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A study of children's written vocabulary.

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A STUDY OF CHILDREN'S WRITTEN VOCABULARY

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TABLE OF CONTENTS

CHAPTER		PAGE
I.	THE PROBLEM	1
II.	SUMMARY OF RESEARCH	6
III.	PLAN AND CONDUCT OF THE STUDY	17
IV.	ANALYSIS OF DATA	21
V.	SUMMARY AND CONCLUSIONS	29
VI.	SUGGESTIONS FOR FURTHER RESEARCH	31
APPENDICES		32
BIBLIOGRAPHY		39

LIST OF TABLES AND CHARTS

CHART — PAGE

I Frequency Chart Comparing Recall and Recognition Tests........ 21

TABLE

I Medians, Quartiles, Interquartile Ranges...................... 22

II Critical Ratio - Recall and Recognition Tests................ 23

III Critical Ratio - Boys (Test I) v.s. Girls (Test I)........... 23

IV Critical Ratio - Boys (Test II) v.s. Girls (Test II).......... 24

V Critical Ratio - Boys (Total Words) v.s. Girls (Total Words)... 24

VI Critical Ratio - Boys (Words Beyond Level) v.s. Girls (Words Beyond Level).. 25

VII Critical Ratio - Boys (Different Words Beyond Level) v.s. Girls (Different Words Beyond Level)........................ 25

VIII Critical Ratio - Boys (I.Q) v.s. Girls (I.Q)................. 25

IX Correlations - Recall v.s. (a) Total Words (b) Total Words Beyond Level (c) Different Words Beyond Level - Recognition (a) Total Words (b) Total Words Beyond Level (c) Different Words Beyond Level.. 26

X Correlations - Mental Age v.s. (a) Total Words on Themes (b) Total Words Beyond Level (c) Different Words Beyond Level (d) Test I - Recall (e) Test II - Recognition................. 27

XI Correlation - Test I - Recall v.s. Test II - Recognition..... 27

CHAPTER I

THE PROBLEM

There have been many studies of vocabulary made. The majority of these are concerned with word counts or vocabulary testing. Most of the earlier word counts were done on the adult level. However, many word counts from children's writing have been made recently. These studies have been very much needed and should prove extremely valuable to writers of children's books, compilers of spelling lists, school administration and teachers. In spite of the amount of research done educators recognize the necessity for continued effort. This is partly due to the fact that while one piece of research may sound authentic and complete, it may not agree in many respects with other studies that seem just as reliable.

Because vocabulary is constantly changing, what may be basic for one generation may be incomplete for the next generation.

There have been several outstanding pieces of research done in the past thirty or thirty-five years in attempts to secure adequate sampling of vocabulary so that lists could be compiled which could be considered fairly basic. Sigmund Fogler [1/] states, in his article "The Case for a Basic Written Vocabulary", that it is obvious that a basic vocabulary is one which is most widely and frequently used by that segment of the population which uses these words.

The word counts of Thorndike [2/] were based largely on adult vocabulary.

1/Fogler, Sigmund "The Case for a Basic Written Vocabulary" El Sch J 47: 43-47 September, 1946.

2/Thorndike, E. L. The Teacher's Word Book - a list of 10,000 Words New York City: Teachers College Columbia University, 1921.

The latest work was the Teacher's Word Book of 30,000 words. This was compiled with the help of Irving Lordge 1/ and contains counts of children's reading, also. Four different counts are summarized in this book, as well as a general count. The counts are separated so that the one that is applicable to a particular situation can be used. The first count emphasized "frequency in readers, textbooks, the Bible, and the English classics." The second count included recent and popular magazines. The third count was based on books recommended for boys and girls in grades 3-8. The fourth count dealt primarily with juvenile and adult reading (it omitted school readers and textbooks.)

This word count is conceded to be a great improvement on the Thorndike Teacher's Word Book published earlier. The authors state that this book should not be considered final as a frequency count of English reading because new words will become important. Also, other divisions of words could have been made. However, it is suggested that it will be easy for others to extend and amend this book by adding other counts.

Because Thorndike has been a pioneer in the field of vocabulary we mention his research here. Other valuable contributions will be noted later.

In the field of testing a great deal has been done. However, there is considerable disagreement in findings. Two types of tests used most widely have been recognition and recall.

1/Thorndike, Edward Lee A Teacher's Word Book of Twenty Thousand Words Found Most Frequently and Widely in General Reading for Children and Young People New York City: Teachers College, Columbia University, 1931.

Thorndike, E.L.; Lordge, Irving The Teacher's Word Book of 30,000 Words New York City: Teachers College, Columbia University, 1944.

Dolch[1] gives an outline of "Methods of Testing for Knowledge of Word Meanings" in his book entitled Reading and Word Meaning. This outline was modified by Kelley[2] five years later. The modified outline is as follows:

"1. Unaided recall (group or individual testing.)

a. Checking for familiarity
b. Using words in a sentence
c. Explaining the meaning and defining
d. Giving a synonym
e. Giving an opposite

2. Aided recall

a. Aided by recognition

(1) matching test
(2) classification test
(3) multiple choice test

(a) choosing the opposite
(b) choosing the best synonym
(c) choosing the best definition
(d) choosing the best use in sentences

(4) Same - opposite test
(5) Same - opposite - neither test
(6) Same - different test

b. Recall aided by association

(1) Completion test
(2) Analogy test

c. Recall aided by recognition and association

(1) Multiple - choice completion test
(2) Multiple - choice substitution test"

1/Dolch, Edward W. Reading and Word Meanings Boston, New York: Ginn and Co., 1927.

2/Kelley, V. H. "An Experiment With Multiple Choice Vocabulary Tests Constructed by Two Different Procedures" Journal of Experimental Education 5: 248-50, 1937.

Kelley describes the various tests and points out the many limitations. He says, "In summary, there does not seem to be any best technique for measuring word meaning and word knowledge. An appraisal of the studies using the various techniques would lead to the conclusion that with our present measuring instruments there is little hope of accurately determining the extent or the quality of the vocabulary of an individual. Any marked success in measuring the word meaning knowledge of an individual pupil must involve either the distinct improvement of the measuring instruments now available, or the development of new and more accurate testing procedures."

Dolch [1] is concerned with the difficulty of determining how well a child knows a word in all of its various meanings. He says, "To any individual the meaning of a word results from all the experience he has had which is thought of; obviously, therefore, few words will have the same meaning for any two persons, since few persons, if any, will have had the identical experience to give the word the same meaning.

