samples might be more suitable than comparisons with the norm.

Table 20

Comparison of Jackson Samples with American Norms on Metropolitan Spelling Test

Age	Number	Mean Score	s	Norm	Difference	t
7	406	17.00	4.80	9.09	7.91	32.96**
11	402	29.83	10.60	29.16	0.67	1.26
14	418	28.95	12.16	31.26	-2.31	-3.92**

Comparison of Variability of Total Samples

Comparison of Variances. In addition to comparison differences between mean scores on a test it is desirable to compare the variances between samples. The variances of the Jackson and West Lothian

samples on the Metropolitan Spelling Test, 1947 Edition, are compared in Table 21. The Jackson samples are significantly more variable than the West Lothian samples at ages 11 and 14 (Dixon and Massey, 1957, p. 106). The difference at age 7 is negligible, a fact which may be explained by examination of Table 22.

Table 21

Comparison of Variances of Jackson and West Lothian Samples on Metropolitan Spelling Test

Age	Jackson		West Lothian		df	F
	Number	Variance	Number	Variance		
7	406	23.077	313	23.252	405/312	.992
11	402	112.424	380	62.932	401/379	1.786**
14	418	147.866	338	90.859	417/337	1.627**

Comparison of Frequency Distributions of Scores. Table 22 presents the distribution of scores for each sample at each age. The large number of scores in the upper range at age 7, where the maximum score was 24, indicates that the test at this age had a ceiling too low to test adequately the best spellers in either sample. This is especially true in West Lothian, where 61 children, or 19 per cent of the sample, attained perfect scores. This factor would serve to depress the variance of the sample. The same factor is also working within the Jackson sample, but in this case the number of perfect scores was only 20, or 5 per cent of the sample. The effect on the West Lothian sample would, then, be greater.

Table 23 indicates the accumulated per cent of pupils scoring at or below each of the intervals in the table. The fact that the

Table 22

Distribution of Scores of Jackson and West Lothian Samples on Metropolitan Spelling Test

Score	Age 7		Age 11		Age 14	
	Jackson	West Lothian	Jackson	West Lothian	Jackson	West Lothian
48-50			4	79	13	18
45-47			24	101	30	45
42-44			31	58	28	39
39-41			40	40	36	41
36-38			40	37	37	50
33-35			44	18	42	29
30-32			30	16	31	33
27-29			35	10	34	29
24-26	20	61	42	5	33	15
21-23	80	122	27	5	26	15
16-20	116	45	27	5	25	8
15-17	94	38	22	3	23	6
12-14	41	20	16	1	18	2
9-11	31	14	9		15	2
6-8	12	10	5	1	12	2
3-5	10	1	5		7	2
0-2	2	2	1	1	8	2
Totals	406	313	402	380	418	338

Table 23

Cumulative Relative Frequencies of Scores of Jackson and West Lothian Samples on Metropolitan Spelling Test

Score	Age 7		Age 11		Age 14	
	Jackson (406)	West Lothian (313)	Jackson (402)	West Lothian (380)	Jackson (418)	West Lothian (338)
48-50			100.0	100.0	100.0	100.0
45-57			99.0	79.2	96.9	94.7
42-44			93.0	52.6	89.7	81.4
39-41			85.3	37.4	83.0	69.8
36-38			75.4	26.8	74.4	57.7
33-35			65.4	17.1	65.6	42.9
30-32			54.5	12.4	55.5	34.3
27-29			47.0	8.2	48.1	25.1
24-26	100.0	100.0	38.3	5.5	40.0	16.0
21-23	95.1	80.5	27.9	4.2	32.1	11.5
18-20	76.4	41.5	21.1	2.9	25.8	7.1
15-17	46.8	27.2	14.4	1.6	19.9	4.7
12-14	23.6	15.0	9.0	0.8	14.4	3.0
9-11	13.5	8.6	5.0	0.5	10.0	2.4
6-8	5.9	4.2	2.7	0.5	6.5	1.8
3-5	3.0	1.0	1.5	0.3	3.6	1.2
0-2	0.5	0.6	0.2	0.3	1.9	0.6

Jackson percentages are consistently above the West Lothian percentages indicates that West Lothian scores ran higher than those in Jackson throughout the range.

Comparisons of Mean Scores of Boys and Girls

West Lothian. The mean scores of the boys and girls in the West Lothian samples are compared in Table 24. The mean scores of the girls are above those of the boys at each age. The differences at ages 7 and 14 are significant at the .01 level.

Table 24

Comparison between Boys and Girls in West Lothian Samples on Metropolitan Spelling Test

Age	Boys			Girls			Difference	t
	Number	Mean Score	s	Number	Mean Score	s		
7	159	18.66	5.34	154	20.70	3.98	-2.04	-3.85**
11	192	40.81	9.04	188	42.22	6.57	-1.41	-1.74
14	151	33.74	10.49	187	36.79	8.47	-3.05	-2.88**

Jackson. As shown in Table 25 girls in Jackson, like those in West Lothian, scored higher on the average than the boys at all age levels. All differences are significant at the .01 level. These differences are greater than the differences found in favor of the girls in the West Lothian samples.

As Table 26 demonstrates, the differences in spelling achievement in favor of the girls in the Jackson samples cannot be attributed to differences in intelligence as measured by the tests previously reported for the total groups.

Table 25

Comparison between Boys and Girls in Jackson Samples on Metropolitan Spelling Test

Age	Boys			Girls			Difference	t
	Number	Mean Score	s	Number	Mean Score	s		
7	181	15.74	5.49	225	18.01	3.90	-2.27	4.73**
11	197	24.73	11.04	205	31.86	9.78	-4.13	3.97**
14	201	26.18	12.60	217	31.52	11.17	-5.34	4.56**

Table 26

Comparison of Intelligence Ratings of Boys and Girls in Jackson Samples

Age	Boys			Girls			Difference	t
	Number	Mean	s	Number	Mean	s		
7	181	105.18	12.06	225	106.33	12.16	-1.15	.95
11	192	108.62	14.11	198	110.12	12.30	-1.50	1.12
14	183	35.7	14.32	204	33.3	13.42	2.4	1.69

Moreover, Table 27 makes it evident that age differences did not favor Jackson girls. The boys are older than the girls at ages 7 and 11. The difference at age 11 is significant at the .05 level. This age difference can probably be attributed to retention policies. On the whole, Jackson children are promoted in age groups. However, a small proportion are retained each year, primarily in the lower grades. As boys are more apt to be retained than girls, the mean age of the boys in any grade might be expected to be higher. This is probably most evident at age 11 because of the accumulation at this age of children

retained during the first six years of school. The balance at age 14 is likely the result of grouping policies in the junior high school.

