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MUSICAL APTITUDE AND PHONOLOGICAL SPELLING
STRATEGIES AMONG READING-PROFICIENT ADULTS
WITH SPELLING DISABILITIES

presented by

Sophie Shambes McGee

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of the requirements for

Ph.D. degree in Teacher Education


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**MUSICAL APTITUDE AND PHONOLOGICAL SPELLING
STRATEGIES AMONG READING-PROFICIENT ADULTS
WITH SPELLING DISABILITIES**

By

Sophie Shambes McGee

A DISSERTATION

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

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ABSTRACT

MUSICAL APTITUDE AND PHONOLOGICAL SPELLING STRATEGIES AMONG READING-PROFICIENT ADULTS WITH SPELLING DISABILITIES

By

Sophie Shambes McGee

The purpose of the study was to collect, analyze, and compare data of various auditory and phonological characteristics shared by spelling-disabled adults who were competent readers. Fifty-seven American-born adult students at Washtenaw Community College in Ann Arbor, Michigan, comprised the study population used to investigate the hypothesis that a "good ear" is necessary to spelling proficiency. The researcher tested the subjects with six measurements of musical aptitude to determine whether low scores would accompany poor spelling performance. In addition, four phonological spelling strategies were investigated, the data for which were collected by administering spelling tests and a questionnaire. The results were then compared to those from a second group of subjects, proficient in both reading and spelling, to whom the same measurements were administered. Poor spellers had difficulty attending to the sounds of language and music.

Sophie Shambes McGee

The following significant characteristics were found among reading-proficient adults with spelling disabilities: (a) low scores on the musical aptitude measurements of pitch and tonal memory, (b) high frequency of occurrence of phonetically misspelled words, (c) high frequency of spelling words by letter naming rather than syllabication, and (d) difficulty with pronunciation of words. The four characteristics listed above have been found to improve with practice and instruction.

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I should like to express my gratitude to Dr. Ruth Brend, a constant source of wisdom and encouragement, who kindly read each chapter and tactfully but firmly moved me through each stage, offering valuable criticisms. With her support, I was bold enough to impose on her special area of expertise in linguistics when I discovered the need to investigate further the phonological deficits found among the spelling-disabled subjects in my study.

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CHAPTER I

THE PROBLEM

Background

Spelling Reform: Simplification

Anyone who studies the history of spelling disability among the English-speaking people of the world discovers quickly that the problem is not new. As far back as the year 1200 there were attempts to renovate English spelling by bringing it into closer correspondence with spoken language (Gibson & Levin, 1975; Zachrisson, 1931). In the fourteenth century, Chaucer lamented the confusing variations of English writing in his poem, "Troilus and Criseyde":

And for there is so grete dyversite
in English, and in writyng of our tonge
So preye I God, that non myswrite the,
Ne the mysmetere for default of tonge!
(Geoffrey Chaucer, 1957, p. 479)

Simplification efforts were directed toward improving an alphabet that struggles with too few a number of letters to represent too great a number of sounds. Since the alphabet has only 26 symbols to represent more than 40 phonemes, spelling reformists claimed that additional alphabetic symbols would produce the necessary letter-to-phoneme correspondences that would simplify reading and writing.

That spelling has persisted to be troublesome and difficult for many people throughout the past 500 years is obvious from the number of attempts made to simplify English spelling. In the sixteenth century, Sir Thomas Smith and John Hart argued for a "phonic" approach, using a somewhat consistent "phonetic" alphabet (Fries, 1963). Alphabetic reform continued in the seventeenth century under the leadership of Alexander Gill, Charles Butler, and John Wilkins, followed by Benjamin Franklin in the eighteenth century and continuing into the middle of the nineteenth century with spelling reformists A. J. Ellis and Isaac Pitman. Organized spelling reform underwent its greatest surge of activity between the years 1875 and 1886 under the leadership of Francis A. March, leader of the American Philological Association, who made a vigorous attack on what he called "the monstrous spelling of the English language" and its adverse effect on education (Dewey, 1971).

Probably the most famous spelling-reform advocate of the twentieth century was George Bernard Shaw, who devised his own version of an orthography for new English spelling. Alphabet-reformists Pitman (1969) and Dewey (1971) attempted to substitute traditional orthography with Sir James Pitman's Initial Teaching Alphabet (ITA) as a temporary alphabet to be used in beginning reading and writing. "ITA is today beyond question the outstanding exemplar of a phonemic notation as an initial teaching medium" wrote Dewey in his recommendation for the effective teaching of initial orthography. The ITA was tested extensively in England and to a lesser extent in the United States, but Dewey's enthusiasm was not

shared by Gibson and Levin (1975), who represented a multitude of anti-reform advocates seeking to preserve traditional English spelling for the following reasons:

1. The principal basis for the efficient recognition of words is the intra-word conditional redundancies generated by rules of the present orthography. Phonetically precise spelling ignoring these rules would remove important clues to efficient word perception.

2. Current English spelling preserves the morphological similarity of words: telegraph (t l gr ef), telegrapher (t legr f r). Reformed spelling does away with this more lexically relevant representation of words.

3. Traditional orthography distinguished the various meanings of homophones: principal-principle, cord-chord.

4. English spelling occasionally shows the etymology of words. For example, the ph spelling for /f/ indicates Greek origin: philosophy, sphere (Gibson & Levin, 1975, p. 187).

An additional objection to simplified spellings is the disfavor with which they are received by the reader. According to White (1979) in his book The Elements of Style, "They distract [the reader's] attention and exhaust his patience." Should the orthography reform take effect, major problems would arise--namely, the accessibility of the countless books already in print for which the new orthography would be too costly to revise and, in a few years, too unfamiliar to be read.

Spelling Reform: Standardization

More successful than the simplification of English spelling was its standardization. The desire for spelling uniformity emerged with the increasing popularity of printing in the sixteenth century, which demanded that a general agreement for spelling variations be adopted. Until that time, there was little standardization of spelling; words were spelled according to their sound, as perceived and created by the writer. By the end of the seventeenth century, the patterns of modern English were fairly well established (Fries, 1963). Although these patterns became relatively fixed in the orthography, the pronunciation of words underwent and continues to undergo more radical changes, a phenomenon that caused even more confusion to those who sought to "make sense" of English spelling. The printing of Dr. Samuel Johnson's dictionary in 1755 provided a widely accepted reference for "correct" English spellings (Crosby & Emery, 1981). In the United States the most influential source for standardized spellings was the American Dictionary of the English Language, edited by Noah Webster in 1828. With the publication of Johnson's and Webster's dictionaries came a general agreement on a standardization of English spelling--a standardization that, like language, keeps changing with events, necessitating frequent publications of latest editions.

The standardization of English spelling continued to frustrate advocates of spelling reform who were more interested in the acceptance of "simplified spellings" than the standardization of what March (1893) referred to as a "monstrous system." Convinced

that at the root of the problems of reading and writing of English was an inadequate orthography, spelling reformists were dealt a crushing blow by a number of linguists (Bloomfield & Barnhart, 1961; N. Chomsky & Halle, 1968; Fries, 1963; Hanna, Hanna, Hodges, & Rudork, 1966; Venezky, 1970), whose research demonstrated the surprising efficiency of many features of English orthography.

Regularity of English Spellings

As mentioned above, recent research in English spelling has revealed that contrary to previous beliefs there exists a remarkable consistency of letter-to-grapheme correspondences in English spelling. Fries (1963) asserted that modern English spelling is not hopelessly erratic; most spelling is patterned, basically phonemic and/or morphophonemic in its representation, with patterns of letters, rather than single letters, as the functioning units of the representation.

Hanna et al. (1966) provided linguistic insights into the nature of English orthography in a computerized study in which they analyzed the sound-letter relationships in more than 17,000 words. They discovered that just as there is pattern and system in the relationships between phonemes and their graphemic representations, there is also pattern and system in the ways words are created, and continue to be created, in our language. The researchers also demonstrated that the number of so-called "spelling demons" in the English spelling system is only about 3 percent of the core vocabulary--that these few words should hardly constitute the basis

for the assumption that the entire English language is orthographically chaotic as advocates of spelling reform (Dewey, 1971; March, 1893; Paine, 1920; Ripman & Archer, 1948; Shaw, 1962) would have us believe.

N. Chomsky (1970) argued that English orthography appears to be a nearly optimal way of representing underlying meanings, offering the following advantages:

1. The semantic similarity of related words is preserved graphically; for example, anxious and anxiety appear alike to the reader, who can go directly from the appearance of the word to its meaning without attention to redundant phonetic information.

2. Lexical representations are resistant to change and persist over long historical periods.

3. Lexical representations are common to a wide range of dialect (Gibson & Levin, 1975).

Applying phonemic principles to the teaching of reading, Bloomfield (1933) stressed the importance of helping beginning readers establish connections between letters and speech sounds (phonemes), a method that soon came to be known as "the linguistic approach." A child's success in learning to read also depends on giving him the most suitable words to read, without regard to their meanings. "The child will get the meanings only when he has solved the mechanical problems of reading," said Bloomfield. Halle (1969) found that adults learning to read English as a second language discovered the helpfulness of their being able to use the high-order

information provided by English orthography. In his analysis of spelling-to-sound correspondences, Venezky (1970) found that knowledge of the morphophonemic level of English simplified the pronunciation rules.

Linguistic studies have helped explain some of the most perplexing problems of spelling in the English language. They have weakened the arguments supporting spelling reform by demonstrating that by simplifying spelling through easy pronunciation, we ignore the high correspondence of relationship between graphemes and phonemes and the benefits of grammatical and semantic information about words derived from their orthographic forms (Gibson & Levin, 1975). Despite the linguistic and educational discoveries in the soundness and effectiveness of English orthography, the problem of spelling disability persists. In a society in which reading problems continue to be a major concern, children in schools today read better than they can spell (Barbe, Francis, & Braun, 1982).

Spelling Disability Among Proficient Readers

Several research studies have indicated that reading-disabled children may have more difficulty than normal readers in processing aural input (Godfrey, Syrdal-Lasky, Millay, & Know, 1981; Katz, Shankweiler, & Liberman, 1981; Moore, Kagan, Sahl, & Grant, 1982; Payne, Davenport, Damanque, & Saroka, 1980). The findings demonstrated the inability of poor readers to use auditory input effectively.

However, in a study conducted by Zivian and Samuels (1986) investigating whether differences existed between reading-disabled and normal readers in the ability to integrate orthographic and phonemic information, the investigators found no evidence that reading-disabled children were less able than normal readers to process or integrate aural input. Perhaps poor readers do not possess auditory deficits as suggested by Zivian and Samuels, but there remains the strong likelihood that such deficiencies do exist in spelling, for even more puzzling than widespread spelling disability is the fact that many children who are poor in the ability to reproduce words in spelling are skilled in the ability to recognize them in reading (Lerner, 1971). Reading achievement and spelling achievement share a close relationship in the beginning stages. Thereafter, their paths grow increasingly apart as reading proficiency increases and the detailed study of words is no longer necessary. Spelling a word is a more complex task than recognizing a word; such aids as context clues, phonics, word configuration, and structural analysis, which enable the reader to recognize words, are not as helpful to the writing of words. As a consequence, reading alone, even a great deal of it, is not a guarantee that correct spelling habits will be learned (Henderson, 1985).

Liberman, Rubin, Duques, and Carlisle (1985) found that poor spellers demonstrated an ineffective use of phonological strategies as compared to good spellers. Concerned with linguistic abilities and spelling proficiency, the researchers concluded that if

successful spelling strategies are to be attained, more explicit instruction in alphabetic orthography will be required. Similarly, Templeton (1980) found that a productive knowledge of English orthography may precede the higher order of phonological knowledge found in the spelling strategies of good spellers.