In spite of the fact that most people recognize the limitations of the many efforts to secure with any degree of certainty the word knowledge of an individual, advance has been made and continued improvement can be expected in the field of vocabulary testing.

Purpose

The present study was undertaken to try to determine, in some measure, the relationships between two types of tests and written vocabulary. Tests thus far have been measuring, almost wholly, recognition vocabulary. How closely do these predict written vocabulary?

1/Dolch - Op. cit.

This investigation seeks to compare two different types of tests (recognition and recall.) Exactly the same area of vocabulary is involved in each test. To the knowledge of the writer there has been no previous study of this type done on this level.

The study seeks to answer the following questions:

1. What percent of words that a child can recognize correctly can he recall without aid?
2. Do the children who obtain high scores on one test secure high scores on the other test?
3. Is there any relationship between total score on the recall test and the level of writing vocabulary?
4. What relationship exists, if any, between scores on the recognition test and writing vocabulary?
5. Is there any relationship between intelligence and scores with either test, or with writing ability?

CHAPTER II

SUMMARY OF RESEARCH

There have been several rather complete reviews of research in the field of vocabulary. One of the most important recent reviews was done by Seegars [1] in 1945. This study was based on research in vocabulary development and testing. It covered the period of 1942-1945. Two of the most pertinent conclusions that Seegars arrived at were (1) That evidence points to the general trend to study depth and area of vocabulary as well as the most common meanings. (2) It is vital that children have many concrete experiences and be made to fill the need for self-expression.

Edgar Dale [2] has compiled a bibliography of vocabulary studies. It includes most of the important studies done within the past twenty-five years. This gives an idea of the many different aspects of vocabulary that have been investigated. Some of these references deal with vocabularies of special groups of children, as a particular grade or age level. Others deal with vocabulary tests. Many Master's theses are included in the bibliography.

A summary of investigations comparing different types of tests was done

1/Seegars, J. Conrad Vocabulary Problems in the Elementary School, Seventh Annual Research Bulletin, The National Conference on Research in English Chicago, Scott, Foresman Co., 1939.

2/Dale, Edgar Bibliography of Vocabulary Studies Columbus, Ohio State University, 1949.

by Kinney [1] and Eurich. They conclude that with the variety of criteria used by different investigations, it is surprising that such consistent results have been obtained. In all of the comparisons used in this study the authors found that the recall and multiple-choice tests rank highest, while the true-false and essay-type rank lowest. Therefore, they are convinced that the new type test has been shown to be at least as valid as the essay examination.

Greene [2] and Jorgensen recognize the difficulties involved in creating diagnostic tests in the field of language and believe that it is very doubtful if any truly diagnostic tests have yet been constructed. "The measurement of general merit of written composition," they state, "while dating well back into the history of educational measurement, has not responded to efforts to improve it in proportion to the attention it has received." They believe that this difficulty comes from the great complexity of the skills involved and from the vagueness with which these skills have been recognized.

Many of the most extensive of vocabulary studies have been concerned with compiling word counts of various sorts. Thorndike's efforts along this line have been mentioned previously. Horn's [3] study also was concerned

1/Kinney, L.B. and Eurich, A.C. "A Summary of Investigations Comparing Different Types of Tests" School and Society 36: 540-544, 1932.

2/Greene, H.A. and Jorgensen, A.N. The Use and Interpretation of Elementary School Tests New York: Longmans, Green and Co. 1935.

3/Horn, Ernest A Basic Writing Vocabulary, 10,000 Words Most Commonly Used in Writing. Iowa City: College of Education University of Iowa, 1926.

with adult vocabulary, but was wholly a compilation of words used in adult writing. His list was entitled "Basic Writing Vocabulary." In an article in the April, 1939 issue of the Elementary English Review Horn 1/ discusses the validity and reliability of adult vocabulary lists. He compares the first 5000 words in Thorndike's Teacher's Word Book with the first 5000 words in his own basic vocabulary list. He discovers that 3,669 of Horn's are in the Thorndike list. Although this may seem remarkable at first Horn comments that, "It is not so remarkable when one considers the degree to which certain basic meanings permeate all language expression." From this study and from the depth of wide experience in the whole field, Horn comes to this conclusion:

> "We have accumulated very dependable data on the four or five thousand words most permanently, most frequently, and most universally used by adults. And even for words far beyond these limits, we have the data which enable us to determine the relative values of words with far greater precision than is possible by methods of judgment."

In 1936 Dolch 2/ published a combined word list - the purpose of which was to offer alphabetically arranged all of the words in eleven of the best known word lists. These include studies based on children's speech or writing, adult letters and reading matter. One of the findings of this investigation was based on a summary of many studies which showed that children know approximately 2000 words when they enter school.

1/Horn, Ernest "The Validity and Reliability of Adult Vocabulary Lists" Elementary English Review 16: 129-134 April, 1939.

2/Dolch - Buckingham, B.R. and Dolch, E.W. A Combined Word List Boston, New York: Ginn and Co., 1936.

This is similar to a conclusion by A. F. Watts.[1] Another feature of the work was the revelation of gaps in the master list. Also, there was disagreement found as to gradings of different words. One of the most needed pieces of information which was not given was the meanings intended by the word forms. There is a great field for further research here.

Of recent word counts that were done by Henry D. Rinsland[2] is probably the most valuable. He has attempted to acquire data for a basic vocabulary for school children. He believed this to be an important study because so many elementary school textbooks were found to contain too many hard words. Also, he believed that the lists of adult words were not necessarily basic to children's needs because children do not use words with the same frequency as adults. He states that more knowledge and additional lists are required for children's lists than for adults lists. Rinsland undertook the study because no previous study had broadly sampled the writings of children from all sections of the United States in all grades and in numbers comparable to the counts of Thorndike and Horn. Other very valid reasons given were: No previous study had fulfilled these particular specifications which should be covered. None had (1) given continuous data for all eight grades (2) given raw frequency or the actual number of times a word occurred in each grade (3) grouped words in each grade into groups of practical size for general use (4) a measure of comparable frequency of occurrance from grade to grade.

1/Watts, A.F. The Language and Mental Development of Children (An Essay in Educational Psychology) London, W.C.: George G. Harrap and Co. Ltd., 1944.