Table 27

Comparison of Mean Ages of Boys and Girls in Jackson Samples

Group	Boys			Girls			Difference	t
	Number	Mean Age in Months	s	Number	Mean Age in Months	s		
Primary	181	94.52	4.46	225	93.88	4.12	0.64	1.49
Intermediate	197	142.90	5.65	205	141.76	4.38	1.14	2.24*
Secondary	201	178.43	4.55	217	178.58	4.33	-0.15	-.34

Comparisons of Variability of Boys and Girls

Comparison of Variances. Differences in variability between boys and girls in West Lothian are reported in Table 28. The boys exhibit greater variability than the girls at all ages. In each case the difference is significant at the .01 level.

Table 28

Comparison between Variances of Boys and Girls in West Lothian Samples on Metropolitan Spelling Test

Age	Boys		Girls		df	F
	Number	Variance	Number	Variance		
7	159	28.49	154	15.87	158/153	1.80**
11	192	81.70	188	43.10	191/187	1.90**
14	151	110.08	187	71.69	150/186	1.54**

A similar comparison of variances is reported in Table 29 for boys and girls in the Jackson samples. In these samples the boys are more variable than the girls at all age levels but only the difference at age 7 is significant.

Table 29

Comparison between Variances of Boys and Girls in Jackson Samples on Metropolitan Spelling Test

Age	Boys		Girls		df	F
	Number	Variance	Number	Variance		
7	181	30.14	225	15.19	180/224	1.98**
11	197	121.77	205	95.55	196/204	1.27
14	201	158.73	217	124.68	200/216	1.27

Comparison of Frequency Distributions of Scores. Tables 30 and 31 report the frequencies and cumulative relative frequencies of scores attained by boys and girls in the West Lothian samples. It is interesting to note that very few girls are found in the lower ranges of scores. This is particularly true of the samples at age 11. The scores of the girls tend to cluster in the middle and upper ranges, a phenomenon which may be inferred from the earlier comparison of variances which demonstrated the greater variability of the boys. On the other hand, the percentages of boys and girls in the very upper ranges are quite similar.

Tables 31 and 32 indicate a similar trend in the scores of boys and girls in the Jackson samples. However, the distinction between boys and girls in the lower ranges is not as sharp as in West Lothian.

Table 30

Distribution of Scores of Boys and Girls in West Lothian Sample on Metropolitan Spelling Test

Score	Age 7		Age 11		Age 14	
	Boys	Girls	Boys	Girls	Boys	Girls
48-50			40	39	8	10
45-47			50	51	14	31
42-44			28	30	16	23
39-41			16	24	20	21
36-38			19	18	21	29
33-35			10	6	8	21
30-32			8	8	20	13
27-29			6	4	13	16
24-26	25	36	3	2	7	8
21-23	56	66	2	3	7	8
18-20	20	25	4	1	5	3
15-17	26	12	3		4	2
12-14	10	10	1		2	
9-11	11	3			1	1
6-8	9	1	1		1	1
3-5	1				2	
0-2	1	1	1		2	
Totals	159	154	192	188	151	187

Table 31

Cumulative Relative Frequencies of Scores of Boys and Girls in West Lothian Sample on Metropolitan Spelling Test

Score	Age 7		Age 11		Age 14	
	Boys (159)	Girls (154)	Boys (192)	Girls (188)	Boys (151)	Girls (187)
48-50			100.0	100.0	100.0	100.0
45-47			79.2	79.3	94.7	94.7
42-44			53.1	52.1	85.4	78.1
39-41			38.5	36.2	74.8	65.8
36-38			30.2	23.4	61.6	54.5
33-35			20.3	13.8	47.7	39.0
30-32			15.1	9.6	42.4	27.8
27-29			10.9	5.3	29.1	20.8
24-26	100.0	100.0	7.8	3.2	20.5	12.3
21-23	84.3	76.6	6.3	2.1	15.9	8.0
18-20	49.1	33.8	5.2	0.5	11.3	3.7
15-17	36.5	17.5	3.1	0.0	7.9	2.1
12-14	20.1	9.7	1.6	0.0	5.3	1.1
9-11	13.8	3.2	1.0	0.0	4.0	1.1
6-8	7.9	1.3	1.0	0.0	3.3	0.5
3-5	1.3	0.6	0.5	0.0	2.6	0.0
0-2	0.6	0.6	0.5	0.0	1.3	0.0

Table 32

Distribution of Scores of Boys and Girls in Jackson Sample on Metropolitan Spelling Test

Score	Age 7		Age 11		Age 14	
	Boys	Girls	Boys	Girls	Boys	Girls
48-50			1	3	2	11
45-47			9	15	14	16
42-44			10	21	11	17
39-41			19	21	13	23
36-38			18	22	16	21
33-35			18	26	18	24
30-32			17	13	12	19
27-29			17	18	12	22
24-26	9	11	19	23	13	20
21-23	27	53	13	14	16	10
18-20	42	74	16	11	17	8
15-17	43	51	15	7	17	6
12-14	21	20	9	7	11	7
9-11	19	12	6	3	11	4
6-8	8	4	4	1	8	4
3-5	10		5		5	2
0-2	2		1		5	3
Totals	181	225	197	205	201	217

Table 33

Cumulative Relative Frequencies of Scores of Boys and Girls in Jackson Sample on Metropolitan Spelling Test