Extensive research has been conducted on possible causes of spelling disability (Fitzsimmons & Loomer, 1978; Groff, 1973; Hillerich, 1977; Mazurkiewicz, 1975; McFeely, 1981; Petty, 1958). Although it appears that the major problem with poor spellers is their ineffective use of phonological strategies, research investigating the explanation of spelling disability among the reading proficient is scant.

Developmental Stages of Spelling

That learning to spell is sequentially developmental in nature is perhaps one of the most significant discoveries in research on spelling acquisition. Studies have shown that spelling is acquired in a series of systematic stages through which children progress as a result of their knowledge of phonology and ability to deal analytically with the structure of language (Beers, 1980; C. Chomsky, 1970, 1971; Clay, 1975; Henderson, 1985; Liberman et al., 1985; Manolakes, 1975; Moskowitz, 1973; Read, 1971, 1973; Zuttell, 1979).

Children grow into spelling proficiency, and as they mature they use different strategies to produce new words. The hypothesis of spelling acquisition is that learning to spell is a language-based activity, just as are learning to speak and read. Beers

(1980) maintained that children internalize information about spoken and written words, organize that information, construct tentative rules based on that information, and apply these rules to the spelling of words.

Spelling strategies of preschool and primary-grade children rely heavily on their phonological knowledge in their attempts to spell (C. Chomsky, 1970; Read, 1971). After children demonstrate their proficiency in matching phonemes to graphemes in the early stages of spelling acquisition, they are then prepared to progress through the more complex subsequent stages of analyzing the structure and patterns of language. Children's early attempts to spell are based on their knowledge of how sounds are articulated. Prerequisite to the developmental processes of spelling acquisition is the child's ability to match sounds to letters in the first and most basic stage--a skill that should be acquired before progressing to the next stage.

In the past, Henderson (1985) explained, the best we could offer deficient spellers was more phonics and memory drill. Today we can offer much more. By examining the nature of children's errors, we can determine the stage of spelling development they have reached. "So informed, we can temper our prescriptions to their competence" (Henderson, 1985, p. 191).

Spelling Instruction

There is little unanimity of opinion regarding proper methods of teaching spelling. Basic research on fundamental strategies for

the teaching of spelling has had little influence on the teaching of spelling. Teachers are not usually familiar with the literature devoted to spelling research and base their instruction more on tradition than on the results of spelling research (Barbe et al., 1982). Many of the ideas presented in research depend on complicated theories of language and learning that teachers do not understand. In addition, basic research in spelling often challenges time-honored truisms about spelling that teachers prefer to preserve.

The application of educational and linguistic research to the teaching of spelling is not commensurate with research efforts (Fitzsimmons & Loomer, 1978). According to T. D. Horn (1960) and Christine and Hollingsworth (1966), the problem with the teaching of spelling is the lack of application of the valuable evidence currently available.

Importance of Having a "Good Ear"

"Some persons have an aptitude for hearing and reproducing . . . speech-sounds; we say that such persons are good imitators or have a "good ear" (Bloomfield, 1933, p. 84).

In 1952, five graduate students from Harvard University conducted a study in Lindale, Georgia, a small mill-town community in the northwestern area of the state. Although the primary purpose of the study was to investigate correlations between a Harvard-designed reading program and an already established basal reading

program, the researchers were also interested in variations in the teaching styles of the school's four first-grade teachers.

One of the researchers, Benjamin Bohnhorst (1954), designed his doctoral dissertation to study the effectiveness of different teaching styles of the four teachers observed. He measured the success of each of the classes by administering and comparing pretest and posttest scores on the Gates Pre-reading Inventory, the California Test of Mental Maturity, and a test designed by Bohnhorst to measure visual discrimination. He was especially interested in the extremely diverse teaching styles of two teachers in particular. The first was a "drill-sergeant" type of teacher, who was focused on time-on-task performances from her students. Her students entered class each morning, went directly to their desks where they found their basal readers and workbooks opened to the appropriate pages, and began working immediately. To insure further that no time be misspent, the teacher placed sharpened pencils at each desk along with crayons, writing and drawing paper, and whatever other materials were necessary for the morning's first project. The second teacher Bohnhorst observed was described as a relaxed, gentle, low-keyed teacher who spent 20 minutes each morning on musical roll call. She sang the names of each of her students on a note (or pitch), after which the students were expected to respond on the same note. "Alice, are you here?" was sung on one note. Alice responded with "I'm here." If Alice's response was on the right pitch, the teacher would move on to another child. If, however, the response was off pitch, the teacher would sing the

following request on the same note: "Let's help Alice be here." The entire class would then assist by singing, "Alice is here" on the appropriate note.

Correlations between the various teaching styles that were observed proved to be a major factor in the results of the posttest scores. The students of the musical-roll-call teacher scored consistently higher on the subsequent tests than did the students of the other three teachers--including the teacher Bohnhorst dubbed "Drill Sergeant," whose students performed second best in overall improvement.

The Bohnhorst study revealed the importance of a child's having or developing a good ear in order to learn many of the important skills taught in early school years. Similarly, the importance of having a good ear is prerequisite to learning to spell. According to Kesselman-Turkel and Peterson (1983), spelling is so sensibly tied to a word's sound and meaning that all one needs in order to spell correctly are (a) a good ear, (b) careful speech, and (c) an understanding of which letters stand for which sounds.

Purpose

The purpose of this study was to examine various auditory and phonological characteristics shared by spelling-disabled adults who are competent readers. More specifically, the areas of investigation were five measurements of musical ability and four phonological spelling strategies.

The scant research on adult spelling disability has focused on poor readers who understandably lack the skills to acquire spelling

competency. Liberman et al. (1985) compared linguistic abilities and spelling proficiency of kindergartners to adult poor spellers, all of whom were enrolled in adult literacy classes.

In this study, the researcher attempted to bring to the problem of spelling disability a knowledge of auditory and phonological disorders not yet explored among competent adult readers with spelling disabilities.

Research Questions

1. Will the scores on any of the six measurements of musical ability (pitch, loudness, rhythm, time, timbre, and tonal memory) differ significantly between the spelling-disabled (Group 1) and spelling-proficient (Group 2) adult students?

2. Will the mean scores on each of the tests of musical ability obtained by the population of high school and college students, as reported in the Seashore norms, reveal significant differences from the mean scores obtained by Group 1 and Group 2?

3. Will there be a correlation between the scores on the oral Spelling 1500 Diagnostic Spelling Test (DS) and the visual Focus on Spelling Proficiency and Diagnostic Spelling Test (FS)?

4. Will deficient spellers have a higher occurrence of phonetic misspellings than proficient spellers?

5. Will the subjects with high occurrences of phonetic misspellings employ the spelling strategy of letter-naming more frequently than will the subjects with lower frequencies of phonetic misspellings?

6. Will there be a significant difference between the self-assessment of musical ability and a high frequency of phonetic misspellings?

7. Will the mean scores of self-assessment of artistic ability differ significantly with the frequency of phonetic misspellings?

8. Will the poor spellers in Group 1 admit to having more difficulty with word pronunciation than those proficient spellers in Group 2?

9. Will the poor spellers in Group 1 be significantly less proficient in the ability of dictionary skill word-pronunciation than those proficient spellers in Group 2?

10. Will significantly more of the poor spellers in Group 1 use the spelling strategy of letter-naming than will the better spellers in Group 2?

11. Will the better spellers pronounce words and/or syllables to themselves as they write significantly more often than the poor spellers?

12. Will the self-assessment of musical aptitude reveal significant differences between the judgments of poor spellers and those of better spellers?

13. Will the self-assessment of artistic ability reveal significant differences between the judgments of poor spellers and those of better spellers?

Terminology

Function word. A term sometimes used in word classifications for a word whose role is largely or wholly grammatical, e.g., articles, pronouns, conjunctions. All contrast with the lexical words in a language, which carry the main semantic content.

Grapheme. An alphabetical symbol (letter).

Grapheme-phoneme correspondence. The relationship between a phoneme (sound) and a grapheme (letter) in writing. In English there is not as close a one-to-one relationship between printed symbols and speech sounds as there is in some other languages, such as Spanish. Some letters (graphemes) represent more than one sound (phoneme), e.g., the two s's in saves. Some sounds (phonemes) are represented by more than one letter or group of letters (graphemes). Examples: the vowel sound in too, do, you, flue, and chew.

Invented spelling. A writing process in which children are encouraged to "write" their thoughts, feelings, and experiences. Because these children have not yet developed the ability to spell words correctly, they invent spellings for the words they use by attempting to spell by matching phonemes to graphemes according to their own levels of linguistic ability.

Morphemes. The smallest meaningful unit in a language, and the central concern of morphology. Examples: roots, prefixes, suffixes, inflectional endings.

Morphology (morphophonemics, morphophonology). A linguistic study of the morphemes of the language, including the analysis and

classification of phonological factors that affect the pronunciation of morpheme variants (allomorphs).

Phoneme. The minimal unit in the sound system of a language, according to traditional phonological theories. The extent to which the phonemes and the graphemes of a language are regular is called the phoneme-grapheme correspondence.

Phonemics. The study of phonemes.

Phonetic analysis. The use of phonics in the spelling of words; also used to pronounce a written word in reading.

Phonetic misspellings. The spelling of a word that cannot be correctly pronounced as written; misspellings of words that do not have a correspondence of phonemes with graphemes.

Phonetics. The science that studies the characteristics of human sound-making, especially those sounds used in speech, and provides methods for their description, classification, and transcription. Three branches of the subject are generally recognized: (a) articulatory is the study of the way speech sounds are made (articulated) by the vocal organs; (b) acoustic phonetics studies the physical properties of the speech sound wave as transmitted out of the mouth; and (c) auditory phonetics studies the perceptual response to speech sounds, as mediated by ear, auditory nerve, and brain.

Phonics. The application of phonetics (or phonemics) to spelling and reading.

Pitch. An auditory phonetic feature, corresponding with the acoustic feature of frequency, which in the study of speech is the number of complete cycles of vibration of the vocal cords.

Pitch discrimination (or sense of pitch). The ability to hear small differences in pitch. It is a measure of the capacity for using pitch in musical hearing and tone production.

Reading-proficient adults. Those attaining a grade-level score of 11.2 or better on the Gates-MacGinitie Reading Test, Levels 10/12 or K/L. A criterion required for all subjects in the study.

Structural analysis. The use of meaning units (or morphemes) in the spelling or recognition of words.

Timbre. The attribute of auditory sensation in terms of which a listener can judge the dissimilarity between sounds of otherwise identical pitch, loudness, and length. The best examples can be found in the characteristic timbres, or tonal qualities, of different instruments of the orchestra; but a similar set of timbres can be established to distinguish between the frequency characteristics of individual sounds (such as vowels and fricatives) or individual speakers (as one of the features of voice quality).

Organization of Chapters II Through V

Chapter II contains a review of pertinent literature in the following areas: (a) the relationship between musical aptitude and the Seashore Measurement of Musical Aptitude, (b) studies on the effectiveness of training to improve musical ability, (c) the effectiveness of the English orthography in the spelling system, (d)

the application of educational and linguistic research to the teaching of spelling, (e) the developmental stages of spelling acquisition, and (f) research on spelling among spelling-disabled and reading-proficient adults.

The materials and procedures employed in this study are described in Chapter III. The design of the study is also presented.

The results of the data collected, compared, and analyzed in the study are reported in Chapter IV.

Chapter V concludes the study with a discussion of the investigation, implications, recommendations for both the teaching of spelling and future research, and the researcher's reflections.

CHAPTER II

REVIEW OF RELATED LITERATURE

The investigation of musical ability among reading-proficient/spelling-disabled adults focused on the following five major areas in the review of the literature:

1. The relationship between musical aptitude and the Seashore Measurement of Musical Aptitude.
2. Studies on the effectiveness of training to improve musical ability.
3. The effectiveness of the English orthography.
4. The application of educational and linguistic research to the teaching of spelling.
5. The developmental stages of spelling acquisition.
6. Research on spelling competency and phonological disorders among adults.