2/Rinsland, Henry D. A Basic Vocabulary of Elementary School Children New York: The MacMillan Co., 1945.

The sample obtained by Rinsland is the richest from the writings of children and comparable to the largest count from the writings of adults. Rinsland's broad sampling shows:

> "1. What a wide range of words may be used by children.
>
> 2. Finding a number of words of three or more frequency is a strong indication that almost any word might be used by children if its meaning is understood and if it comes within range of the subject of writing.
>
> 3. It is definitely consistent with psychology of individual differences and the common scientific observation that ranges objectively determined are almost always wider than those subjectively estimated."

Mc Kee 1/ urges caution in the use of word lists in his article "Word Lists and Vocabulary Difficulty in Reading Matter." He claims that

> "There is a great possibility of serious error in using reading word lists in an uncritical and mechanical fashion for the judgment of the vocabulary difficulty of a reading selection."

McKee shows by illustration that sentences can be constructed by using only words from the first 2,000 of the Thorndike list, which are too difficult for fourth-grade children to understand. This article was written before the Rinsland list was published. There is reason to believe that this list could be much more safely used than either the Thorndike or Horn list.

Fitzgerald 2/ also had compiled a word list taken from children's letters written outside of school. Three thousand one hundred eighty four letters written by children of the 4th, 5th and 6th grades were used. These represented a cross-section of the country, as they came from 41 states.

1/McKee, Paul "Research Values in Children's Writing Vocabularies" Bibliog. Elementary English Review 7: 73-77 March 1930.

2/Fitzgerald, James A. "The Vocabulary of Children's Letters Written in Life Outside the School" Elementary School Journal 34: 358-370 January, 1934.

Fitzgerald also noted spelling errors in words. This study was done prior to the Rinsland study, and is not nearly so complete.

Many educators are intensely interested in the subject of vocabulary development. Several have come to the conclusion that teaching lists of words out of context has little value. Bertha Handlan 1/ says, "Not only is the procedure largely wasted effort, but it also suggests to students that they have no responsibility for words beyond those specifically taught and that words have meaning outside context."

Shirley Meek 2/ asserts that creative writing doesn't just happen but is a laborious process which is encouraged by all kinds of devices to make it grow into a real living thing.

Cronback 3/ lists types of behavior that may be called for in understanding a word.

1. Mastery of the term as a generalization
2. Selection of words appropriate to a given situation - application
3. Recall of different meanings - breadth of meaning
4. Application of term to all possible situations - precision
5. Use of concept in thinking and discussion - availability

1/Handlan, Bertha "Vocabulary Development" Elementary English Review 23: 350-357 December, 1946.

2/Meek, Shirley "Creative Writing" National Elementary Principal 20: 346-53 July, 1941.

3/Cronback, Lee J. "An Analysis of Techniques for Diagnostic Vocabulary Testing" Journal of Educational Research 36: 206-217 November, 1942.

An experiment in vocabulary building was carried out by Harold Bernard.[1/] He came to the conclusion that a students' vocabulary grows in college regardless of whether or not he makes a special effort to improve it. Also, he discovered that there is a measurable gain in vocabulary in college in only six weeks. His final conclusion was that students who give vocabulary specific attention may gain about twice as rapidly as others who are not consciously trying for improvement.

In an article on "Written and Spoken Vocabularies of Children" Rahja[2/] suggests that there are at least four types of vocabulary that can be attributed to each individual - hearing, reading, writing and speaking. He says that hearing and reading vocabularies far exceed the range of both writing and speaking. Then he adds that speaking has a wider range than writing. Watts[3/] would disagree with this statement. He says,

> "It is clear that the vocabularies at the command of children for the purposes of writing must be greater than those which serve them for everyday speech. In writing many words flow readily from the pen which do not come trippingly from the tongue."

Durrell[4/] has classified the four vocabulary types into two groups.

1. Involving intake of ideas (reading, hearing)
2. Involving out-put of ideas (speaking, writing). Using basal readers and social studies texts (intermediate grades) Durrell

1/Bernard, Harold W. "An Experiment in Vocabulary Building" School and Society 53: 742-3 June, 1941.

2/Rahja, J. M. "Written and Spoken Vocabularies of Children" Elementary English Review 10: 74-77 March, 1933.

3/Watts, A. F. The Language and Mental Development of Children (An Essay in Educational Psychology) London, W. C.: George G. Harrap and Co. Ltd., 1944.

4/Durrell, Donald D; Sullivan, Helen B. "Vocabulary Instruction in the Intermediate Grades" Elementary English Review 15: 138-145 April, 1938.

constructed a word list. Only words were recorded which did not appear on the Gates Primary List. He obtained lists of from 500 to 700 words at each intermediate grade level.

Tests

Hundreds of experiments have been tried to determine which type of vocabulary test is most authentic in indicating the vocabulary ability of an individual or group of individuals. We include here only those which seem most pertinent to the present study.

Stalnaker 1/ has reported an experiment with the use of two types of tests - recognition and recall. The recognition test was of the multiple-choice type and contained one hundred items. The recall test required the student to write the omitted word in the blank space in the sentence. The initial letter of the word was given and one or more synonyms. The tests were not equated. The same words were not used.

As a result of this study Stalnaker comes to the conclusion that "a recognition and a recall vocabulary test give scores which correlate so highly that for almost all purposes the test may be used which, on the basis of other consideration, is most desirable."

A report on Recall and Recognition tests has also been made by Dorothy Andrews 2/ on the college level. The test used was composed of 160 items - 80 recognition and 80 recall. The structure of the tests was controlled by using two forms. One was the reverse of the other. The recall questions

1/Stalnaker, J. M. "Recognition and Recall in a Vocabulary Test" Pedagogical Seminary and Journal of Genetic Psychology 46: 463-464 June, 1935.

2/Andrews, Dorothy "A Comparison of Two New-Type Questions: Recall and Recognition" Journal of Educational Psychology 29: 175-93; March, 1938.

on the first test were recognition questions on the second test, and recognition items became recall items. One rather important fact was revealed by this study which others have noted before - that questions demanding relatively unaided recall are more difficult than recognition questions covering the same subject matter. Andrews also noted that the best students tend to do equally well on both kinds of items. She also discovered that the poorer students find the recall questions relatively more difficult than do the better students. Item analysis of the recognition and recall items also indicated greater difficulty for recall questions.