Score	Age 7		Age 11		Age 14	
	Boys (181)	Girls (225)	Boys (197)	Girls (205)	Boys (201)	Girls (217)
48-50			100.0	100.0	100.0	100.0
45-47			99.5	98.5	99.0	94.9
42-44			94.9	91.2	92.0	87.6
39-41			89.8	81.0	86.6	79.7
36-38			80.2	70.7	80.1	74.6
33-35			71.1	60.0	72.1	59.4
30-32			71.9	47.3	63.2	48.4
27-29			53.3	41.0	57.2	39.6
24-26	100.0	100.0	44.7	32.2	51.2	29.5
21-23	95.0	95.1	35.0	21.0	44.8	20.3
18-20	80.1	71.6	28.4	14.1	36.8	15.7
15-17	57.2	38.7	20.3	8.8	28.4	12.9
12-14	33.1	16.0	12.7	5.4	19.9	9.2
9-11	21.5	7.1	8.1	2.0	14.4	6.0
6-8	11.0	1.8	5.1	0.5	9.0	4.1
3-5	6.6	0.0	3.0	0.0	5.0	2.3
0-2	1.1	0.0	0.5	0.0	2.5	1.4

The fact that there are more boys than girls in the lower ranges is not surprising in the Jackson sample. This trend has been demonstrated consistently in research in the United States. Relatively speaking the poorest spellers in West Lothian are even more apt to be boys than in Jackson.

Comparison of Misspellings of West Lothian and Jackson Samples

The analysis of the spelling records included a comparison of the misspellings of the Jackson and West Lothian samples. The object was to discover the favorite method of attack on unknown words used by children in each sample. It was felt that these comparisons might shed light on the way in which differences in instructional practices affect the method of spelling.

Comparison of Most Common Misspellings. The most common misspelling used by each sample for each word was determined and these were compiled in the tables reported on the following pages. Since it was expected that any major differences would involve the degree of use of phonetic generalization, the misspellings were analyzed on this basis. The criterion used for classification was whether the word could be understood when the misspelling was pronounced as spelled. At age 7 misspellings were considered phonetic if the letters used could have, in English, the sounds ascribed to them. At ages 11 and 14 the same criterion was applied, except that the letter had to be capable of producing the correct sound in the position in which it was used. For example, at age 7, "g" might have the sound "guh" or "juh." At age 14, "g" had the sound "guh" when followed by "a", "o", or "u" and the sound "juh" when followed by "e" or "i." Local usage was considered in testing

whether misspellings were phonetic. For example, algerbra was accepted as a phonetic rendition for algebra in Jackson, while soond was accepted for sound in West Lothian.

On this basis, the per cent of phonetic misspellings was determined and comparisons were made for the samples at each age. These comparisons are reported in Table 37. The West Lothian samples tended to use more misspellings which represented a phonetic rendition of the desired word at ages 7 and 11. Differences are significant at the .05 level. Moreover, there is a clearly observable age trend which indicates improvement in the ability of Jackson children to apply phonetic generalizations relative to Scottish children. This is all the more striking when it is considered that the younger Jackson samples exhibit above normal mean IQ's and might be expected to be better than average in applying generalizations.

Table 37

Comparison of the Per Cent of Phonetic Renditions in Most Common Misspellings of Jackson and West Lothian Samples

Age	Jackson		West Lothian		Difference	z
	Number	Per Cent Phonetic	Number	Per Cent Phonetic		
7	24	25.00	24	62.50	-37.50	2.61**
11	50	63.34	50	85.00	-21.66	2.48*
14	50	73.34	50	74.00	- 0.66	.07

Examination of Tables 34, 35, and 36 reveals an interesting trend to support these conclusions. At age 7, the most common misspelling was identical for both samples in 7 cases, or 29 per cent of the

Table 34

Comparison of Most Common Misspellings of Jackson and West Lothian Samples at Age 7

Test Word	Most Common Error		Frequency of Error	
	Jackson	West Lothian	Jackson	West Lothian
1. write	right	rite	98	51
2. bread	bred	bred	32	38
3. basket	baskit	bascet	20	22
4. pencil	pensel	pensil	13	26
5. short	sort	sort	26	21
6. send	sent	sent	57	9
7. garden	garder	gardin	10	6
8. inside	insind	in-side	15	18
9. light	like	lite	10	48
10. our	ore	oer	11	5
11. night	nigth	nite	10	19
12. ride	rade	rid	7	15
13. little	littel	littel	10	15
14. ran	run	rum, ram	24	2
15. week	weak	weak	4	7
16. her	hear	hir	7	25
17. cake	cate	cack	3	17
18. ball	boll	boll	10	39
19. red	rad	read	10	3
20. can	came	came	2	2
21. good	doog	god	2	8
22. she	her	*	2	
23. came	come	cam	3	17
24. cow	com, cwt cim, how	caw	1	3

*In West Lothian, 7 different misspellings were discovered for this word, each one used only once.

Table 35

Comparison of Most Common Misspellings of Jackson and West Lothian Samples at Age 11

	Test Word	Most Common Error		Frequency of Error	
		Jackson	West Lothian	Jackson	West Lothian
1.	disappointed	disapointed	disapointed	163	68
2.	thoroughly	throughly	thuroly	35	17
3.	patience	patients	patients	136	11
4.	assistance	asistance	asistance	29	18
5.	principal	principle	principle	47	13
6.	deceive	decieve	decieve	83	48
7.	obedient	obedent	obediant	50	23
8.	attitude	atitude	atitude	62	115
9.	gymnasium	gymnasiam	jimnasium	10	25
10.	liquor	licker	liquer	54	39
11.	algebra	algerbra	algibra	48	87
12.	associate	asociate	assosiate	21	29
13.	quantities	quanties	quantites	40	34
14.	vacancy	vacency	vacansy	15	33
15.	athletics	atheletics	athletices	19	7
16.	admission	admition	addmission	48	37
17.	allowed	aloud	aloud	118	47
18.	usual	usal	usuall	23	6
19.	examination	examanation	examanation	34	9
20.	electricity	electricty	electrisity	48	16
21.	whose	who's	whoes	76	8
22.	material	materal	matterial	19	11
23.	fountain	founten	fountian	22	8
24.	flutter	fluter	fluter	45	16
25.	soldier	solder	soilder	28	7