The Relationship Between Musical Aptitude and the Seashore Measurement of Musical Talents

The Seashore Measurement of Musical Talents (C. Seashore, Lewis, & Saetveit, 1960) is the best-known test of musical aptitude. The tests included in the measurement--pitch, time, rhythm, timbre, loudness, and tonal memory--represent the auditory qualities of music, each of which can be isolated for measurement. The Seashore

test asks specifically whether variations within each of the separate measurements can be heard. The results are recordable, repeatable, verifiable, and predictive (C. Seashore, 1938).

Pitch

Pitch discrimination has played the primary role in determining musical ability. Both psychologists and musicians place more emphasis on the ability to perceive the variations of pitch than on any of the other musical measurements. In his own description of the Seashore measurement, C. Seashore (1938) asserted that pitch is the most basic measure of musical aptitude through which musical capacity or incapacity can be judged. Lundin (1953), in his research of studies on the psychology of music, affirmed the common belief that the ability to discern pitch discrimination is a necessary attribute for musicianship. Common sense, Lundin continued, tells us that one will not be a successful singer if he cannot sing "in tune," regardless of a superior quality of the voice.

C. Seashore (1919a) asserted that the judgment of pitch discrimination is innate, not dependent on logic but rather on the various degrees of sensitive mechanisms in the inner ear. Pitch discrimination, a capacity that does not vary with age, is the most widely accepted of the musical measurements for determining music capability. According to the test's author, the average pitch scores of grade-school children is lower than that of adults, not because of the capacity of the sense organ in the ear but because of

the relative cognitive immaturity of the child compared to that of the adult.

The Seashore measurement was included in a battery of entrance tests for all entering freshmen at Casper Junior College in an effort to identify prospective members of the college choir. Russell Schwejda (1954), the director of music at the college, claimed that the pitch test gave a "good factual argument" in persuading students to join the choir.

Faulds (1959) administered a battery of 14 auditory tests to 67 freshmen from the Westminster Choir College and 35 freshmen from Princeton University to examine various aspects of pitch discrimination. He found that those subjects who were poor at pitch discrimination in a "pure situation" like the Seashore test were correspondingly poor in a musical situation.

In a study conducted in the Biolinguistic Laboratory of the University of Michigan, Brody (1949) administered a series of tests to a group of 34 children, ages 9 to 17, involved in a voice-training program based on effective motor coordination for the production of tone. The Seashore Pitch Test, the only test given from the Seashore measurement, was selected as an auditory discrimination test, not only because it measures the ability to hear two pitches, but also because it measures the ability to compare and make judgments on the previous pitch. The researcher claimed that the test was a measure of a specific function of the cortex and could not be considered an elemental capacity.

Tonal Memory

Unlike C. Seashore, who singled out pitch as the best predictor of musical ability, other researchers, while supporting the claim that pitch is an essential measurement, have concluded that tonal memory is also a valuable predictor. Drake (1933) believed tonal memory to be the one factor on which musical ability could most accurately be predicted. J. L. Mursell (1937), a notorious skeptic on the reliability of musical ability tests, reported that the Seashore Measure of Tonal Memory, along with the Kwalwasser-Dykema Test of Tonal Memory, correlated highest with various criteria of musical success.

Pitch and Tonal Memory: Fundamental Criteria in the Measurement of Musical Talent

Using the Spearman tetra-difference statistical technique, Drake (1942) found that at least five separate abilities constitute musical talent. He recommended that the two capacities, pitch discrimination and auditory (tonal) memory, are distinct and fundamental for the musical mind and should always be included in any music testing program.

In a factor analysis of the Seashore measurement, McLeish (1950) found that the tests of pitch and tonal memory both revealed high correlations to musical ability. Bachem (1954), in his study of time factors in relative and absolute pitch, concluded that the most musical subjects (half of whom had absolute pitch) had the highest scores in memories for pitch during a test in which he

introduced longer time delays than normally given on the pitch measurement. Using the Seashore test, Konig (1957) noted that the more the lengthening of time intervals on the pitch test, the more notably the scores fell for some of the subjects, suggesting that both tonal memory and pitch were determining factors in the pitch scores. Although Konig's subjects were not selected for their musical ability, the studies produced similar results: Both pitch and tonal memory were predictors of musical talent.

Bienstock (1942) found in her research of various studies on musical aptitude that, in considering the tests of musical talent available to date, most investigators agreed that the Seashore Pitch and Tonal Memory Tests were the two most important and fundamental criteria in the measurement of musical talent.

Time, Rhythm, Timbre, and Loudness

So questionable are the low coefficients of the time, rhythm, timbre, and loudness tests of the Seashore measurement to musical ability that Farnsworth (1931) concluded that only the pitch and tonal memory tests were sufficiently reliable for diagnostic value; the other tests should be used only with extreme caution. Similarly, Bienstock (1942) and Lundin (1953), in their surveys of studies on tests of musical aptitude, found an overwhelming consensus that little importance should be placed on the significance of the measurements of time, rhythm, timbre, and loudness.

Summary

Of the various measurements used to test musical ability, only the pitch and tonal memory tests are sufficiently reliable for diagnostic value. Studies of musical aptitude tests have revealed an overwhelming consensus that the measurements of time, rhythm, timbre, and loudness are of little significance in determining musical aptitude. Furthermore, the importance of tonal memory and pitch as basic constituents of musical talent is evident by their inclusion in all leading music tests.

Studies on the Effectiveness of Training to Improve Musical Ability

The theory that pitch discrimination is an innate characteristic that does not improve with training was supported by C. Seashore (1919b), who was steadfast in his view that individual differences in the ability to discriminate pitch reach maximum levels at an early age. He further believed that people possess a number of specific inherited abilities that cannot be altered or improved upon with training.

Although Seashore's views have had a profound influence on both psychologists and musicians, little evidence has substantiated the theory of inborn capacity. On the contrary, Lundin (1953) reported that most of the research has supported the opposite theory--that pitch discrimination, like other musical behavior, is acquired and subject to improvement.

Disputing the theory that musical talent is hereditary and questioning the emphasis of schools in sorting out the musically

talented for special training, Brody (1949) selected 34 subjects from grades 4 through 12 to participate in a voice-training program. Throughout a seven-week program based entirely on effective motor coordination for production of tone, the researcher emphasized the activities of posture, respiration, phonation, resonance, and articulation. At the end of the training period, the following improvements in musical ability were observed:

1. All of the subjects displayed qualitative changes in their singing voices.

2. All of the nonsingers were able to carry tunes.

3. The shallow breathers showed a considerable increase in the length of breath.

4. All but one increased their ability to sing in tune.

5. Twenty-three of the 34 students showed improvement in breathing control, pitch performance, and auditory discrimination.

6. The same group of 23 students showed an average gain of four points on the Seashore Pitch Test, whereas 12 of the 34 subjects showed an average gain of nearly six points.

Pitch discrimination in tests of musical ability is measured by sounding two tones (on tuning forks with resonators or electrical oscillators) and gradually reducing the frequency until the listener is unable to discern which of the two tones is higher. The frequencies usually employed in setting the frequencies are 30, 23, 17, 12, 8, 5, 3, 2, 1, and 0.5 (C. Seashore, 1938). Wolner and Pyle (1933) selected seven children with such poor pitch-discrimination

ability that they were not able to discern octaves. Using tuning forks accompanied by verbal explanations as to the correctness of the responses, the researchers spent 16 hours with each of the subjects in individualized sessions. Before the training, the children were not able to discriminate a difference of 30 cycles per second (cps). At the end of the 16 hours, all of the children improved; four could distinguish differences as low as 1/2 cps, and the remaining three could distinguish differences of 2, 3, and 8 cps, respectively.

Twelve adults were selected in a study conducted by R. Seashore (1935), in which improvement in pitch discrimination was observed. Using an electrical oscillator as a training instrument, Seashore found that the average ability to discriminate pitch differences rose to 4.6 cps from the previous threshold of 9.2 cps. The average percentile rank on the Seashore Pitch Test improved from 6.6 to 45. Carpuso (1934) claimed that, after six weeks of training in interval recognition, one of the subjects improved from 6 to 93 in the percentile rank of the Seashore test. Similarly, Wyatt (1936, 1945) concluded that deficiencies of pitch discrimination are remediable. After individualized training with 16 college students with poor ability to discriminate pitch, he reported that the average increase of the score on the Seashore Pitch Test was 6.1 points.

Semeonoff (1940) conducted a study in which 270 children ranging from age 12 to 15 were tested. Significant differences on musical aptitude tests were found between children who played instruments and those who did not. Although the amount and length

of training were not considerations in the study, the research gave evidence that children with training on musical instruments received higher scores on musical aptitude tests.

In comparing the mean scores of junior high school students with no music training outside the school with those who received ten or more private lessons, Kwalwasser (1936) found the difference in the scores to be statistically significant. On the Kwalwasser-Dykema Test of Musical Ability, the mean of the untrained group was 176.26, whereas the mean for the trained group was 187.50.

Summary

The results of the studies on the ability to improve musical aptitude, particularly in the area of pitch, have shown that improvement is possible. Through remediation of auditory-discrimination techniques or musical training, many subjects were able to obtain higher scores as revealed after retesting. Subjects with musical training in their backgrounds received significantly higher scores on the tests of musical ability than did those subjects with no training.

The Effectiveness of the English Orthography

English spelling has traditionally been condemned by scholars and educators because of the apparent inconsistency of relationships between the phonemes of American-English speech and the graphemes by which phonemes are represented in writing. The playwright and outspoken critic of English spelling, George Bernard Shaw, is

credited with the humorous but outrageous formula that results in the spelling of GHOTI for the word fish: gh as in rough, o as in woman, and ti as in vacation. A scholar of the teaching of spelling, Edmund Henderson (1985), recently made the claim that linguists, who know so much about language, think learning to spell is very difficult--a claim this researcher has been unable to support in her review of recent studies by linguists on the subject of spelling.

Two schools of thought have prevailed in the concern about the apparent lack of regularity in the English spelling system. One side would reform the orthography toward a more consistent letter-to-sound correspondence, thus reducing the number of graphemes involved with the spelling of words. The other side would prefer that the orthography remain unchanged for two reasons: (a) changing the orthography would interfere with the traditional patterns and meaning relationships that have evolved historically, and (b) studies of English orthography have revealed a far greater consistency of phoneme-to-grapheme correspondence and a far greater consistency in writing morphemes than previously believed.

Advocating Spelling Reform

The fundamental cause of our present chaotic and indefensible spelling, underlying all the rest, has been the effort to spell a cosmopolitan language--basically Anglo-Saxon or Teutonic but greatly enriched from Romance sources, notably Norman-French--which distinguishes about 40 sounds, by means of a Roman alphabet, quite adequate for Latin, for which it was developed, but containing a maximum of 26 letters. (Dewey, 1971, p. 4)

Bloomfield (1933) said that to change the orthography of a language does not change the language; the language remains the same, regardless of how it is written. (Bloomfield, however, questioned the feasibility of an orthographic revision for reasons to be discussed in the following section, "Arguments Against Spelling Reform.") Ever since the Great Vowel Shift, which occurred during the Middle Ages, in which the pronunciation of words changed but spelling remained essentially the same, advocates of spelling reform have attempted to improve English spelling by devising a more compatible grapheme-to-phoneme orthography.