Courtney, Bucknam and Durrell 1/ report studies of Multiple-Choice-Recall versus oral and written recall. In Courtney's study of ninth grade students the tests were carefully prepared. Care was taken to construct questions that would be equally fair to both types of test. Selections were read by pupils who wrote all they could remember of what they had read. Questions were constructed for most frequently recorded ideas. Results of testing showed that scores on the multiple-choice test were markedly higher than on the written recall test. The authors report, "It is evident from this study that multiple-choice recall does not insure comparable written recall." Because many pupils who obtained high scores on the multiple-choice test received low scores on the written recall test there is valid reason for feeling that the usual reading test should be supplemented with measures of written recall.

1/Courtney, Douglas; Bucknam, Margaret E; Durrell, Donald D.
"Multiple Choice Recall Versus Oral and Written Recall"
Journal of Educational Research 36: 458-61 February, 1946.

Bucknam's study is a comparison of oral recall, written recall and multiple-choice recall with 5th grade children. Bucknam prepared six selections to be used by the children. She then made a list of major ideas which was to be used as a check list for scoring oral and written recall. A multiple-choice test was prepared using three items for each of the major ideas. Two major findings of this study were:

1. Confirmation of the finding that "multiple-choice recall is considerably easier than unaided recall, either written or oral."
2. "These findings emphasize the need for measuring fluency or oral and written recall in analyzing the reading ability of pupils."

An experimental study was done by Hurlburt 1/ on:

"The Relative Value of Recall and Recognition Techniques for Measuring Precise Knowledge of Word Meanings - Nouns, Verbs, Adjectives. As a result of this study she concludes that the two types of tests used in this study appear to have only a limited number of factors in common. She also reports that, "coefficients of correlation for recognition - multiple choice test form and mental age are approximately the same as the coefficients of correlation for recall - completion test form and mental age."

An interesting study was done by Sims 2/ on "The Reliability and Validity of Four Types of Vocabulary Tests." The four tests used in the study were (1) Identification tests (2) Multiple-response tests (3) Matching tests (4) Checking tests. Sims summarizes the investigation as follows:

1. "The reliability coefficients for the four types of tests are approximately equal and rather high.

2. The inter-correlation among the tests is high for identification, multiple-response and matching, but the checking test does not show very satisfactory correlation with any of the other tests.

1/Hurlburt, L.D. "The Relative Value of Recall and Recognition Techniques for Measuring Precise Knowledge of Word Meaning -- Nouns, Verbs, Adjectives" Unpublished Doctor's Dissertation Boston: Boston University, School of Education, 1949.
2/Sims, Verna Martin "The Reliability and Validity of Four Types of Vocabulary Tests" Journal of Experimental Research 20: 91-96 September, 1929.

3. There is some evidence that the matching test gives the most satisfactory group measure of vocabulary."

Sims believes that the assumption that the checking test measures vocabulary is a doubtful one. In this he disagrees somewhat with Dolch who seems quite enthusiastic about the possibilities of the check-list type of test. He says, "The free association method seemed to have unusual merits for our purpose."

Cronbach[1] has done a study on:

> "Analysis of Techniques for Vocabulary Testing." He emphasizes the importance of ascertaining how well a student knows a word in all of its various meanings. He states that there is reason to believe that "various types of tests measure various aspects of word knowledge" and that therefore, "it is important to see which testing procedure is appropriate for each level."

In summary of this study Cronbach says:

> "It appears important in many situations to determine how precisely a student understands a word rather than whether he can pass a single item test on the words. In other cases, one may wish to analyze objectively just what meaning a word has for a student, without necessarily implying that one meaning is correct. For either of these purposes, the multiple true - false technique appears to have potential advantages.
>
> The ultimate development of this or any other answer to the problems of vocabulary testing must be carried on through the work of specialists in the various subject fields. It is hoped that this presentation will lead workers in these areas to try this technique, so that more conclusion data on its validity and usefulness may be obtained."

[1] Cronbach, L. J. Op. cit.

CHAPTER III

PLAN AND CONDUCT OF THE STUDY

In order to carry out this experiment (to determine the relationship between two types of tests and children's written vocabulary) it was first necessary to construct the tests. In order to have a valid measure of comparison it was mandatory that the two tests evoke response concerning identical vocabulary. Test items, empirically chosen, dealt with nouns, adjectives and verbs. The categories selected called for:

1. names of colors
2. names of wild animals
3. names of workers and leaders
4. words which tell size
5. words which tell how a person or animal moves.

Words were selected from Thorndike's [1] list of 10,000 words commonly used. All words found in the Thorndike list (in each of these categories) were used in the construction of the test.

The first test - the Recall Test was divided into five sections. Each section had similar directions asking the pupil to list as many words as possible under each category.

The second test was the Recognition Test. The items were arranged in mixed order in five sections - The division was made merely to make the

1/ Thorndike, Edward Lee <u>The Teacher's Word Book - a List of 10,000 Words</u> New York City: Teachers College, Columbia University, 1921.

appearance of the test less formidable. The first section contained many of the easier items, the last section many of the more difficult. These were not arranged according to any statistical survey of difficulty of items but simply according to the judgment of the author. Each category in this test was given a different number. The directions were: Place the correct number beside each word. A sample test was given by the teacher on the blackboard preceding the Recognition Test.

After the two tests were completed they were tried out on an experimental group. This group consisted of thirty-five sixth graders, as the tests were to be given finally to sixth grade pupils. This pre-test was necessary so that the approximate amount of time required by the tests could be determined. Also, reaction of pupils to the tests could be observed. It was especially important to note with what ease or difficulty directions could be followed.

The results of the pre-test showed that the tests consumed a reasonable amount of time and that directions were easily followed. The records from the tests of this experimental group were not included in the final compilation of results.

After the tests had been constructed and the pre-testing completed it was necessary to plan specific types of motivation for themes. It was not possible to supply stimuli which would call forth the same vocabulary used in the tests. In other words, the specific vocabulary in the tests and the vocabulary in the themes were not necessarily related.

A sampling of children's writing broad enough to be significant was felt to be important. Therefore, it was decided to ask for three themes from each child. As motivation for the first theme a still picture was shown all pupils. Questions were asked concerning the picture to arouse interest. Then the pupils were asked to write the story of the picture.