Table 35--continued

Test Word		Most Common Error		Frequency of Error	
		Jackson	West Lothian	Jackson	West Lothian
26.	pickle	pickel	pickel	95	12
27.	swept	sweep	sweept	18	6
28.	cousin	cousen	cusin	12	6
29.	limb	lim	lim	36	19
30.	prepared	prepard	prepaired	20	14
31.	whom	hom	hom, hoom	11	2
32.	fare	fair	fair	70	29
33.	knew	new	new	58	17
34.	vacation	vaction	vaccation	28	11
35.	wore	ware	woar, woare	14	2
36.	pumps	punps	pumpes	8	4
37.	interesting	interresting intresting enteresting	intresting	6 6 6	29
38.	straw	staw	strow	14	5
39.	lie	lye	lye	15	7
40.	wrong	worng	wronge	9	5
41.	leave	leve	leeve	23	4
42.	blood	blod	blud	8	5
43.	these	thease	theese	6	7
44.	bowl	boul	boul, boal	9	6
45.	bottle	bottel	bottel	12	2
46.	hurt	hert	hirt	16	2
47.	study	studie	studdy	6	4
48.	funny	funney	funy	4	4
49.	lost	losed	loost	4	2
50.	sound	sownd	soond	2	2

Table 36

Comparison of Most Common Misspellings of Jackson and West Lothian Samples at Age 14

	Test Word	Most Common Error		Frequency of Error	
		Jackson	West Lothian	Jackson	West Lothian
1.	criticism	critisism	critisism	37	43
2.	simultaneous	simotanious	similtanious	22	33
3.	emphasizes	emphisizes	emphasises	32	83
4.	inconvenience	inconvience	inconveniance	67	25
5.	prejudice	predjudice	predudice	40	71
6.	advantageous	advantagous	advantagous	44	34
7.	analysis	analisis	analyses	47	20
8.	comparatively	comparitively	comparitively	102	60
9.	ridiculous	rediculous	rediculous	92	41
10.	supplementary	suplementary	suplimentary	33	45
11.	approximately	approximatly	approximatly	46	26
12.	thoroughly	throughly	thourghly	90	25
13.	courteous	courtious	courtious	66	60
14.	unanimous	unanamous	unanimus	35	19
15.	physician	physican	physian	40	14
16.	specifically	specificly	specificaly	30	19
17.	deceive	decieve	decieve	128	57
18.	patronage	patrinage	patrionage	35	11
19.	schedule	schedual	schedual	33	40
20.	obedient	obediant	obediant	45	29
21.	straightened	straighten	straitened	26	22
22.	insignificant	insignifigant	incignificant	23	24
23.	patience	patients	patients	63	9
24.	capacity	capasity	capasity	46	32
25.	principal	principle	principle	92	31

Table 36--continued

Test Word		Most Common Error		Frequency of Error	
		Jackson	West Lothian	Jackson	West Lothian
26.	disappointed	disapointed	disapointed	59	41
27.	assistance	assistence	asistance	35	9
28.	attitude	atitude	atitude	56	68
29.	allowed	aloud	aloud	108	28
30.	liquor	liquer	liquer	30	61
31.	quantities	quanities	quanties	39	12
32.	athletics	atheletics	atheletic	34	3
33.	associate	asociate	assosiate	12	27
34.	pickle	pickel	pickel	106	5
35.	vacancy	vaccancy	vacency	15	12
36.	gymnasium	gynasium	gymnasiam	14	10
37.	admission	addmission	addmission	28	29
38.	whose	who's	who's	56	23
39.	soldier	solder	soilder	19	2
40.	examination	examanation	examation	19	3
41.	fare	fair	fair	69	4
42.	algebra	algerbra	algabra	29	28
43.	swept	sweept	sweeped	14	4
44.	electricity	electricty	electrisity	28	2
45.	flutter	fluter	fluter	18	5
46.	material	materal matereal matterial	matieral	6 6 6	3
47.	usual	usually	usuall	9	5
48.	prepared	prepaired	prepaired	11	5
49.	cousin	couson	cusin	5	2
50.	limb	lim	lim	10	13

time. At age 11, identical misspellings have increased to 16, or 32 per cent of the total, and by age 14 there are 23 identical misspellings representing 46 per cent of the cases.

Comparison of Readability of Misspelled Words. The fact that the West Lothian samples tend to misspell words by offering an incorrect phonetic rendition leads to the possibility that West Lothian misspellings might be more easily understood than Jackson misspellings. This possibility was checked in the following manner.

Words were drawn at random from the total misspellings of each sample. The selection was such that one misspelling by each sample was obtained for each word. When the misspelling selected represented an actual word, another word was selected in a random manner. In this way, tests were constructed which represented 24 Jackson and 24 West Lothian misspellings at age 7, and 50 misspellings for each sample at ages 11 and 14. In order to control practice effect, the words were alternated so that odd-numbered misspellings were from the Jackson samples and even-numbered misspellings were from the West Lothian samples. Moreover, the tests were constructed so that one-half of the West Lothian misspellings preceded the Jackson misspelling of the same word, and vice-versa. Copies of the tests may be examined in the Appendix. Examinees were instructed to respond to each misspelling in turn and not go back once a response had been made.

These tests of readability were administered to three sections of undergraduate students in teacher education at the University of Michigan. Because these sections had not been grouped in any special manner and were sections of the same class, there is no reason to believe that they would differ in performance on the test. At any rate,

copies of all three tests were distributed in each class, but with each student responding only to the misspellings of one age group. Tests were administered by faculty members involved in the investigation, using a common set of instructions. They were administered at the same time under similar conditions. There is every reason to believe that almost identical conditions prevailed in all cases.

Table 38 reports the results of these tests. At each age level, the examinees were able to respond correctly to a greater number of the West Lothian misspellings. The differences reported are significant at the .01 level. The greatest difference occurred at age 11, a time when West Lothian children have been observed to be at a peak in relative spelling ability and ability to apply phonetic generalizations. The difference at age 14 is smaller than at the other ages. However, in this case the difference is still significantly in favor of the West Lothian children, in contrast to the results of the comparisons of most common misspellings. It is likely that this is a function of the tests employed, a matter which is discussed in the next chapter.