Described by Scrag (1974) as "one of the finest phoneticians English has known," John Hart (1554) wrote what is thought to be the first book on spelling reform, entitled A Method of Comfortable Beginning for All Unlearned, and in 1570 published a phonetic alphabet as an instrument to teach reading. In about 1569, Hart published Orthographie, in which he described the "newe maner of writing," which he had previously discussed in his manuscript The Opening of the Unreasonable Writing of Our English Young (c. 1551):

For even so I have opened the vices and faultes of our writing: which cause it to be tedious, and long in learnyng: and learned hard, and evill to read. . . . And then have I sought the meanes (herein writen) by the which we may use a certaine, good and easi writing, onli following our pronunciations; and keping the lettera in their auncient, Simple, and Singular powers. (cited in Fries, 1963, p. 55)

William Bullokar published four books in about 1580 in which he advocated "amended" spelling with a new orthography not too different from that which already existed at the time. Similarly, Sir Thomas Smith and Edmund Coote in the sixteenth century,

Alexander Gill, Charls Butler, and John Wilkins in the seventeenth century, and Benjamin Franklin in the eighteenth century advocated the use of phonetic alphabets (Fries, 1963). During the nineteenth century, A. J. Ellis and Isaac Pittman attempted to construct a simpler alphabetic system.

Phonetic alphabets, the primary focus of spelling reformists, were designed with the hope that it would be possible to represent the individual sounds so precisely that the full details of the pronunciation of any language could be revealed by the writing alone (Fries, 1963). In 1888, an alphabet of international application was established by the International Phonetic Association, the International Phonetic Alphabet (IPA), which represented the sounds for 26 vowels and 52 consonants. During the twentieth century, additional appeals for reform and attempts to teach reading and spelling through a simpler system were developed (Zutell, 1979): Sir James Pitman's initial teaching alphabet (ITA), World English Spelling (WES) of the World English Society, the initial teaching medium (ITM), and New Spelling (NS) of the British Simplified Spelling Society.

Block (1972) reported that the results of the ITA, the most widely taught of the revised systems, when it is used as an initial teaching tool, have repeatedly demonstrated it to be an effective aid to spelling development. Petty, Murphy, and Mohan (1974) studied the effects of teaching the ITA to third, fourth, and fifth graders and found that little improvement was made. Block, however,

contended that the ITA was never intended for children who had previous training in traditional spelling experience; hence, the ITA must be used as an initial teaching method.

Attempts to simplify English orthography with the hopes of providing a less complicated spelling system and more easily acquired reading skills have repeatedly been met with opposition, despite arguments that the change would be beneficial to the English language:

There would be no serious difficulty about devising a simple, effective orthography for all types of standard English; the use of it would save an enormous amount of time and labor, and, far from injuring our language, would raise the general level of standard speech, both by reassuring native speakers of non-standard and by removing their tendency of spelling-pronunciations. (Bloomfield, 1933, p. 502)

Arguments Against Spelling Reform

Opponents of the alteration of English orthography have maintained that, contrary to the claims of the spelling reformists, English orthography has a higher correspondence of regularity to the phonemes than previously thought. Recent analyses of English orthography have suggested that a logical system of impressive regularity emerges; the spelling system generally reflects a structural consistency only partially evidenced in sound-symbol correspondences (N. Chomsky & Halle, 1968; Klima, 1972; Templeton, 1979; Venezky, 1970).

Stanford researchers (Hanna, Hodges, & Hanna, 1971) used computer technology to analyze phoneme-grapheme correspondences in more than 17,000 words. Several of their findings are as follows:

1. The American-English orthography is an alphabetically based orthography; i.e., it employs graphic symbols to represent the speech sounds, the phonemes, of the language.

2. Although the orthography does not perfectly conform to the alphabetic principles, there is a more consistent relationship than traditionally thought, as demonstrated by the fact that about half the spelling words normally used in writing were spelled correctly by a computer that was programmed with certain phoneme-grapheme principles of the American-English writing system.

3. Just as there is pattern and system in the relationship between phonemes and their graphemic representations, there is also a morphological pattern and system in the way words are created.

4. "Spelling demons" found in the spelling system account for less than 3 percent of the core vocabulary. The researchers contended that these few words hardly constitute a basis for assuming that the entire language is orthographically chaotic and that most words are spelling problems.

Apart from phonological correspondences, the present spelling system also reflects morphological, syntactical, and derivational aspects of language. Phonetic spelling would obscure the derivation of words and cause serious confusion between words of like sound (homophones), now distinguished by different spellings (Henderson, 1985):

their, there, they're

knight, night

right, rite, write, wright

buy, by

cent, scent, sent

hear, here

road, rode, rowed	hour, our
sew, so, sow	knew, new
to, too, two	one, won
Mary, marry, merry	see, sea
wear, where, ware	tow, toe

From a morphophonemic standpoint, word alternations are frequently preserved in English orthography in the very instances in which one might suspect functionless graphemes. In discussing the spelling of *paradigm*, *damn*, and *bomb*, Weir and Venezky (1968) offered the following analysis:

In a pure and direct spelling-to-sound analysis, one is forced to the conclusion that the *g* in *paradigm*, the *n* in *damn*, and the final *b* in *bomb* are functionless graphemes. When viewed, though, from a morphophonemic standpoint, the pairs *paradigm:paradigmatic*, *damn:damnation*, *bomb:bombard* reveal a regular morphophonemic alternation that is preserved in the orthography. (p. 192)

Without the retention of the full consonant cluster in the final position, the identity of the common morphemic element in such pairs would be obscured on the graphemic level.

Additional support of English orthography was offered by Klima (1972) when he cited the monumental study on the generative phonology of English by N. Chomsky and Halle (1968), in which the authors praised English orthography for its clarity in reflecting the linguistically well-motivated deep structure of English words. The general rules that N. Chomsky and Halle discovered for English phonology suggest an underlying phonological form for *giraffe*, with abstract feature segments corresponding approximately to /giraeffe/

with a double /ff/ and a final /e/. The word courageous, they argued, has an underlying lexical form /koraege-s/, with an /e/ as in the orthographic representation. They concluded:

Once again, a quite abstract underlying form, very similar to conventional orthography, accounts for the variant forms by rules of great generality and wide applicability. There is, incidentally, nothing particularly surprising about the fact that conventional orthography is, as these examples suggest, a near optimal system for the lexical representation of English words. The fundamental principle of orthography is that phonetic variation is not indicated where it is predictable by general rule. . . . Orthography is a system designed for readers who know the language, who understand sentences and therefore know the surface structure of sentences. . . . It is noteworthy that English orthography, despite its often cited inconsistencies, comes remarkably close to being an optimal system for English. (p. 49)

The English language is frequently referred to as a "cosmopolitan" language, inasmuch as it is composed of German, Danish, Norman French, Church Latin, classical Latin, and classical Greek, in addition to the borrowing of words from a number of other languages. It is a language rich in vocabulary and well suited to diversity, not only in the United States but globally. English serves well as an international language, for it is read as a first or second language by more than half the literate population of the world (Baugh, 1957). Should the proponents of spelling reform create a singular letter-to-sound relationship, the elements that now comprise the international characteristics of the English language would render unrecognizable the meanings of thousands of words whose basic written forms would be lost in strictly phonetic spellings (Potter, 1950).

Bloomfield (1933) said that the real difficulty of a new orthography is economic and political in that the confusion and expense of reprinting books "far [transcend] our present political and administrative powers" (p. 502).

Summary

One of the greatest faults in the teaching of spelling has been to see only disorder in the matching of letters and sounds. Attempts to reform the orthography of the English language with the hopes of facilitating the acquisition of spelling have failed for more than 400 years. The idea that English spelling is highly regular and bound by a finite and practically assimilable set of "rules" is now widely held among language scientists.

The Application of Educational and Linguistic Research to the Teaching of Spelling

The methods of procedure, the order of presentation, and the various minor devices can be determined only by experiment; from the outset, however, one must know what one is trying to do. (Bloomfield, 1933, p. 501)

Educational Research

Fitzsimmons and Loomer (1978) designed a study to find the degree to which a sample of elementary teachers were aware of research- and non-research-supported procedures in spelling and to what degree those procedures were used in the classroom. Improvement in spelling programs in the elementary schools, they found, did not seem commensurate with research efforts.

Historically, spelling has been one of the most frequently investigated areas of the curriculum, but Petty (1969) stated that much has been learned but the knowledge has not been used; the problem in spelling really is the application of what is known. T. D. Horn (1960) also stated that the chief problem with spelling today appears to be the need for a more critical and universal application of the evidence now available. Christine and Hollingsworth (1966) agreed that, despite the large number of studies conducted in the area of spelling during the twentieth century, children continue to experience spelling difficulties. In his research on the methods and teaching of spelling, Campanole (1962) concluded that if instruction in spelling were planned in a more definite fashion, using pertinent research findings, it could be made more meaningful. Similarly, E. Horn (1944), in his study of various spelling strategies, concluded that:

The evidence is sufficiently complete and convincing to enable schools to teach spelling with substantial professional efficiency. Shortcomings in the teaching of spelling are therefore due not so much to the absence of satisfactory evidence as to the lack of knowledge of existing evidence, to the failure to apply it intelligently, or to erroneous interpretations. (p. 6)

Basic to teaching children the significance of phoneme-to-grapheme correspondences and spelling patterns of English is teachers' understanding of this knowledge. Aaron (1960) conducted a study of teachers' knowledge of phonics and discovered that how much teachers knew about these skills had a bearing on the extent to which they taught them. After replicating Aaron's study, Spache and Bagget (1965) reported similar findings. They discovered that the

extent to which teachers could and did teach their pupils various phonics and syllabication skills depended on their own knowledge of the underlying principles and conventions.

Using a sample of 300 elementary school teachers from 26 school districts in New Jersey, Mazurkiewicz (1975a) administered a "phonics competency examination" to assess teachers' knowledge of a variety of consonant grapheme-phoneme correspondences. The researcher found that the weaknesses included not only a lack of knowledge of the consonant and vowel letters, but also the vowel and consonant sounds, phonic knowledge as reflected in generalizations, phoneme-grapheme correspondences, and graphemic options for phonemes.

In a subsequent study of 2,482 professors of reading in 50 states, Mazurkiewicz (1975b) discovered the following inadequacies among college reading instructors:

1. They did not agree on what reading terms should be taught. They did not agree on the definitions of those terms or on the generalizations to be used in word analysis.

2. Only a small percentage had satisfactory knowledge of decoding elements they themselves deemed important for teachers to know.

3. Gross misunderstanding characterized their instruction to teachers.

4. They supplied contrary information to teachers.

5. They were generally poorly instructed about or meagerly conversant with those elements that are basic to the teaching of reading and spelling.

Similarly, Wallace (1962); Gagan (1960); Austin, Morrison, & Morrison (1963); and Schubert (1959) conducted investigative research that revealed an overall lack of knowledge of teachers in the area of phonics and word analysis. Moreover, Fries (1963) found that those who wrote professionally about the teaching of reading made no distinction between phonics and phonetics, or between phonic and phonetic.

Spelling Strategies

Additional confusion surfaces with the selection of what educators believe to be the most effective teaching strategies. For example, Henderson (1985) contended that correct spelling of English words must be memorized because the alphabetic principle, which teaches children the alphabet letters and then applies them to the spelling and pronunciation of words, does not result in correct English spellings. He stated further that the alphabetic method of learning to spell is "inadequate"; hence memory plays the primary role. Bloomfield and Barnhart (1961) would disagree, for it was their belief that the alphabetic principle is crucial to spelling acquisition--memorization is necessary for unusual spellings, which concern us secondarily.

Anderson and Dearborn (1952) stated that children do not need to know their sounds in order to read or write; the recognition is the word--hence words are best taught in units. To support their views, the authors attempted to substantiate their theory of the

"word" approach in the following statement with reference to Bloomfield:

Because of the nonphonetic characteristics of the English language, Bloomfield has suggested that the vocabulary of beginning materials be confined to words in which each letter shows only one phonetic value. . . . Bloomfield's method is not incompatible with the word method, however, inasmuch as in any case the words are always represented in units. (p. 209)

According to Fries (1963), Anderson and Dearborn ignored the fact that Bloomfield's position on the word-method approach was one of criticism: "The most serious drawback of all the English instruction known to me, regardless of the special method that is in each case advocated, is the drawback of the word method" (Bloomfield, cited in Fries, 1963, p. 33).