The second theme was written following the introduction of an exciting story. This introduction was purposely cut short at a time when the listener was in suspense as to what would happen next. The children were then asked to conclude the story. The third theme was written following the showing of a one-reel film. They were told to write the story of the movie as they remembered it.

This experiment was conducted in eight schools near Boston. Of the one hundred eighty pupils taking part, complete records on tests and themes were obtained from one hundred fifty. Of these, eighty were girls and seventy were boys.

Other information obtained was: Chronological age and Intelligence Quotients. (These were transformed to mental age) Unfortunately, the mental ages were obtained from three different intelligence tests, as the same tests were not used in all schools taking part in the experiment.

When the data ~~was~~ were complete, tests were corrected and word counts on themes tabulated. First, a count was made of the total number of words on each theme, then the three scores for each pupil were added. This gave the total running vocabulary on all themes for each child. In order to determine which themes contained the richest vocabulary all words on the first three levels of the Durrell [1/] "Frequency-of-Use" word list were cancelled. This was done for each theme and the totals for each pupil added.

1/Durrell, Donald D. Improvement of Basic Reading Abilities Yonkers-on-Hudson, New York: World Book Co., 1940.

This gave the total running vocabulary beyond the "easy" level for all themes. From these results all similar words were cancelled, so that no single word was counted twice. This gave the total number of different words beyond the easy level.

A chart was then constructed which gave the following information:

1. Name of pupil
2. Chronological age in years
3. Chronological age in months
4. Intelligence quotient
5. Mental age in years
6. Mental age in months
7. Score on Test I
8. Score on Test II
9. All themes - total words
10. All themes - total words beyond easy level
11. All themes - different words beyond easy level.

Frequency tables were then constructed for each of these categories. The mean and standard deviation for each were then computed. These tables included all pupils. Then similar tables were made for each of the sexes. Means and standard deviation were also found for these. Critical Ratio tables and correlations were found comparing many different sets of data.

CHAPTER IV

ANALYSIS OF DATA

As previously explained this experiment consisted of two tests, plus word count on themes. Sample tests are included in the appendix. These were simply constructed and easily scored. The these data and the test results can be found on the chart in the appendix which gives all raw scores obtained from the experiment.

A frequency chart comparing the recall test and the recognition test was constructed. Critical ratio tables comparing the tests, and the relationship between scores of boys and girls versus the two tests and the three types of theme data. Correlations were found between all data obtained from raw scores in the experiment.

Descriptive Data - Chart I

Frequency Chart Comparing Recall (I) and Recognition (II) Tests

Class Interval	Test I	Test II
325 - 344		7
305 - 324		26
285 - 304		31
265 - 284		28
245 - 264		20
225 - 244		13
205 - 224		11
185 - 204		6
165 - 184		4
145 - 164		4
125 - 144		
105 - 124	4	
85 - 104	25	
65 - 84	43	
45 - 64	60	
25 - 44	18	

(concluded on next page)

Chart I (concluded)

Class Interval	Test I	Test II
	150	150
Mean	66.87	268.70
S. D.	18.50	42.70

This chart shows clearly the wide discrepancy in scores between the recall and recognition tests. The highest scores on the recall test are lower than the lowest scores on the recognition test. A comparison of the means of the two tests shows that pupils were able to recognize about four times as many words as they were able to recall.

Table I
Medians, Quartiles, Interquartile Ranges

	Median	2_1	2_3	Interquartile Range
Chronological Age (Monthly)	11.7 yrs. 141.24	186.89	149.85	12.96
Mental Age (Monthly)	12.5 yrs. 150	136.35	159.65	23.30
I. Q.	106.10	95.15	115.95	20.80

A comparison of the median and interquartile range is table I shows a median of 11.7 years for the chronological age (with a range of 12.96), while the median for mental age is 12.5 (with a range of 23.30). Thus, the mental age is slightly higher than the chronological age, while the range in mental age shows a wider spread than that of the chronological age. The median I.2 of 106.10 is slightly above the median of 100 for population.

Table II
Critical Ratio - Recall and Recognition Tests

Tests	Mean	$S.E._m$	S.D.	Diff. $M_1 - M_2$	S.E. Diff.	C.R.
I - Recall	66.87	1.51	18.50	201.83	3.80	53.11
II - Recognition	268.7	3.49	42.70			

This critical ratio (in table II of 53.11 would be expected after a study of the frequency chart comparing these tests. This is higher than other experimental data has shown regarding recall and recognition items. However, many of these other experiments involved recall and recognition of ideas rather than of simple vocabulary.

Table III
Critical Ratio - Boys (Test I) v.s. Girls (Test I)

Test I Recall	Mean	$S.E._m$	S.D.	Diff. $M_1 - M_2$	S. E. Diff.	C. R.
Boys	66.70	2.29	19.20	.90	.89	1.01
Girls	67.60	2.11	18.90			

Table IV

Critical Ratio - Boys (Test II) v.s. Girls (Test II)

Test II Recognition	Mean	S.E. $_m$	S.D.	Diff. $M_1 - M_2$	S.E. Diff.	C. R.
Boys	264.	5.72	47,90	8.9	3.98	2.24
Girls	272.9	4.12	36.80			

Critical ratios obtained by comparing boys and girls scores on test I and II are shown in tables III and IV. The figures for test I shows a critical ratio of 1.01, or very little difference in the scores for the two sexes. The critical ratio for test II is 2.24. The mean for the girls is 272.9 or eight points higher than the mean of 264 for the boys.

Table V

Critical Ratio - Boys (Total Words) v.s. Girls (Total Words)

Themes Total Words	Mean	S. E. $_m$	S.D.	Diff. $M_1 - M_2$	S. E. Diff.	C. R.
Boys	597.72	25.38	212.40	8.12	17.27	.47
Girls	589.60	18.61	166.40			

Table VI
Critical Ratio - Boys (Words Beyond Level)
v.s. Girls (Words Beyond Level)

Themes Words B.L.	Mean	S. E. m	S. D.	Diff. $M_1 - M_2$	S. E. Diff.	C. R.
Boys	170.28	9.53	79.80	10.48	2.59	4.05
Girls	159.80	9.89	88.40			

Table VII
Critical Ratio - Boys (Different Words Beyond Level
v.s. Girls (Different Words Beyond Level)

Themes Diff. W.B.L.	Mean	S. $E._m$	S. D.	Diff. $M_1 - M_2$	S. E. Diff.	C. R.
Boys	131.80	7.67	64.20	11.40	5.76	1.98
Girls	120.40	5.08	45.40			

Table VIII
Critical Ratio - Boys (I.Q.) v.s. Girls (I.Q.)