Table 38

Comparison of Readability of Words Misspelled by Jackson and West Lothian Samples

Age	Jackson			West Lothian			Difference	df	t
	Number	Mean	s	Number	Mean	s			
7	38	5.05	1.62	38	9.00	1.76	-3.95	73	-10.13**
11	37	29.70	2.22	37	38.19	2.16	-8.49	73	-16.65**
14	39	36.77	2.40	39	39.95	2.06	-3.18	76	-6.24**

CHAPTER V

Discussion

The results reported in the present investigation indicate that West Lothian children are superior in spelling ability to American children of the same ages when measured by the Metropolitan Spelling Test, 1947 Edition. These results closely parallel those reported by MacGregor (1934) in a similar study. He tested virtually all eleven-year-olds in Fife, Scotland, in several areas of achievement using the Public School Achievement Test. His investigation indicated that spelling was the strongest Scottish subject relative to the United States. Although comparisons in the present investigation were conducted in terms of raw scores, it is interesting to note that conversion of the mean raw score of the eleven-year-old sample into an age equivalent reveals an advantage of 26 months for the West Lothian children. This is strikingly similar to the 29 month advantage MacGregor reported for the Fife sample.

MacGregor confined his study to one age group but concluded that part of the Scottish advantage was due to beginning instruction at an earlier age and part was due to efficiency of teaching. In a later study of reading achievement Taylor (1950) supported his conclusions concerning the advantage of beginning reading instruction at age five. Her Scottish sample at age six scored approximately one year above the American norm on the Metropolitan Achievement Test, Primary I Battery. However, there was again no opportunity to measure achievement over a period of time.

Scholl (1960) pursued the same problem in Burton-upon-Trent, England. She tested children at a number of ages up to age 13. Although she found that most of the early advantages in reading deteriorated with age, small advantages in spelling were maintained at least as late as age 13. Scholl pursued her study further with an investigation of the achievement of American children on British attainment tests. The data from this study have not been fully analyzed but the results of the spelling tests are reported in Table 39. The American samples are significantly below the English norm at all ages. These results corroborate her earlier results and support the findings in the present investigation.

Table 39

Comparison of Jackson Samples with English Norm on Schonell Spelling Test

Age	Number	Mean Score	s	Norm	Difference	t
7	147	23.29	10.80	28.93	-5.64	-6.34**
9	173	43.80	13.63	49.47	-5.67	-5.45**
11	162	61.05	12.44	70.12	-9.07	-9.26**

The English superiority in spelling discovered by Scholl was significant but not of the proportion reported by MacGregor for Scottish children. In this light, an investigation by Vernon, O'Gorman and McLellan (1955) offers further evidence. They reported that comparisons of English and Scottish children at ages 8, 11, and 14 revealed a significant advantage in spelling ability in favor of the Scottish children. It is also interesting that no deterioration of the

advantage was found with increasing age, even though differences did become smaller in most of the other areas of achievement tested.

The results of the present investigation are of interest in this respect. The West Lothian advantage over the American norm at age 7 was considerably larger than the advantage which accrued to the West Lothian sample at age 14. However, it was pointed out that the norm at this age was questionable. West Lothian superiority over the Jackson sample was not as large. It is at age 11 that the difference is most marked and the subsequent deterioration of the difference at age 14 is suggestive of an age trend. This conclusion is supported in the comparisons of most common spelling errors.

These comparisons revealed that Scottish children made significantly more errors of a phonetic nature at ages 7 and 11 but that at age 14 there was no significant difference between the groups. These results suggest that the Jackson children catch up in their ability to apply phonetic generalizations.

On the other hand, the tests of readability of misspelled words indicate that West Lothian misspellings are read more easily than Jackson misspellings at age 14, although the difference is not as great as at the younger ages. It is only possible to speculate as to why the difference disappears completely in the first instance, but only partially in the second.

It is possible that the test words at age 14 do not lend themselves to phonetic rendition to the same degree as the words in the tests at ages 7 and 11. Then again, the tests of readability were drawn from all errors. The most common misspellings are quite likely to be those of better spellers since the errors of poor spellers tend to be more random. Carroll (1930) has demonstrated that better

spellers are more proficient at applying generalizations. The cause and effect pattern here is circular. Better spellers generalize more efficiently and are thus apt to agree more often in their misspellings than will poor spellers. The most common misspelling is then more likely to be the misspelling of the better spellers. For this reason most common misspellings are apt to exhibit more cases of faulty generalization than cases of failure to generalize. A third possibility is that the tests of readability may measure factors other than ability to spell phonetically. At any rate, the evidence suggests some amount of "catching up" on the part of the American children. This is not sufficient, however, to overcome the early superiority of the Scottish samples.

The evidence of an age trend suggests that as the American children reach maturity, they overcome some of the disadvantage of having received less instruction. However, the comparisons of the Scottish samples with norms for American children a year older indicates that the Scottish children at ages 7 and 11 more than maintained any advantage gained by starting instruction a year earlier. At the time of these comparisons American children have had an equal amount of instruction. They are a year older, but it might be argued that one year doesn't really make a great deal of difference as long as they finally learn to spell as well as their capabilities will allow. The fact that the Scottish children are superior in spelling to groups of American children who have the advantage of a year of maturity indicates that age of instruction is not the major consideration at present in the teaching of spelling.

Certain facts which have not yet been pointed out are relevant in regard to this aspect of the discussion. The Jackson sample at age

7 was found to contain a significantly larger proportion of girls than boys. As the girls attained higher scores than the boys it is quite likely that the sex imbalance tended to raise the mean score above what might be attained by a group in which the numbers of boys and girls were equal. The difference in attainment between the Scottish and Jackson samples at this age might, then, actually be larger than is indicated.

The same trend is found in the fourteen-year-old West Lothian sample. The difference in the proportion of girls is not statistically significant but it is quite large. It is likely that this imbalance inflated the mean score to some extent. This fact, coupled with the finding that the difference at age 14 was not significant when American children were a year older, suggests that the American children do, indeed, make up any early differences once they have had the same amount of instruction. However, other factors enter at this point.