A complete antithesis to the linguistic approach of inventive spelling (to be discussed in the section following) is a technique encouraged by Fernald (1943), which instructs teachers to cross out any misspelled words in such a way that the incorrect form is obliterated and the correct form is written in its place. Furthermore, Fernald encouraged students to strive for perfection in their attempts to spell when she told them never to misspell a word: "Never write a word incorrectly. If you are not sure how to write a word, ask the teacher or look it up in your speller or your dictionary" (Fernald, 1943, p. 210, quoting Cook & O'Shea, 1914).

Another popular method of teaching reading and spelling is the "phonics" approach, but discussions of the technique are so complex, conflicting, and confusing that there is a gross lack of understanding and consensus of definition.

Linguistic Contributions

An investigation of contemporary literature on spelling instruction indicates that little use is made of linguistic information in spelling programs (Hanna et al., 1971). Furthermore, Fries (1963) reported that educators not only ignore the valuable contributions by linguists to the scientific study of language, but frequently their attempts to support teaching strategies through linguistic validation have revealed misrepresentations of linguistic endeavors to shed light on reading.

In his article "Linguistics and Reading," Bloomfield (1942) explored the applications of linguistic knowledge by educators whose jobs are to teach children to read and write. He stated,

Perhaps the most important weaknesses of the present approaches to the teaching of reading arise out of a misunderstanding or an ignoring of the structural significance of alphabetic writing, and the nature of the spelling patterns of present-day English. (p. xv)

He clarified the uses of the words phonics, phonetics, and phonemics and offered a brief history of English spelling to demonstrate that although the alphabet is phonemically based, it is not a phonemic alphabet in the sense that there is a single letter for each phoneme and a single phoneme for each letter.

Hanna et al. (1971) would support Bloomfield's alphabetic principle with their rationale that a comprehensive spelling program should begin with the following criteria:

1. An awareness of the alphabetic nature of the English writing system, which frees students from the memorization of each word.

2. A knowledge of morphology, which contributes to the students' spelling development as well as being inherently interesting.

3. An awareness that unusually spelled words (spelling demons) account for only 3 percent of the core vocabulary, which should not dictate basic spelling procedures.

Linguists have viewed the act of learning to read and write as first and foremost the establishing of the ability to produce the phonemes of one's language and recognize their corresponding graphemes. Bloomfield and Barnhart (1961) devised a method of teaching reading whose central thesis was that an inseparable relationship exists between the words as printed and the sound for which the letters are conventional signs, and that to learn to convert letters to meaning requires from the start a concentration upon letters and sounds to bring about as rapidly as possible an automatic association between them. In this way, they believed that a good knowledge of spelling would follow routinely along with learning to read.

What seems crucial is that we avoid making the beginning speller's linguistic tasks too difficult. Goodman and Greene (1977), in their research on miscue analysis to determine receptive competence (the ability to understand language), discovered that children have a lot going for them in overcoming the problem of the mismatch between written and spoken language, for they will use all they know about their language to make predictions. The authors

further stated that although the essential part of language acquisition has taken place by the time children enter school, an important role of education is to facilitate the expansion of their linguistic competence--to encourage them to become linguistically more mature and sophisticated.

The first major studies to examine how children begin to spell were conducted by C. Chomsky (1970) and Read (1971), in which they disclosed that very young children try to make sense of language by using information already available to them. Children apply their intuitive knowledge of the sound structure of English to spelling and essentially teach themselves to spell if allowed and encouraged to progress through the stages of spelling acquisition in accordance with their readiness. Because young children have not yet developed the ability to spell words correctly, they invent spellings of their own; hence, the term "invented spelling" was derived.

Replicating the Read study, Paul (1976), using her own kindergarten class as subjects of her investigation, found that "ordinary" children (i.e., not the children of linguists and college professors, as some of those in the Read and C. Chomsky studies) enjoyed writing in their own inventive way. Furthermore, she found that the children did not develop bad habits through their wrong spellings left uncorrected by adults; on the contrary, they became gradually more enthusiastic and knowledgeable about their ability to spell.

Although many teachers and parents object to the concept of invented spelling, in which wrong spellings are left uncorrected

(Barbe et al., 1982), linguists have agreed that the environment that contributes to early and logical spelling acquisition is one in which "children are allowed to trust their own ears and their own judgments. . . . The whole approach introduces them to the written word by making them aware that it belongs to them and grows out of their own consciousness" (C. Chomsky, 1970).

A study conducted by Moskowitz (1973) provided evidence that not only do speakers of English have knowledge of internal morphophonemic rules (IM rules), but that these rules are acquired from predictable sources and at predictable stages of acquisition. One goal of the experiment was to determine the number of trials it would take for a child to produce vowel alternations correctly. Her experiment, which included a total of 39 subjects between the ages of 5 and 12, provided the following information regarding children's knowledge of IM rules:

1. Children do have knowledge of vowel-shift rules, as evidenced by the ability of 9 to 12 year olds and 4 to 7 year olds to apply IM rules correctly.

2. Knowledge of IM rules is acquired by some children by age seven to nine.

3. The source of the knowledge of IM rules is the spelling system of English.

The rules of English grammar must be discovered. According to Larkin (1977),

Most everyone (above a certain age) knows a language and, therefore, knows what the rules of that language are. . . . We

must deduce them from our verbal behavior. Whenever people use English they are behaving according to the rules of English grammar . . . using their own internalized grammar in order to construct and understand meaningful sentences of English. (p. 4)

When children come to school, about 90 percent believe they can write, whereas only 15 percent believe they can read (Graves, 1983). Children believe that the marks they make on paper can be interpreted by others. When asked to write, they do so by scribbling, drawing pictures, writing their names, and so on. Soon they begin to write from their own perceptions of words. What they are attempting to do is make correspondences between the sounds of the phonemes and the representation of those sounds in graphemes. They are, in fact, practicing their linguistic abilities in an effort to make phoneme-grapheme connections. According to Graves, children feel confident in their ability to make these connections until they are told they are wrong.

Children should be able to do their own experimenting. . . . In order for a child to understand something, he must construct it himself, he must re-invent it. Every time we teach a child something, we keep him from inventing it himself. (Piaget, 1972)

Summary

Teachers appear to be inadequately prepared to impart to children the linguistic knowledge necessary to acquire reading and writing skills. Educational and linguistic research on the subject of the acquisition and effective teaching of spelling is available but, unfortunately, with little widespread use or understanding. Encouraging children's natural inclination to spell according to

their own levels of linguistic ability and without unnecessary adult interference has enabled them to acquire writing skills that are both comfortable and enjoyable.

The Developmental Stages of Spelling Acquisition

Research on the spelling strategies used by children has suggested a developmental and predictable nature of learning to spell. Studying the spelling patterns of first and second graders, Beers (1980) found that the children appeared to have developed a highly sophisticated knowledge of English phonology. Although children proceed through spelling-pattern sequences at different rates, the patterns Beers examined appeared constant for most of the children. The fact that the sequences are relatively consistent indicates that children may be building a set of internalized rules with which to deal with the system of English orthography. One of the most important findings of Beers's study is the evidence he provided that pointed to the developmental nature of learning to spell:

Many of the high frequency words were spelled correctly (hat, bed, gate) which can be attributed to reading or spelling instruction. These very same children, however, failed to spell low frequency words correctly (sap, speck, drape) regardless of the classroom instruction they received. This finding suggests that, although children may memorize weekly spelling lists, they may not yet recognize the orthographic principles underlying those words; otherwise, they would certainly apply them to less familiar words. (p. 209)

Clay (1975) suggested that children begin writing in much the same manner as they learn to speak: by experimenting and active learning. So natural a progression is the acquisition of spelling

that it appears that children may acquire writing skills in the same ways they learn oral language. The repeated observation that small children have strong urges to spell words phonemically--that is, as they sound (Manolakes, 1975)--signals that this impulse should be directly exploited for its importance in the early stages of spelling acquisition.

Additional studies of observed spelling-pattern sequences conducted by Read (1971, 1973), C. Chomsky (1970, 1971), Paul (1976), and Beers and Henderson (1977) found that children seem to have developed a highly sophisticated knowledge of English phonology. Furthermore, the sequential patterns of spelling are relatively consistent, indicating that children may be building a set of internalized rules that allow them to progress from one spelling level to another. In a study that investigated the acquisition of knowledge of internal morphophonemic rules while observing the spelling strategies of children, Moskowitz (1973) reported that the rules were acquired in various and predictable stages.

When spelling errors of children are studied developmentally, Henderson (1985) reported that the spellings of new words are made predictably and in stages. Likewise, Liberman et al. (1985), in their study to determine the linguistic ability and spelling proficiency of kindergartners in relation to their skill in invented spelling, reported that spelling skills develop systematically as young children master the ability to analyze words into their constituent phonemes.

In another investigation of the developmental nature of children's spelling strategies, Zutell (1979) examined the attempts of children in grades one through four to spell complex word patterns. He found that the development of spelling proficiency involves both cognitive and linguistic processes exhibited in stagelike characteristics. He suggested that rather than assign children extensive phonics drills and weekly spelling tests, it would

. . . seem more profitable to construct learning environments in which children have the opportunity to formulate, test, and evaluate their own hypotheses about the orthography. . . . Children need the opportunity to discover for themselves the structures governing English spelling. (p. 52)

Summary

The research presented here demonstrates that children's knowledge about spelling is acquired systematically, developmentally, and gradually. The stages of the spelling-pattern sequences through which a child progresses appear to develop as a result of the young speller's knowledge of English phonology and ability to deal analytically with the structure of language.

Research on Spelling Competency and Phonological Disorders Among Adults

The scant research available on adults with spelling disabilities has focused on reading-disabled subjects who, not surprisingly, have been found to perform poorly on tasks requiring explicit understanding of the internal structure of words (Byrne & Ledez, 1983; Liberman et al., 1985; Marcel, 1980; Morais, Cary,

Alegria, & Bertelson, 1979). However, there appears to be no research or literature available on the subject of spelling disability among reading-proficient adults. Research has revealed that it is too risky a postulate to assume that spelling ability will inevitably accompany good reading skills (Blair, 1975). The studies described below may have some bearing on the investigation of characteristics shared by reading-proficient adults who have serious spelling disorders.

Linguistic Abilities and Spelling Proficiency in Kindergartners and Adult Poor Spellers

Concerned with the linguistic abilities and spelling proficiency of kindergartners and adult subjects, Liberman et al. (1985) found that the problem with poor spellers was their ineffective use of phonological strategies. The researchers reported on two investigations; in one they examined the invented spellings of kindergartners, and in the other they explored the "virtually uncharted territory" of linguistic factors in adult literacy. With the kindergartners, the researchers found that the children who were better spellers exhibited better skills, as well, in analyzing the phonemic constituents of words. With the adults, all of whom were enrolled in an adult literacy class, it was evident that the subjects had not mastered the basic phoneme-grapheme spelling relationships that would allow them to produce even phonetically reasonable renditions of nonsense words for which the investigators allowed several acceptable spellings (i.e., for the

pseudo-word lete, four spellings--lete, leet, leat, liet--would all be scored correct). Additional areas in which the adult subjects experienced difficulties were as follows:

1. An informal qualitative analysis of the errors made on writing samples showed clearly that they had serious linguistic problems over and above their poor spelling. Approximately one-third of their errors reflected grammatical weaknesses--difficulties with function words accounted for 12 percent of the errors, and omissions or substitutions of inflectional endings accounted for another 21 percent.

2. The adults were able to pass only 63 percent of the items on the Berry-Talbott Language Test (1966), which measures inflectional and derivational knowledge. In contrast, in a study completed by Rubin (1984), a group of first graders was able to pass 57% of the same items. Moreover, the young children did well on the lower-level items and less well on the higher, thus showing a systematic development of morphemic understanding. The adults, on the other hand, often performed poorly on even the simplest categories of plural and past tense inflections, though they were able to use them correctly in their spontaneous speech.