I. Q.	Mean	S. $E._m$	S. D.	Diff. $M_1 - M_2$	S. E. Diff.	C. R.
Boys	104.45	1.70	14.20	.15	.61	.24
Girls	104.30	1.66	14.85			

The three critical ratios for tables V, VI and VIII show: (a) no significant difference in total words written by boys and girls (C.R = .47) (b) the boys definitely ahead of the girls on total words beyond the easy level (C.R. 4.05). (c) boys somewhat in advance of girls on the different words beyond the easy level. These comparisons are interesting in contrast with the girls' lead on test scores.

Table IX
Correlation - Recall and Recognition
Tests - Themes (Written Vocabulary)

	Recall Test	Recognition Test
Total Words - Themes	r = .44 S.D.= .066	r= .84 S.D. = .072
Total Words Beyond Level	r= .58 S.D.= .054	r= .54 S.D. = .058
Different Words Bey. L.	r = .54 S.D.= .058	r= .49 S.D. = .062

It might have been expected that there would be a much higher correlation between the recall test and written vocabulary than between the recognition test and written vocabulary. However, the correlations in table IX show only slightly higher correlations for the recall test in each section. The correlation for recall v.s. total words was .44 with a standard deviation of .066; for recognition v.s. total words - r = .34 with a standard deviation of .072. In comparing tests with total words beyond the easy level we find; recall - r = .58, S.D. = .054; recognition - r = .54, S.D.= .059. The two tests correlated with different words beyond the easy level show: recall - r = .54 with a standard deviation of .058 and recognition - r = .049 with a standard deviation of .062.

Table X

Correlation - Mental Age v.s. Themes and Tests I and II

	Mental Age
Themes - Total Words	r = .31 S.D. = .074
Themes - Total W. Bey. L.	r = .41 S.D. = .068
Themes - Different W. Bey. L	r = .43 S.D. = .067
Test I - Recall	r = .49 S.D. = .062
Test II- Recognition	r = .64 S.D. = .049

The correlations of mental age and theme data are not high. A comparison of correlation between mental age and the two tests is interesting. The correlation with test I is only .49, S.D. .062, while the correlation with test II is .64, S.D. .049. This higher correlation with the recognition test may be due to the fact that the group mental tests from which scores were obtained have an element of recognition vocabulary in their construction.

Table XI

Correlation - Test I - Recall v.s. - Test II - Recognition

	Recall
Recognition	r = .62 or = .050

Table XI shows the correlation between the recall and recognition tests. This correlation was computed to be .62 with a standard deviation of .050.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study would have been more valid if the author had been able to conduct the experiment personally. However, the teachers in the classrooms carried out directions carefully and were faithful in returning promptly all material.

It is rather disappointing to find that the results of an experiment such as this are not what one expected to find. As has been noted before, one test did not show significantly higher scores in relation to written vocabulary than the other.

The high correlation of mental age and scores on the recognition test can be discounted, as the mental test given was a written group test rather than the individual Binet test.

The interesting results of correlations between boys and girls with tests and word count might indicate that boys in general have a slightly higher written vocabulary than girls, although many more similar experiments would have to be conducted to make a definite statement about this.

Conclusions Drawn from This Study

1. Children are able to recognize approximately four times as many words as they are able to recall.
2. Recall tests predict only slightly more than recognition tests length and quality of written vocabulary.
3. Girls obtain higher scores than boys on vocabulary tests; while boys get higher scores in length and richness of vocabulary.

4. There is a wider range in mental age in any given class than in chronological age.

5. There is a higher correlation between vocabulary tests and richness of vocabulary than with total word count.

CHAPTER VI

SUGGESTIONS FOR FURTHER RESEARCH

There were many aspects of this experiment which could have been improved or enlarged upon. Other similar experiments might prove to be valuable. Some further studies which could be made are:

1. A comparison of the various categories used in this test to discover which elicited the greatest response.
2. Conduct a similar study using Benet intelligence tests rather than group tests and comparing with results on recall and recognition tests and word count. (This should give a more valid correlation of intelligence with these items)
3. A study could be made of different types of motivation to determine which one stimulated the greatest response in total words written and in richness of vocabulary.
4. A comparison of these vocabulary tests with achievement tests in reading and vocabulary.
5. A similar study on two grade levels (as 6th and 7th) comparing the results of the tests and word count on written vocabulary.
6. A comparison of many similar studies to see if boys' scores on written vocabulary are slightly higher than girls' scores, as this study indicates.

APPENDICES

RAW SCORES

Girls (No.)	Age	I. Q.	Test I	Test II	Total W.	Total B.L.	Diff. B.L.
1	11.7	80	56	220	335	88	66
2	10.9	102	47	228	323	82	62
3	12.10	94	57	242	469	119	82
4	14.6	77	63	193	574	148	105
5	11.3	89	32	262	318	67	54
6	11.8	88	59	257	454	113	95
7	11.7	90	46	247	472	130	104
8	12.7	85	44	273	714	162	119
9	12.7	95	69	264	362	114	71
10	12.8	85	77	256	744	167	117
11	13.11	72	42	163	581	116	86
12	14.2	65	62	234	890	208	137
13	11.7	100	71	289	477	148	111
14	11.7	125	87	309	417	104	82
15	12.4	106	85	311	547	180	139
16	12.11	85	38	229	544	135	98
17	11.8	112	53	287	600	163	139
18	11.10	110	77	290	437	113	92
19	13.6	81	59	266	536	153	127
20	11.5	98	52	257	584	160	121
21	11.11	100	70	300	410	102	80
22	11.8	123	46	271	730	203	157
23	12.8	123	65	281	638	150	120
24	11.8	109	83	291	641	193	157
25	11.7	105	99	294	931	314	242
26	11.0	122	92	294	780	290	217
27	11.3	114	63	273	662	198	151
28	11.9	113	82	296	761	269	203
29	11.2	143	100	327	774	234	174
30	12.10	91	75	283	785	258	204
31	11.0	125	82	309	779	230	180
32	11.6	99	57	258	412	107	86
33	14.1	76	58	148	483	113	86
34	11.11	106	87	296	629	173	136
35	11.5	103	63	310	756	237	194
36	11.5	115	91	302	664	217	172
37	11.9	98	60	260	439	96	80
38	12.2	89	53	208	578	126	92
39	12.0	123	99	308	705	220	183
40	11.5	103	89	291	443	101	82
41	11.4	97	68	244	816	208	153
42	11.2	120	113	337	907	269	212
43	11.2	124	96	324	524	177	136