Perhaps most important is the fact that by age 14 American children have actually had one more year of spelling instruction than have Scottish children. This occurs because formal spelling instruction in Scottish schools ends with the completion of primary school. American children generally receive spelling instruction in Grades 7 and 8. Furthermore, as the testing at this level was conducted among children who had reached the extreme end of the grade range for which the test was constructed it is quite likely that the norm for age plus twelve months was obtained by extrapolating beyond the reasonable limits of the test. The appearance that American children do make up all differences in spelling achievement except those attributable to the earlier Scottish start must be considered in the light of these factors. In this light, the relative advance at age 14 seems more likely to be

the result of an instructional advantage which accrues to the American children between the ages of 11 and 14 rather than to increased maturation.

The comparisons of misspellings suggest that American children catch up in their ability to generalize. As American practices do not teach for the development of generalizations in spelling, the extra year of instruction by age 14 is probably not a factor in these results. This suggests that generalizations are discovered by children even when they are not specifically taught for in the classroom. However, the persistence of Scottish superiority suggests that the ability to generalize from specific words in spelling develops more slowly when the learning materials are not structured to assist in such development. Moreover, this ability may not develop completely for all children in the unstructured situation.

It has become increasingly evident that instructional methods have an important role in spelling achievement. This viewpoint is supported by Schonell (1956), who reports that school experiences have more influence on spelling achievement than do such factors as intelligence and maturity. He further points out that this influence appears to be stronger in spelling than in other areas of achievement. Results of research reported above, indicating an age trend in all achievement areas but spelling, tend to support Schonell's conclusions.

The evidence suggests that the relative roles of maturation and instruction are not constant but vary from subject to subject. Reading seems to be more closely related to maturation than does spelling. This is not surprising if spelling is thought of as following reading in the development of language skill. Words cannot be spelled until they are read. It follows then that spelling always lags a bit

behind reading and does not, in all probability, ever reach the limits set by maturation. This may be true, at least, in regard to the words one learns to spell.

It has been observed, however, that some catching up occurred with age in the ability of American children to generalize, even though teaching for generalization was most certainly a more important part of the Scottish spelling program. It appears that the ability to generalize is more closely related to maturation than to instructional practices. If the evidence were more clear that the American children had caught up completely in their ability to generalize, this factor might be eliminated from further consideration. However, the combined results of the most common misspellings and the tests of readability, coupled with the fact that American children a year older and with an instructional advantage of one year do not spell as well as Scottish children, dictate the need to examine instructional practices very carefully, with special attention to practices which encourage the use of spelling generalizations.

The most apparent difference in instruction is the Scottish practice of beginning instruction at an earlier age than in the United States. The discussion above clearly indicates that the advantage of this early start can be maintained as children mature. However, evidence that this is not the case in reading leads to the question of whether it is worthwhile to begin reading a year earlier just to speed up growth in spelling. Moreover, the evidence reveals that Scottish children continue to make spelling gains beyond those attributable to early beginning age. Other reasons must be sought to explain these gains.

The Scottish practice of using the corrected test as an instructional device is certainly not unknown in the United States. Horn (1947) reported on the value of this method and it is incorporated in all popular spelling series in the United States.

The unit of study in Scotland differs considerably from the practice most common in the United States. Usual Scottish practice is to introduce new words each day while the most popular American practice is to use a weekly plan. Horn (1960) suggests that there is no particular advantage in the shorter unit.

It has been noted that the usual West Lothian practice is to present words in groups according to phonetic or structural similarities, a practice not commonly used in American schools. In addition, phonics instruction receives considerable emphasis in the primary reading program. A 1950 report of the Scottish Education Department discusses the look-and-say and phonic methods of teaching reading, but stresses the phonic approach. The same report recommends careful pronunciation of spelling words and the presentation of spelling rules during spelling instruction (Scottish Education Department, 1950). In a later report, a combination of methods is suggested for beginning reading instruction (Scottish Education Department, 1955), but as at least one Scottish educationist has said, ". . .tradition dies hard." Inglis (1956) has reported that few Scottish teachers would begin the teaching of reading without some recourse to phonic methods.

The anslyses of spelling errors in the present study indicate that phonetic emphasis in instruction is reflected in the spelling habits of the children. The spelling superiority of the Scottish samples further indicates that while phonetic spelling may be a mixed blessing, the advantages seem to outweigh the disadvantages.

The fact that the Scottish sample at age 11 has the greatest superiority is probably not accidental. The analyses of spelling errors indicate that the phonetic superiority of Scottish children is also the greatest at this age. The possible reasons for this have already been implied but may bear repeating here. By age 11 formal instruction has probably reached its peak in West Lothian. Children at age 7 are limited in their ability to generalize, and by age 14 the American children have benefitted from additional instruction and maturity.

The fact that the Primary VII year is the time when the children in West Lothian will sit for the qualifying examination may be an additional factor in this respect. Teachers have a tendency to stress those areas which will be tested. Furthermore, the children are keyed to the test situation and are psychologically prepared to do their best.

Two factors which may work in favor of the West Lothian children can only be guessed at as far as their influence on spelling achievement is concerned. The first of these is the emphasis on writing and copy-book work in West Lothian schools. It is very possible that this practice has an effect on spelling ability, especially since accurate spelling is stressed in all written work. Dolch (1942) contends that children's writing provides the best opportunity to practice spelling habits.

The other influence is a cultural emphasis on literary skills. The Scots are a nation of readers and reading ability is considered a definite virtue. There is reason to believe that vocabulary and spelling growth are also thought of as assets in the same light. The academic tradition of the schools reflects this cultural emphasis.

It is generally conceded that the reasons for spelling success are varied. It would be impossible in this investigation to sort out the degree to which each factor is responsible for the significant advantage Scottish children enjoy in this respect. Each of the factors discussed will probably have some influence. However, some features of the pattern stand out sufficiently to be recognized for their importance. The evidence strongly suggests that spelling is more surely an outcome of instruction than of maturation, that altering methods of instruction will influence the final outcome in spelling ability, and that structuring materials to emphasize phonetic and structural generalizations will be reflected in increased facility in spelling.

Up to this point discussion has centered upon the effect of various educational practices on mean scores of groups of children. The center of attention has been the average. The effect that the same differences have upon such related considerations as individual and sex differences remains to be determined.