3. It appeared that when the adults had to do even a moderate degree of analysis of their language, whether written or spoken, their linguistic abilities were strained to the point of breakdown.

4. In view of their performance on the morphemic-analysis task, it was not surprising to find that language analysis at the

phonemic level was especially trying for these adults. On very simple phoneme-analysis tasks, which are similar to those used in training kindergartners and first graders in phonemic segmentation, only 58 percent of their responses were correct. Moreover, they found the task frustrating and unpleasant.

Lieberman et al.'s concluding remarks stressed the belief that the ability to analyze the structure of one's language does not develop naturally as a result of cognitive maturation. It must be learned and taught. Furthermore, those children who have linguistic inadequacies will require more explicit instruction in alphabetic orthography if they are ever to deal effectively with unknown or previously unlearned words.

Spelling, Phonology, and the Older Student

Most studies investigating orthographic-phonological ability have involved young children from preschool to early elementary grades. To determine the correspondence between knowledge of certain higher-order aspects of phonology and knowledge of English spelling, Templeton (1980) conducted a study of older students, which involved good spellers in grades six, eight, and ten. Twenty students at each grade level were assigned randomly to one of two groups. In the first group, each child was shown a base word plus a suffix and asked to pronounce the resulting derived word. Next, the word and suffix were removed and the student was asked to spell the derived word. In the second group, a base word was pronounced for the student while a suffix was visually presented. The required

response was the same as with the first group; the student first pronounced and then spelled the resulting derived word. Although the subjects studied were not adults, several findings were significant to age variations as students demonstrated their linguistic proficiencies on spelling strategies:

1. Although the correlation between vowel alternation and spelling increased across grades, this relationship was significant only at grade ten.

2. At each grade, students appeared to generalize orthographic knowledge to pseudowords. There was no significant difference between the spelling of the real words and the pseudowords.

3. At all three grade levels it was found that presenting a sentence in which a derived word could occur significantly affected correct vowel alternation. In addition, spelling performance was significantly better for words with which a sentence was presented than for words presented in isolation.

4. "Seeing" a base word seemed to provide a more direct correlation to the appropriate selection of phonological rules than "hearing" a base word. Templeton stated that this finding occurred even among tenth graders, which suggests the tenuous nature of the knowledge of vowel alternation.

Templeton's study gives evidence that among good spellers a closer correspondence between orthography and phonology develops with age and from more experience with written language. Although

most of the students in his study were able to internalize English spelling with little apparent awareness of whatever rules or generalizations they used, Templeton found that even among good spellers there was a need to learn better ways to examine word structure. His study further suggests that a productive knowledge of English orthographic structure may precede the higher order of phonological knowledge.

Summary

Although phonological awareness appears to be prerequisite to spelling proficiency, orthographic awareness may be the basis for attaining a higher order of phonological knowledge, which enables students to analyze previously unknown words. Whereas good spellers demonstrate better skills in analyzing the phonemic and morphemic constituents of words than do poor spellers, it appears that orthographic-phonological skills increase with age among good spellers. Adults with deficiencies in both reading and spelling demonstrate a low-level understanding of the phonemic structure of words--a lack of linguistic competency they share with the poorest of the kindergarten invented spellers. Several investigations have demonstrated that linguistic awareness can be improved with training.

Chapter Summary

The literature reviewed in the first section of Chapter II concerned the relationship between musical aptitude and the Seashore Measurement of Musical Aptitudes. Research has revealed that pitch

and tonal memory are the two most important and fundamental criteria in measuring musical talent. Evidence that pitch discrimination may be improved with training was substantiated, as was the finding that subjects with musical backgrounds received significantly higher scores on the pitch and tonal memory sections of musical aptitude tests.

English orthography was found to be more regular and assimilable to a set of bound rules than previously thought. In addition, the high regularity of consistency of phoneme-to-grapheme correspondences provides an effective orthography for the English spelling system.

Improvement in spelling programs in schools does not appear to be commensurate with educational and linguistic research efforts. Studies have demonstrated that teachers themselves are inadequately prepared to impart to their students the linguistic knowledge necessary for acquiring reading and writing skills.

Research on the spelling strategies of children has suggested that spelling acquisition is both developmental and predictable in nature. The stages of spelling sequences through which children progress appear to develop as a result of their knowledge of English phonology and ability to deal analytically with the structure of language.

Finally, the writer discussed the importance of linguistic competency in older children and adults to the acquisition of spelling skills, a competency that several researchers have demonstrated can be improved with training.

CHAPTER III

METHODOLOGY

The methodology used in conducting the study is presented in six sections:

1. The population and sample.
2. Selection of subjects.
3. Tests and materials.
4. Procedures of testing and data collection.
5. Research questions.
6. Data analysis.

The Population and Sample

The population was composed of 57 students, all of whom were voluntarily enrolled in the researcher's Vocabulary and Spelling Power courses at Washtenaw Community College in Ann Arbor, Michigan. Forty-one of the students selected (Group 1) were proficient in reading but disabled in spelling; 16 students (Group 2) were proficient in both reading and spelling. Although the study focused primarily on Group 1, Group 2 was included to provide a comparison of scores and spelling self-evaluation attitudes. The subjects were 18 years or older, a criterion for admission in community colleges in Michigan. All participants were American-born speakers of English.

Selection of Subjects

The basis of selection of the reading-proficient/spelling-disabled subjects was (a) a grade level of 11.2 with an extended scale score of 622 or better (see Appendix C) on the Gates-MacGinitie Reading Test, Levels 10/12, Forms K/L, and (b) a poor performance on the Spelling 1500 Diagnostic Spelling Test, on which spelling disability was determined with 21 or more incorrect spellings.

The 16 students who were proficient in both reading and spelling were selected on the basis of (a) scores of 15 errors or less on the Spelling 1500 Diagnostic Spelling Test and (b) a grade level of 11.2 or better on the Gates-MacGinitie Reading Test, Levels 10/12, Forms K/L. The Focus on Spelling Proficiency and Diagnostic Spelling Test and the Seashore Measures of Musical Talents were not criteria for the selection of subjects but were included in the study to provide further diagnostic measurements.

The subjects were also assessed with reading and spelling tests normally used in the Reading Department of Washtenaw Community College.

Tests and Materials

Gates-MacGinitie Reading Test

Reading proficiency was determined through the administration of the Gates-MacGinitie Reading Test, Levels 10/12, Forms K/L. The test consisted of 45 questions in a vocabulary test and 48 questions in a comprehension test. Vocabulary, comprehension, and total

scores were determined separately from the Grade 12 Norm Table--the highest grade level norm available (see Appendix C). Raw score, grade equivalent (GE), percentile rank (PR), and extended scale score (ESS) were obtained for each subject. Because there were 30 levels of post-high-school (PHS) scores, the ESS made it possible to represent the differences in achievement from the lower to the higher end of the scale.

Spelling 1500

The Diagnostic Spelling Test in Spelling 1500 (Hook, 1967) consists of 100 words, each of which is representative of a particular spelling rule, strategy, or academic subject (see Appendix B). Only 50 spelling words from the test were used; the words were first dictated and then used in sentences for clarification. Although the words were dictated to the entire class (some of whom were not reading proficient and therefore not included in the study), the words were familiar to the reading-proficient students who were the subjects of the research. Spelling disability was determined with 21 or more incorrect spellings. The test allowed observation of the types of spelling errors that occurred, the most serious of which were phonetic misspellings--an area the researcher investigated in the study (see Appendix D).

Focus on Spelling

After identifying spelling performance on the Spelling 1500 word-dictated test, the Proficiency and Diagnostic Spelling Test

from Focus on Spelling (Rodney & Seat, 1967) was administered to determine the subjects' visual ability to identify correctly spelled words from a choice of misspelled exemplars. For each of the 100 spelling words on the test, there were four possibilities, only one of which was correctly spelled (see Appendix B). Focus on Spelling is intended for college-bound high school seniors, college freshmen, and adults who find spelling deficiencies detrimental to their careers. The authors of the book state that a score of 77 percent or below constitutes a serious problem in basic spelling.

Seashore Measures of Musical Talents

The Seashore Measures of Musical Talents (C. Seashore et al., 1960), first published in 1919 and revised in 1939, is designed to be used with subjects from fourth grade to adult. The authors affirm that musical ability is an important area not addressed by scholastic or general aptitude tests. Some of the most common uses of the test are educational and vocational counseling, admission to music instruction in schools, and selection for membership in bands, choirs, and orchestras. The test provides separate measures for six musical capacities: pitch, loudness, rhythm, time, timbre, and tonal memory (see Appendix B).

Pitch. In the test of the sense of pitch, 50 pairs of tones are presented. In each pair the listener is to determine whether the second tone is higher or lower than the first. The stimuli are derived from a beat-frequency oscillator through a circuit producing pure tones lacking in harmonics and overtones. The tones are at

about 500 cycles and have a duration of .6 second each (see Table 3.1).

Table 3.1.--Frequency differences between tones in pairs.

Item Numbers	Differences in Cycles
1- 5	17
6-12	12
13-22	8
23-32	5
33-40	4
41-45	3
46-50	2

Loudness. Fifty pairs of tones are presented. The subject is to indicate for each pair whether the second tone is stronger or weaker than the first. Stimuli are derived from the same apparatus that is used for the pitch test, but the frequency is held constant at 400 cycles (see Table 3.2).

Table 3.2.--Intensity differences between tones in pairs.

Item Numbers	Differences in Decibels
1- 5	4.0
6-10	2.5
11-20	2.0
21-30	1.5
31-40	1.0
41-50	0.5

Rhythm. Thirty pairs of rhythmic patterns comprise the sense of rhythm test. The subject is to indicate whether the two patterns in each pair are the same or different. The source of the stimuli is a beat-frequency oscillator set at 500 cycles. Tempo is constant at the rate of 92 quarter notes per minute. The first ten items contain patterns of five notes in 2/4 time; the next ten, patterns of six notes in 3/4 time; and the last ten, patterns of seven notes in 4/4 time.

Time. The test of the sense of time consists of 50 pairs of tones of different durations. The subject is to determine whether the second tone is longer or shorter than the first. The source for the stimuli is the oscillator used in the pitch test. The duration of the tones is controlled automatically by a tape timing device for which the tape has been prepared with a predetermined schedule of time intervals. The frequency of the tones is held constant at 440 cycles (see Table 3.3).

Table 3.3.--Differences in duration between tones in pairs.

Item Numbers	Differences in Seconds
1- 5	.300
6-10	.200
11-20	.150
21-30	.125
31-40	.100
41-45	.075
46-50	.050

Timbre. The purpose of the timbre test is to measure ability to discriminate between complex sounds that differ only in harmonic structure. It consists of 50 pairs of tones; in each pair the subject is to judge whether the tones are the same or different in timbre or tone quality. The tones are produced with a special generator. Each tone is made up of a fundamental component, whose frequency is 180 cycles, and its first five overtones. Tonal structure is varied by reciprocal alteration in the intensities of the third and fourth harmonics (see Table 3.4).

Table 3.4.--Amounts by which intensities of third and fourth harmonics in variable tones differ from levels in standard tone.

Item Numbers	Decibel Increase in 4th Harmonic	Decibel Decrease in 3rd Harmonic
1-10	10.0	9.6
11-20	8.5	4.0
21-30	7.0	2.4
31-40	5.5	1.2
41-50	4.0	0.7

Tonal memory. This test has 30 pairs of tonal sequences consisting of ten items each of three-, four-, and five-tone spans. In each pair one note is different in the two sequences, and the subject is to identify which note it is by the number. A Hammond organ is used as the stimulus source. The 18 chromatic steps upward from middle C are used. Tempo is carefully controlled, and intensity is essentially constant.