(continued on the next page)

RAW SCORES (continued)

Girls (No.)	Age	I. Q.	Test I	Test II	Total W.	Total B.L.	Diff. B.L.
44	11.4	120	105	311	1278	401	294
45	11.6	117	90	299	452	118	88
46	11.5	112	98	314	523	156	115
47	11.5	122	74	296	631	204	149
48	11.7	105	86	301	482	146	92
49	11.3	115	61	320	715	225	180
50	11.2	120	90	334	724	214	164
51	11.2	120	77	325	547	161	116
52	11.5	105	37	274	592	142	88
53	12.7	105	56	267	709	149	113
54	11.10	98	51	290	470	110	79
55	11.8	107	45	281	649	140	102
56	12.2	99	70	245	643	184	145
57	11.9	104	40	226	700	172	134
58	11.11	103	44	298	450	100	72
59	11.2	105	75	286	470	119	95
60	12.1	108	58	282	487	123	90
61	12.1	116	75	307	795	242	167
62	12.2	105	40	275	423	104	77
63	12.10	112	64	300	725	173	128
64	11.8	111	65	295	417	107	82
65	11.8	109	55	267	608	121	102
66	13.0	85	38	239	411	84	64
67	11.3	117	73	250	599	136	100
68	12.1	87	61	271	708	174	112
69	11.5	115	58	277	734	170	128
70	15.0	74	72	221	508	140	96
71	12.9	88	57	234	548	116	89
72	12.4	97	51	202	601	116	87
73	11.2	118	66	274	501	136	98
74	11.7	129	66	305	548	135	98
75	11.8	101	71	249	707	177	122
76	11.1	116	75	277	457	122	91
77	11.4	101	54	269	425	122	96
78	12.4	97	49	279	442	81	67
79	11.11	101	37	227	378	91	70
80	11.4	115	38	257	630	136	101

RAW SCORES (continued)

Boys (No.)	Age	I. Q.	Test I	Test II	Total W.	Total B.L.	Diff. B.L.
81	11.2	138	91	294	765	286	214
82	10.10	122	80	292	699	223	167
83	11.10	113	99	306	1079	349	282
84	11.6	114	90	305	687	216	178
85	13.3	104	107	301	780	248	196
86	11.10	119	79	318	981	405	338
87	12.10	128	98	323	959	340	282
88	11.8	119	119	307	790	297	270
89	11.0	111	79	295	646	215	161
90	11.4	113	96	320	1278	431	301
91	11.5	111	83	330	780	171	136
92	11.6	112	88	300	1143	375	284
93	11.5	116	70	276	487	151	119
94	12.2	113	69	295	658	182	137
95	11.7	116	89	325	698	236	195
96	11.1	90	103	284	483	140	112
97	11.5	96	59	228	428	122	95
98	13.2	81	46	202	424	102	66
99	11.4	120	91	318	760	191	145
100	12.1	102	73	273	599	164	106
101	11.4	117	69	248	673	216	160
102	11.1	108	58	217	460	132	104
103	11.6	109	87	264	568	123	94
104	11.3	120	58	308	514	147	114
105	11.2	118	92	306	544	143	112
106	11.6	110	74	263	595	166	125
107	11.5	117	80	302	645	160	118
108	13.0	75	46	172	173	47	40
109	11.7	106	55	225	358	95	67
110	10.11	104	55	269	524	165	116
111	12.6	90	56	295	326	81	61
112	13.6	94	55	214	561	113	83
113	12.5	94	46	228	300	73	63
114	12.3	101	50	268	357	93	68
115	12.1	110	65	297	294	72	58
116	12.5	100	55	309	681	207	174
117	11.7	120	83	311	762	235	191
118	13.3	76	45	276	646	176	153
119	12.0	110	66	270	767	231	160
120	11.8	97	43	235	915	237	151
121	11.1	118	68	296	697	207	179
122	12.5	81	52	194	516	128	111
123	12.0	101	78	314	696	213	182
124	12.3	89	46	185	607	139	98

(continued on the next page)

RAW SCORES (concluded)

Boys (No.)	Age	I. Q.	Test I	Test II	Total W.	Total B.L.	Diff. B.L.
125	12.3	88	47	198	561	141	122
126	13.7	77	25	214	499	121	92
127	12.9	81	45	151	599	153	109
128	12.10	88	62	265	654	172	133
129	11.6	95	38	167	711	152	105
130	11.10	88	53	228	457	108	82
131	12.1	97	54	255	759	184	122
132	12.0	106	60	218	394	114	82
133	12.6	104	75	264	303	89	71
134	12.3	110	35	182	154	44	39
135	12.8	108	83	305	377	107	83
136	13.4	99	40	262	268	69	59
137	13.11	83	40	211	305	94	68
138	11.2	111	64	265	505	142	105
139	10.10	125	72	293	447	109	81
140	11.7	98	29	275	623	138	115
141	13.3	86	62	294	584	145	105
142	11.5	112	51	220	534	138	97
143	12.0	97	60	159	595	115	87
144	12.1	121	74	308	588	175	141
145	13.1	85	47	181	565	111	87
146	13.8	96	58	211	826	196	134
147	13.0	86	47	222	489	102	69
148	11.10	133	75	329	563	185	140
149	11.4	107	63	247	406	117	94
150	12.0	117	50	310	700	229	163

Name........................... Age................ Grade...............

School......................... Boy or Girl......... Date...............

Place the correct number beside each word.