Flesch (1955) asserts that sex differences in achievement are indigenous to the United States. While it is certainly true that the pattern of female superiority in language areas has been demonstrated more consistently in American research, differences have also been reported in Great Britain. However, in some British studies the boys have demonstrated superiority (Ministry of Education, 1957). MacGregor (1934) found that the girls in his study were superior in language usage and spelling and the boys were superior in reading. Vernon, O'Gorman, and McLellan (1955) also reported female superiority in spelling. The results reported in the present investigation support these findings. The girls are significantly superior to the boys in spelling at all ages in both national samples. In parallel studies of reading achievement

among the same samples the trend was reversed and the boys were superior. It may be that the greater docility of the girls, expressed in a willingness to do all that the teacher requests by way of study, can help to explain superiority in an area which has already been observed to be more influenced by school experiences than by such factors as intelligence or maturation.

The findings reported here also indicate that female superiority in the Jackson samples is larger than in the West Lothian samples. It is likely that this difference is the result of American methods which tend to stress readiness and attention to individual differences more than is the practice in Scotland. This conclusion is supported by the results of the tests of variability which indicate that the Jackson samples are more variable than the West Lothian samples.

MacGregor (1934) discovered no significant differences in the variability of boys and girls in spelling achievement. The present investigation offers different results. The boys in the West Lothian samples are significantly more variable at all ages. The frequency tables indicate that this is the result of a wider scattering of boys in the lower ranges. The Jackson samples exhibit greater male variability only at age 7, but boys still predominate in the lower frequency ranges at all ages. Scottish methods seem to be more effective with girls who have spelling difficulties than with boys. The docile character of girls may be a factor here. This feature would probably make girls more adaptive to formal classroom methods whereas boys tend to rebel. At any rate, it is also clear that the hard core of poor spellers in both countries is predominantly male.

CHAPTER VI

Summary and Conclusions

The purpose of this study was to compare the performance of groups of Scottish children with the American norms, and with the performance of similar groups of American children, on a spelling achievement test standardized in the United States. In addition, comparisons were made of the variances of the national samples, and of the mean achievement and variances of boys and girls within each national sample. Finally, the spelling errors of the national samples were compared. The object was to obtain evidence in relation to the following differences in educational practices.

Scottish children are introduced to reading and spelling a year earlier than American children. Beginning reading instruction in Scotland tends to place somewhat more emphasis on phonics than is the case in the United States and spelling words are introduced according to phonetic or structural similarities. The Scottish curriculum tends to be more academically oriented and classroom methods are more formal than in the United States. Transfer examinations for secondary school at about age 12 probably affect the curriculum by increasing the emphasis on the three R's in the primary school.

The testing program was conducted in West Lothian County, Scotland and in Jackson, Michigan. Samples of 300-plus children were tested with the Metropolitan Spelling Test, 1947 Edition, at each of the approximate ages 7, 11, and 14 in each country. Form S was used at age 7, and Form V at ages 11 and 14.

The principal findings were as follows:

1. The mean scores of the West Lothian samples were above the norms for American children of the same ages. Differences were significant at the .01 level.

2. The mean scores of the West Lothian samples were above the norms for American children a year older than the mean ages of the samples. Differences were significant at the .01 level at ages 7 and 11. The difference at age 14 was not significant.

3. The mean scores of the West Lothian samples were above those of the Jackson samples at all ages. Differences were significant at the .01 level. These differences obtained despite the fact that the Jackson samples were slightly older and, at ages 7 and 11, above normal in IQ.

4. The variances of the Jackson samples were greater than the variances of the West Lothian samples at ages 11 and 14. These differences were significant at the .01 level. The difference at age 7 was negligible.

5. The frequency distribution tables indicated that a high percentage of children at age 7 in both national samples achieved perfect scores. The same may be said for the West Lothian sample at age 11.

6. The mean scores of girls were higher than those of boys in the West Lothian samples at all ages. The differences at ages 7 and 14 were significant at the .01 level. Mean scores of girls in the Jackson samples were significantly above those of the boys at all ages. The differences in the Jackson samples were greater than in the West Lothian samples.

7. The variance of the scores of the boys in West Lothian was greater than that of the girls at each age. Differences were significant at the .01 level.

8. The variance of the scores of the boys in Jackson was greater than that of the girls. Only the difference at age 7 was significant.

9. Frequency distribution tables indicated that in both countries boys predominated in the lower achievement ranks at all ages.

10. A higher percentage of most common misspellings of the West Lothian samples were phonetic than those of the Jackson samples. The differences at ages 7 and 11 were significant at the .05 level. The difference at age 14 was not significant. Differences between the samples deteriorated with age.

11. Randomly selected misspellings of the West Lothian samples were read correctly more often than were those of the Jackson samples. Differences were significant at the .01 level at all ages.

The above findings permit the following general statements concerning the achievement of the samples on the spelling tests:

1. West Lothian children exhibit superior spelling achievement when compared with American norms and with groups of American children of the same ages.

2. The mean spelling scores of the West Lothian children are higher than the American norms for children a year older.

3. The Jackson children exhibit more variability in their scores than do the West Lothian children.

4. The evidence suggests that this test is too easy to measure adequately the spelling ability of West Lothian children.

5. Girls in Jackson and West Lothian exhibit spelling ability superior to that of the boys. Female superiority is greater in Jackson.

6. West Lothian boys exhibit greater variability in spelling ability than do the girls. Such differences are not as evident in Jackson.

7. The hard core of poor spellers in both Jackson and West Lothian is predominantly male.

8. In general, the most common misspellings of West Lothian children indicate a tendency to spell unknown words phonetically. Jackson children exhibit relative improvement in this ability with increasing age.

9. Random misspellings of West Lothian children are easier to read than are those of Jackson children.

The evidence of this investigation demonstrates quite conclusively that West Lothian children are superior in spelling achievement. The early start appears to give an advantage as does the attention given to phonics at the beginning. Time, apparently, does not erase the advantage of the early start. However, the evidence suggests that American children catch up to some extent in their ability to apply phonics to spelling, although West Lothian children remain the better spellers. These results are not to be interpreted to mean that American schools should emulate Scottish instructional practices in spelling. The advantage of learning to spell well must be weighed against the other aims of instruction in general and of the language arts in particular. The question becomes one of the prominence which spelling achievement should hold in relation to other educational goals.