Spelling Questionnaire

In addition to the tests that were administered, each of the subjects was asked to complete a questionnaire on spelling self-evaluation. The four-page questionnaire focuses on the following categories (see Appendix B):

1. Pronunciation difficulties.
2. Dictionary skills with emphasis on the ability to use the pronunciation key.
3. Auditory spelling techniques: letter naming and word pronouncing or syllabizing.
4. Self-appraisal of musical or artistic ability.

Procedures for Testing and Data Collection

The subjects were group tested under the direction of the instructor/investigator during class sessions. Testing took place at Washtenaw Community College, where the four tests were administered to all students enrolled in Vocabulary and Spelling Power. The number of students tested at one time ranged from 8 to 17. Only one of the four tests was administered per class session.

The first test given was the Gates-MacGinitie, Forms 10/12, Levels K/L. Subjects were each given a hand-scored test booklet in which to write their answers. Directions for administration were read for both the vocabulary and comprehension components of the tests, and a stop clock was used to monitor the time allowed for each test: vocabulary--20 minutes, comprehension--35 minutes.

The second test administered was the Spelling 1500 Diagnostic Spelling Test. Subjects were first asked to write 50 words given in dictation and then placed in sentences for clarification by the administrator:

Example: "circumference--The students were asked to determine the circumference of the circle."

The test was not timed, subjects were permitted to ask that words be repeated, the test administrator did not go on to the next word until all subjects were ready, and the subjects were told to take time at the end of the test to look over their spelling.

For the purpose of further diagnosis, the Focus on Spelling Proficiency and Diagnostic Spelling Test was administered during the third class session to each student in the class (see Appendix B). The test required that the correct spelling be chosen from a list of four printed words, three of which were misspelled. Once the selection had been made, students wrote in a designated space what they believed to be the correct spelling.

The Seashore Measures of Musical Talents was the final measurement administered. The instrument was a group test that required the playing of a reel-to-reel tape containing the six parts of the measurement. Using the Wollensak Model 1520, several demonstrations of what to listen for were given for each of the tests. The regular classroom was the testing room for all of the testing sessions.

Research Questions

1. Will the scores on any of the six measurements of musical ability (pitch, loudness, rhythm, time, timbre, and tonal memory) differ significantly between the spelling-disabled (Group 1) and spelling-proficient (Group 2) adult students?

2. Will the mean scores on each of the tests of musical ability obtained by the population of high school and college students, as reported in the Seashore norms, reveal significant differences from the mean scores obtained by Group 1 and Group 2?

3. Will there be a correlation between the scores on the oral Spelling 1500 Diagnostic Spelling Test (DS) and the visual Focus on Spelling Proficiency and Diagnostic Spelling Test (FS)?

4. Will deficient spellers have a higher occurrence of phonetic misspellings than proficient spellers?

5. Will the subjects with high occurrences of phonetic misspellings employ the spelling strategy of letter-naming more frequently than will the subjects with lower frequencies of phonetic misspellings?

6. Will there be a significant difference between the self-assessment of musical ability and a high frequency of phonetic misspellings?

7. Will the mean scores of self-assessment of artistic ability differ significantly with the frequency of phonetic misspellings?

8. Will the poor spellers in Group 1 admit to having more difficulty with word pronunciation than those proficient spellers in Group 2?

9. Will the poor spellers in Group 1 be significantly less proficient in the ability of dictionary skill word-pronunciation than those proficient spellers in Group 2?

10. Will significantly more of the poor spellers in Group 1 use the spelling strategy of letter-naming than will the better spellers in Group 2?

11. Will the better spellers pronounce words and/or syllables to themselves as they write significantly more often than the poor spellers?

12. Will the self-assessment of musical aptitude reveal significant differences between the judgments of poor spellers and those of better spellers?

13. Will the self-assessment of artistic ability reveal significant differences between the judgments of poor spellers and those of better spellers?

Data Analysis

Descriptive statistics were computed on the collected data for each of the subjects and then each of the two groups within the study in preparation for causal-comparative analysis. Next, an analysis of variance (ANOVA) for correlated means was used as the statistical analysis to test the significance of the differences between the means. Significance of differences was compared on each of the variables between the two groups. The one-way ANOVA was used to compare the mean scores of each of the independent variables on the Seashore Measures of Musical Talents. In addition, an ANOVA was

used to determine whether the means of the various data presented in the study differed significantly between the two groups.

The results of the self-evaluative questionnaire are reported in chi-square statistics for the responses to the following questions for both Groups 1 and 2: (a) ability to pronounce words, (b) dictionary-key pronunciation ability, (c) letter naming while spelling a word, (d) pronouncing words and syllables while spelling, (e) musical ability, and (f) artistic ability.

All statistics used in the research were derived from the statistical program, Minitab. The statistical research procedures were designed in accordance with statisticians from Washtenaw Community College and Michigan State University.

Summary

In Chapter III the methods and procedures of the study were described. Reading levels were obtained by administering the Gates-MacGinitie Reading Test, Forms 10/12, Levels K/L. Spelling proficiency was determined by performance on two spelling measurements: the Spelling 1500 Diagnostic Spelling Test and the Proficiency and Diagnostic Spelling Test from Focus on Spelling. Additional information was obtained through a self-evaluative questionnaire completed by each of the subjects.

The adult subjects selected for the study were 57 community college students, all of whom were proficient in reading but displayed various levels of spelling ability. Their performances on the Seashore Measures of Musical Talents were compared and analyzed.

The conditions and procedures of testing were described, and the research questions were presented.

The procedures for obtaining data were explained, and a description of statistical-analysis techniques was given. Methods of reporting the results of the study were determined largely through the application of ANOVA and chi-square statistical procedures.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

The purpose of this study was to collect, analyze, and compare the data of various auditory and phonological characteristics shared by spelling-disabled adults who were competent readers (Group 1). The scores were then compared to those obtained by reading- and spelling-proficient adults (Group 2). The norms on the musical ability tests of both groups were also compared to the population norms of more than 4,000 high school and college students as reported in the test manual of the Seashore Measures of Musical Talents (Seashore et al., 1960). In addition, comparisons of spelling strategies and self-evaluative musical and artistic ability were investigated through an analysis of the results of a questionnaire administered to both groups of adults.

The data on the tests of musical ability were statistically tested with ANOVA (from the subprogram Minitab) and z-scores. Variables on comparisons of phonetic misspellings were also analyzed with analysis of variance. The Pearson-r formula was used to calculate the degree of correlation between the two spelling measurements administered to determine spelling competency. The results of the questionnaire were analyzed using a chi-square

statistical procedure (also from the subprogram Minitab). Chapter IV contains the results of the statistical analyses of the findings as they relate to the major research questions.

Research Questions and Statistical Analyses

Musical Aptitude Between Group Test Scores

Research Question 1. Will the scores on any of the six measurements of musical ability (pitch, loudness, rhythm, time, timbre, and tonal memory) differ significantly between the spelling-disabled (Group 1) and spelling-proficient (Group 2) adult students?

ANOVA was used to test each of the six measurements: pitch, loudness, rhythm, time, timbre, and tonal memory (see Tables 4.1 through 4.6).

Pitch. The data indicated that there were significant differences between the poor spellers and the proficient spellers in the ability to discriminate levels of pitch. These differences occurred in total number of correct responses to determine whether for each pair of tones presented the second tone was higher or lower than the first. The F-value of 11.25 with a probability level of .01 at a critical value of 7.08 was statistically significant for the Pitch Test (see Table 4.1).

Loudness. The data indicated that there was no significant difference between the two groups in the ability to determine for each pair of tones presented whether the second was stronger or weaker than the first. The results of the Loudness Test scores were not statistically significant (see Table 4.2).

Table 4.1.--Analysis of variance on pitch.

Source	df	SS	MS	F
Group	1	785.9	785.9	11.25
Error	55	3841.3	69.8	
Total	56	4627.3		

Level	N	Mean	SD
1	41	33.049	8.523
2	16	41.313	7.897

Pooled standard deviation = 8.357

$p < .01$ Critical value = 7.08

Table 4.2.--Analysis of variance on loudness.

Source	df	SS	MS	F
Group	1	0.8	0.8	0.06
Error	55	666.5	12.1	
Total	56	674.2		

Level	N	Mean	SD
1	41	43.244	3.604
2	16	44.063	3.130

Pooled standard deviation = 3.481

$p > .01$ Critical value = 7.08

Rhythm. The data indicated that there were significant differences in the ability to determine whether the two patterns in each pair of rhythmic patterns presented were the same or different. The F-value of 7.47 with a probability level of .05 at a critical value of 4.00 was statistically significant for the Rhythm Test (see Table 4.3).

Table 4.3.--Analysis of variance on rhythm.

Source	df	SS	MS	F
Group	1	40.13	40.13	7.47
Error	55	295.38	5.37	
Total	56	335.51		

Level	N	Mean	SD
1	41	26.195	2.315
2	16	28.063	2.323

Pooled standard deviation = 2.317

p < .05 Critical value = 4.01

Time. There were no significant differences between the two groups in the ability to determine whether in the 50 pairs of tones of different durations presented the second was longer or shorter than the first. The results of the Time Test were not statistically significant (see Table 4.4).

Table 4.4.--Analysis of variance on time.

Source	df	SS	MS	F
Group	1	20.1	20.1	1.00
Error	55	1106.9	20.1	
Total	56	1127.1		

Level	N	Mean	SD
1	41	40.366	4.893
2	16	41.688	3.156

Pooled standard deviation = 4.486

$p > .05$ Critical value = 4.01

Timbre. The data indicated that there was no group difference in the ability to discriminate whether in each of the 50 pairs of tones presented the tones were the same or different in timbre (or quality of tone). The results of the Timbre Test were not statistically significant (see Table 4.5).

Tonal memory. The data indicated that there were significant differences in identifying which note was different in the 30 pairs of tonal sequences presented to both groups of subjects. The F-value of 7.26 with a probability level of .05 and a critical value of 4.01 was statistically significant for the Tonal Memory Test (see Table 4.6).

Table 4.5.--Analysis of variance on timbre.

Source	df	SS	MS	F
Group	1	0.7	0.7	0.03
Error	55	1356.1	24.7	
Total	56	1356.8		

Level	N	Mean	SD
1	41	37.122	5.036
2	16	36.875	4.773

Pooled standard deviation = 4.966

$p > .05$ Critical value = 4.01

Table 4.6.--Analysis of variance on tonal memory.

Source	df	SS	MS	F
Group	1	283.7	283.7	7.26
Error	55	2148.5	39.1	
Total	56	2432.2		

Level	N	Mean	SD
1	41	20.098	6.324
2	16	25.063	6.049

Pooled standard deviation = 6.250

$p < .05$ Critical value = 4.01

Summary. Six separate measurements of musical ability were investigated and compared. Differences in the data compiled for both Group 1 and Group 2 were computed and analyzed for statistical significance with ANOVA. It would appear that the good spellers had better musical ability in the areas of pitch, rhythm, and tonal memory--the three measurements that were found to be statistically significant. The data revealed no differences between the two groups in loudness, time, and timbre--the three measurements that were found not to be statistically significant.

Musical Aptitude Test Scores
Compared to Seashore Norms

Research Question 2. Will the mean scores on each of the tests of musical ability obtained by the population of high school and college students, as reported in the Seashore norms, reveal significant differences from the mean scores obtained by Group 1 and Group 2?

Pitch. The data indicated that there was a significant difference between the mean pitch scores of the Seashore norms and those of the poor spellers of Group 1. The z-value of -7.1317 with a probability level of .05 was statistically significant. The mean pitch scores of the Seashore norms and those of the proficient spellers of Group 2 were calculated; the resulting z-value of .913 was not significant (see Table 4.7).

Loudness. There was no significant difference between the mean loudness scores of the Seashore norms and those of Group 1 or Group 2. The z-values of .6049 and 1.0748, respectively, were not statistically significant (see Table 4.8).

Table 4.7.--Z-values of the Pitch Test.