(1) names of colors
(2) names of wild animals
(3) names of workers and leaders
(4) words which tell size
(5) words which tell how a person or animal moves

( ) blue	( ) march	( ) golden	( ) range
( ) charge	( ) tall	( ) leap	( ) fox
( ) butcher	( ) rat	( ) mole	( ) black
( ) elephant	( ) baker	( ) mount	( ) large
( ) walk	( ) silver	( ) dog-catcher	( ) solicitor
( ) minute	( ) gray	( ) little	( ) spring
( ) swing	( ) jump	( ) panther	( ) historian
( ) gold	( ) principal	( ) swim	( ) deer
( ) school teacher	( ) hare	( ) rose	( ) wide
( ) fat	( ) long	( ) roll	( ) stag
( ) mouse	( ) grocer	( ) hedgehog	( ) footman
( ) dance	( ) wolf	( ) big	( ) crowd
( ) lumber	( ) small	( ) fly	( ) cook
( ) drummer	( ) brown	( ) manager	( ) least
( ) white	( ) run	( ) step	( ) red
( ) slip	( ) equal	( ) lion	( ) writer
( ) milkman	( ) muskrat	( ) green	( ) rabbit
( ) fall	( ) race	( ) salesman	( ) bear

Place the correct number beside each word.

(1) names of colors
(2) names of wild animals
(3) names of workers and leaders
(4) words which tell size
(5) words which tell how a person or animal moves

( ) reindeer	( ) badger	( ) crimson	( ) coon
( ) stout	( ) mighty	( ) ground hog	( ) dash
( ) scramble	( ) flee	( ) huge	( ) violet
( ) lawyer	( ) bishop	( ) speed	( ) lofty
( ) skate	( ) ivory	( ) instructor	( ) bolt
( ) yellow	( ) tread	( ) orange	( ) servant
( ) camel	( ) skip	( ) gross	( ) slight
( ) scant	( ) purple	( ) trip	( ) police
( ) limp	( ) polar bear	( ) lieutenant	( ) leopard
( ) nurse	( ) troop	( ) climb	( ) weatherman
( ) cream	( ) rove	( ) fawn	( ) cherry

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(continued)

( ) doe	( ) patrolman	( ) olive	( ) commander
( ) craftsman	( ) plump	( ) cleaner	( ) sweep
( ) trot	( ) enormous	( ) weasel	( ) descend
( ) brief	( ) correspondent	( ) slide	( ) amber
( ) rhinoceros	( ) grey	( ) float	( ) creep
( ) scarlet	( ) treasurer	( ) narrow	( ) tiny
( ) teller	( ) roam	( ) jack rabbit	( ) ape

Place the correct number beside each word.

(1) names of colors
(2) names of wild animals
(3) names of workers or leaders
(4) words which tell size
(5) words which tell how a person or animal moves

( ) shoemaker	( ) sturdy	( ) buck	( ) lurch
( ) tramp	( ) moose	( ) trudge	( ) bison
( ) infinite	( ) stroll	( ) lemon	( ) broad
( ) gardener	( ) ruby	( ) cardinal	( ) mahogny
( ) sable	( ) alderman	( ) ebony	( ) actor
( ) prance	( ) buffalo	( ) physician	( ) arise
( ) buff	( ) fleshy	( ) beaver	( ) pigmy
( ) ramble	( ) romp	( ) plod	( ) caper
( ) average	( ) trod	( ) lag	( ) sneak
( ) tiger	( ) hazel	( ) massive	( ) lavender
( ) azure	( ) lynx	( ) bookkeeper	( ) sloth
( ) conductor	( ) middle-sized	( ) boar	( ) secretary
( ) meager	( ) fighter	( ) extensive	( ) dive
( ) copra	( ) otter	( ) trample	( ) blond
( ) hop	( ) slender	( ) dart	( ) attorney
( ) ass	( ) glide	( ) zebra	( ) wade
( ) potter	( ) glit	( ) microscopic	( ) mince
( ) chipmunk	( ) mink	( ) musician	( ) ferret

Place the correct number beside eadh word.

(1) names of colors
(2) names of wild animals
(3) names of workers or leaders
(4) words which tell size
(5) words which tell how a person or animal moves

( ) tiptoe	( ) pace	( ) kangaroo	( ) polecat
( ) chamois	( ) spossum	( ) overseer	( ) minstrel
( ) bronze	( ) vice-president	( ) scamper	( ) lilac

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(concluded)

( ) bantam	( ) flit	( ) gallop	( ) wander
( ) scanty	( ) monumental	( ) monkey	( ) guilder
( ) stalk	( ) walrus	( ) cardinal	( ) bunny
( ) architect	( ) clump	( ) mammoth	( ) enlarged
( ) indigo	( ) primrose	( ) chocolate	( ) ranger
( ) medium	( ) coachman	( ) stamp	( ) antelope
( ) crawl	( ) vault	( ) immeasurable	( ) slate
( ) falter	( ) sulton	( ) tumble	( ) ruddy
( ) massy	( ) husky	( ) baboon	( ) frolic
( ) skunk	( ) chinchilla	( ) jeweler	( ) dodge
( ) postman	( ) patter	( ) raccoon	( ) detective
( ) emerald	( ) dealer	( ) extended	( ) yak
( ) jig	( ) coral	( ) scuffle	( ) hike
( ) regent	( ) elk	( ) russet	( ) rotund
( ) obese	( ) bound	( ) jet	( ) coyote

Place the correct number beside each word.

(1) names of colors
(2) names of wild animals
(3) names of workers or leaders
(4) words which tell size
(5) words which tell how a person or animal moves

( ) platypus	( ) burly	( ) skipper	( ) giraffe
( ) executor	( ) chimpanzee	( ) dromedary	( ) woodchuck
( ) mauve	( ) stagger	( ) scud	( ) pink
( ) prowl	( ) chamberlain	( ) herculean	( ) mathematician
( ) clamber	( ) sorrel	( ) stride	( ) prairie-dog
( ) guanaco	( ) stumble	( ) parade	( ) fleet
( ) jaguar	( ) peccary	( ) husbandman	( ) monstrous
( ) housewife	( ) ascend	( ) rouge	( ) gopher
( ) expanded	( ) cougar	( ) flop	( ) turquoise
( ) wiggle	( ) pirate	( ) cobalt	( ) steward
( ) copious	( ) molecular	( ) magician	( ) diminutive
( ) hurdle	( ) skid	( ) immense	( ) squirm
( ) miniature	( ) jonquil	( ) midget	( ) longitudinal
( ) plunge	( ) frisk	( ) caribou	( ) cinnamon
( ) surveyor	( ) tan	( ) wildcat	( ) shin
( ) ski	( ) catapult	( ) scurry	( ) writhe
( ) gorilla	( ) waitress	( ) tawny	( ) hippopotamus
( ) swarthy	( ) shuffle	( ) prospector	( ) chubby

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