APPENDIX

TEST OF THE READABILITY OF MISSPELLED WORDS - FORM 7

Check classification: Male_____ Female_____ Student_____ Teacher_____

DIRECTIONS: Look at each word and try to decide what word was intended from its appearance and/or from sounding it out. Write only one word in each space. If you have absolutely no idea what word was intended, put a "0" in the blank space.

1. rad _____
2. iowur _____
3. com _____
4. nite _____
5. hir _____
6. riad _____
7. insied _____
8. gandan _____
9. sind _____
10. shs _____
11. neew _____
12. littul _____
13. brd _____
14. gowd _____
15. dall _____
16. flie _____
17. kume _____
18. shart _____
19. lite _____
20. pencile _____
21. rud _____
22. cac _____
23. riet _____
24. backet _____
25. bekaet _____
26. ceam _____
27. littie _____
28. reb _____
29. riade _____
30. branb _____
31. selt _____
32. liet _____
33. aur _____
34. cint _____
35. doog _____
36. weck _____
37. ginon _____
38. insid _____
39. eigth _____
40. hur _____
41. pasill _____
42. selld _____
43. hes _____
44. rane _____
45. han _____
46. dall _____
47. nake _____
48. rit _____

TEST OF THE READABILITY OF MISSPELLED WORDS - FORM 11

Check classification: Male_____ Female_____ Student_____ Teacher_____

DIRECTIONS: Look at each word and try to decide what word was intended from its appearance and/or from sounding it out. Write only one word in each space. If you have absolutely no idea what word was intended, put a "0" in the blank space.

1. quanities _____
2. gimnasaum _____
3. wromg _____
4. funay _____
5. losed _____
6. studey _____
7. assoseiate _____
8. prepaired _____
9. pricmpual _____
10. disapointed _____
11. curson _____
12. athletices _____
13. liquore _____
14. solieder _____
15. vaction _____
16. fluterd _____
17. hore _____
18. strooy _____
19. stod _____
20. bottel _____
21. obedente _____
22. atitude _____
23. pupms _____
24. hirt _____
25. waer _____
26. liy _____
27. ljbra _____
28. thoughorly _____
29. asiccents _____
30. useal _____
31. hoom _____
32. examineation _____
33. bowt _____
34. faintain _____
35. wepted _____
36. addmission _____
37. metearal _____
38. nue _____
39. lim _____
40. theese _____
41. buld _____
42. decieve _____
43. pipical _____
44. pateitence _____
45. leve _____
46. haurye _____

Form 11, cont'd

47. electricty _____
48. vacantcy _____
49. alowed _____
50. intressting _____
51. exsamination _____
52. cusen _____
53. sudty _____
54. lyime _____
55. dutter _____
56. wronge _____
57. addmichion _____
58. piccle _____
59. gymnasiam _____
60. quititise _____
61. desive _____
62. vacashion _____
63. athleticks _____
64. swepted _____
65. liy _____
66. electrisity _____
67. femnay _____
68. blud _____
69. throughly _____
70. assosiate _____
71. thes _____
72. leeve _____
73. useal _____
74. alloud _____
75. prepered _____
76. whow _____
77. foundtin _____
78. princciple _____
79. interessting _____
80. wour _____
81. duttle _____
82. pubbs _____
83. hirt _____
84. asistances _____
85. strowe _____
86. losed _____
87. atitude _____
88. soond _____
89. vackencly _____
90. whoes _____
91. fagr _____
92. mattrel _____
93. neue _____
94. obedent _____
95. disepointed _____
96. algubra _____
97. pashont _____
98. lickquor _____
99. sloider _____
100. boal _____

TEST OF THE READABILITY OF MISSPELLED WORDS - FORM 14

Check classification: Male____ Female____ Student____ Teacher____

DIRECTIONS: Look at each word and try to decide what word was intended from its appearance and/or from sounding it out. Write only one word in each space. If you have absolutely no idea what word was intended, put a "0" in the blank space.

1. courtice _____
2. wasally _____
3. examanation _____
4. unamious _____
5. lim _____
6. spceficly _____
7. tholy _____
8. chedule _____
9. prediđous _____
10. ridicilous _____
11. alloed _____
12. sewpt _____
13. suplamentary _____
14. soilder _____
15. pickel _____
16. liquer _____
17. straigtened _____
18. physitian _____
19. cosum _____
20. paitence _____
21. analusios _____
22. emphisies _____
23. vacency _____
24. simoltanious _____
25. gymnasisum _____
26. advantagous _____
27. aproximently _____
28. mateirl _____
29. inconvinunce _____
30. capicity _____
31. quanity _____
32. comparitivly _____
33. flakor _____
34. whoses _____
35. asistance _____
36. critisiaum _____
37. insignificist _____
38. prcipal _____
39. addutted _____
40. pratonage _____
41. algerbra _____
42. addmission _____
43. desptad _____
44. prpared _____
45. faire _____
46. athleticss _____

Form 14, cont'd

47. obient _____
48. assiate _____
49. deseve _____
50. elactrace _____
51. scheduial _____
52. insignifigent _____
53. usall _____
54. gymnasian _____
55. capasity _____
56. picile _____
57. spacificly _____
58. pregedous _____
59. comparitively _____
60. examiation _____
61. adventagous _____
62. approxmatly _____
63. physcian _____
64. streatend _____
65. soughter _____
66. atitude _____
67. peapard _____
68. lomb _____
69. simotanous _____
70. quantitys _____
71. swapit _____
72. decieve _____
73. patranage _____
74. faier _____
75. liqour _____
76. inconveinence _____
77. pations _____
78. suplementary _____
79. admisson _____
80. disapointed _____
81. electricty _____
82. couism _____
83. matereal _____
84. curtious _____
85. whos _____
86. alloud _____
87. rediculous _____
88. algibra _____
89. unanamous _____
90. analice _____
91. athetics _____
92. flater _____
93. asociate _____
94. vacanacy _____
95. critism _____
96. obeant _____
97. empfizez _____
98. thosoaly _____
99. prinicpal _____
100. asistances _____

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