Levels	N	Mean	SD	Z-Value
Seashore	4,314	40.400	6.600	
Group 1	41	33.049	8.523	-7.1317
Group 2	16	41.313	7.897	.9130

$p < .05$ Critical value = 1.96

Table 4.8.--Z-values of the Loudness Test.

Levels	N	Mean	SD	Z-Value
Seashore	4,319	42.80	4.70	
Group 1	41	43.24	3.60	.6049
Group 2	16	44.00	3.10	1.0748

$p > .05$ Critical value = 1.96

Rhythm. The mean rhythm scores of the Seashore norms and those of the poor spellers in Group 1 were calculated with a z-value of .6974, which was not statistically significant. The data indicated that there was a significant difference between the mean rhythm scores of the Seashore norms and those of the proficient spellers of Group 2. The z-value of 2.233 with a probability level of .05 was statistically significant (see Table 4.9).

Time. The data indicated that there was no significant difference between the mean time scores of the Seashore norms and those of Group 1 or Group 2. The z-values of .08286 and 1.0886, respectively, were not statistically significant (see Table 4.10).

Table 4.9.--Z-values of the Rhythm Test.

Levels	N	Mean	SD	Z-Value
Seashore	4,024	26.50	2.80	
Group 1	41	26.20	2.30	.6974
Group 2	16	28.10	2.30	2.2330

$p > .05$ Critical value = 1.96

Table 4.10.--Z-values of the Time Test.

Levels	N	Mean	SD	Z-Value
Seashore	4,316	40.30	5.10	
Group 1	41	40.36	4.89	.08286
Group 2	16	41.68	3.15	1.08860

$p > .05$ Critical value = 1.96

Timbre. The data indicated that there was no significant difference between the mean timbre scores of the Seashore norms and those of Group 1 or Group 2. The z-values of 1.85 and 1.35, respectively, were not statistically significant (see Table 4.11).

Tonal memory. The data indicated that there was a significant difference between the mean tonal memory score of the Seashore norms and that of the poor spellers in Group 1. The z-value of 6.82 with a probability level of .05 was statistically significant. The mean tonal memory score of the Seashore norm and that of the proficient spellers of Group 2 was calculated; the z-score of .0547 was found not to be statistically significant (see Table 4.12).

Table 4.11.--Z-values of the Timbre Test.

Levels	N	Mean	SD	Z-Value
Seashore	4,319	38.60	5.10	
Group 1	41	37.12	5.04	1.85
Group 2	16	36.87	4.77	1.35

$p > .05$ Critical value = 1.96

Table 4.12.--Z-values of the Tonal Memory Test.

Levels	N	Mean	SD	Z-Value
Seashore	4,068	25.00	4.60	
Group 1	41	20.10	6.32	6.8300
Group 2	16	25.06	6.05	.0547

$p > .05$ Critical value = 1.96

Summary. As with the between test scores, similar results were found when each group was compared to the population: Significant differences occurred in the measurements of pitch and tonal memory between Group 1 and the population. However, Group 1 did not differ significantly from the population in the measurement of rhythm as did Group 2.

Correlation of Spelling Test Assessments

Research Question 3. Will there be a correlation between the scores on the oral Spelling 1500 Diagnostic Spelling Test (DS) and the visual Focus on Spelling Proficiency and Diagnostic Spelling Test (FS)?

The relationship between the scores obtained by the 57 subjects on the two measures was calculated using the Pearson-r formula of statistical relationship (see Table 4.13). The correlation between the DS and the FS was .757, with a value of $r = .5730$. At a probability level of .0005 with a critical value of .0354, the value of $r = .5730$ indicated that there existed a strong correlation between the orally administered testing instrument (DS) and the measurement that asked students to visually choose the correctly spelled word from among three others that were misspelled (FS). The tests are contained in Appendix B.

Table 4.13.--Correlation between DS and FS diagnostic spelling tests.

Correlation	Pearson-r Value
.757	.5730

DS = Spelling 1500 Diagnostic Test

FS = Focus on Spelling

$p < .0005$

Critical value = .0354

Summary. The Pearson-r statistical procedure indicated a strong correlation between the auditory measurement of oral dictation (DS) and the visual measurement of selecting a correctly spelled word from among four spelling variations (FS). The results suggest that either test could produce similar diagnostic results.

Phonetic Misspellings

Research Question 4. Will deficient spellers have a higher occurrence of phonetic misspellings than proficient spellers?

The data indicated that there were significant differences in the number of occurrences of phonetic misspellings between spelling-deficient and spelling-proficient adults. These differences occurred in the percentage of phonetic misspellings derived from all the spelling errors in both groups. The F-value of 18.95 with a probability level of .01 was statistically significant (see Table 4.14).

Table 4.14.--Analysis of variance on phonetic misspellings.

Source	df	SS	MS	F
Group	1	1415.4	1415.4	18.96
Error	55	4106.0	74.7	
Total	56	5521.5		

Level	N	Mean	SD
1	41	12.902	9.992
2	16	1.813	2.738

Pooled standard deviation = 8.640

p < .01 Critical value = 8.640

Research Question 5. Will the subjects with high occurrences of phonetic misspellings employ the spelling strategy of letter-naming more frequently than will the subjects with lower frequencies of phonetic misspellings?

The ANOVA indicated that there was a significant difference in the higher use of the spelling technique of letter naming by those adult spellers with a higher occurrence of phonetic misspellings. The value of $F = 26.06$ with a probability level of .01 was statistically significant (see Table 4.15).

Table 4.15.--Analysis of variance on phonetic misspellings and letter-naming strategy.

Source	df	SS	MS	F
Letter naming	1	1775.2	1775.2	26.06
Error	55	3746.3	68.1	
Total	56	5521.5		

Level	N	Mean	SD
1	41	12.902	9.992
2	16	1.813	2.738

Pooled standard deviation = 8.640

$p < .01$ Critical value = 7.08

Research Question 6. Will there be a significant difference between the self-assessment of musical ability and a high frequency of phonetic misspellings?

ANOVA was used to test the relationship between the judgment of one's musical ability and the frequency of occurrences of phonetic misspellings. The results indicated that among adults whose

spelling errors consisted of high numbers of phonetic misspellings, there existed a low self-assessment of musical ability. Among adults with lower occurrences of phonetic misspellings, the self-judgment of musical ability was high. The resulting F-value of 26.06 with a probability level of .01 was statistically significant (see Table 4.16).

Table 4.16.--Analysis of variance on phonetic misspellings and self-assessment of musical aptitude.

Source	df	SS	MS	F
Musical aptitude	1	1673.8	1673.8	23.93
Error	55	3847.7	70.0	
Total	56	5521.5		

Level	N	Mean	SD
1	22	2.955	4.572
2	35	14.086	10.013

Pooled standard deviation = 8.364

$p < .01$ Critical value = 7.08

Research Question 7. Will the mean scores of self-assessment of artistic ability differ significantly with the frequency of phonetic misspellings?

The data indicated that there were significant differences in the judgment of one's artistic ability and the frequency of phonetic misspellings. The adults with higher occurrences of phonetic misspellings judged themselves to have artistic ability

significantly more often than did those with lower occurrences of phonetic misspellings. The F-value of 21.26 with a probability level of .01 was statistically significant (see Table 4.17).

Table 4.17.--Analysis of variance on phonetic misspellings and self-assessment of artistic ability.

Source	df	SS	MS	F
Artistic ability	1	1539.1	1539.1	21.26
Error	55	3982.3	72.4	
Total	56	5521.5		

Level	N	Mean	SD
1	31	14.548	10.627
2	26	4.115	4.877

Pooled standard deviation = 8.509

$p < .05$ Critical value = 7.08

Summary. Statistically significant differences were found in the percentages of occurrences of phonetic misspellings between the poorer spellers of Group 1 and the proficient spellers of Group 2. Furthermore, high occurrences of phonetic misspellings accompanied the more frequent use of the letter-naming technique, whereas the reverse was found with the more phonologically sound strategy of syllabication or word pronunciation.

Next, self-assessments of musical aptitude and artistic ability were analyzed. It was found that the subjects who were most apt to

employ spelling strategies that used the letters of the alphabet to represent the sounds of speech had high occurrences of phonetic misspellings and perceived themselves as having little musical ability. Finally, an investigation of self-assessment of artistic ability revealed that adults with high occurrences of phonetic misspellings regarded themselves as having more artistic ability than did those adults with lower frequencies of phonetic misspellings. The variables of phonetic misspellings and the phonological spelling strategy of letter naming were found to be statistically significant between the two groups.

Questionnaire Responses

Research Question 8. Will the poor spellers in Group 1 admit to having more difficulty with word pronunciation than those proficient spellers in Group 2?

Chi-square was used to test the differences in word-pronunciation difficulties between the poor spellers of Group 1 and the proficient spellers of Group 2. The data indicated that poor spellers admitted to having significantly more difficulty with the pronunciation of words than did the proficient spellers. Thirty-one of the 41 subjects in Group 1 indicated "yes," whereas only 2 of the 16 subjects from Group 2 responded likewise. The chi-square value was calculated at 18.804 with a probability level of .010. The results were statistically significant (see Table 4.18).

Table 4.18.--Pronunciation difficulty.

Group Status	Yes (%)	No (%)	Total No. in Groups
1 (poor spellers)	75.6	24.4	41
2 (better spellers)	1.5	87.5	16
All			57

Chi-square = 18.804 df = 1 p < .010 Critical value = 6.634

Research Question 9. Will the poor spellers in Group 1 be significantly less proficient in the ability of dictionary skill word-pronunciation than those proficient spellers in Group 2?

Chi-square was used to test the differences in the ability to use the dictionary to determine the pronunciation of words. The data indicated that the poor spellers of Group 1 perceived themselves as having significantly less ability in the dictionary skill of word pronunciation than did the more proficient spellers of Group 2. The chi-square value was calculated at 8.884 with a probability level of .050. The results were statistically significant (see Table 4.19).

Table 4.19.--Dictionary word-pronunciation ability.

Group Status	Yes (%)	No (%)	Total No. in Groups
1 (poor spellers)	43.0	57.0	41
2 (better spellers)	87.4	12.5	16
All			57

Chi-square = 8.884 df = 1 p < .050 Critical value = 3.841

Research Question 10. Will significantly more of the poor spellers in Group 1 use the spelling strategy of letter-naming than will the better spellers in Group 2?

Answers to the questionnaire revealed that fewer of the better spellers in Group 2 wrote words by naming the letters as they spelled than did the poorer spellers in Group 1. Chi-square was used to test the differences between the letter-naming spelling procedure between Group 1 and Group 2. The result of the chi-square calculation was 11.731 with a probability level of .010, which was statistically significant (see Table 4.20).

Table 4.20.--Spelling by letter naming.

Group Status	Yes (%)	No (%)	Total No. in Groups
1 (poor spellers)	56.0	44.0	41
2 (better spellers)	6.0	94.0	16
All			57

Chi-square = 11.731 df = 1 p < .010 Critical value = 6.634

Research Question 11. Will the better spellers pronounce words and/or syllables to themselves as they write significantly more often than the poor spellers?

The data indicated that better spellers were more likely to pronounce words or syllables of words as they wrote than were poorer spellers. The chi-square test was used to compare the differences between the two groups. The chi-square value was calculated at 6.605 with a probability of .050, showing the difference between the two groups to be statistically significant (see Table 4.21).

Table 4.21.--Spelling by word or syllable pronunciation.

Group Status	Yes (%)	No (%)	Total No. in Groups
1 (poor spellers)	58.54	41.46	41
2 (better spellers)	93.75	6.25	16
All			57

Chi-square = 6.605 df = 1 p < .050 Critical value = 3.841

Research Question 12. Will the self-assessment of musical aptitude reveal significant differences between the judgments of poor spellers and those of better spellers?

Responses on the judgment of musical ability revealed that better spellers perceived themselves as having significantly more musical ability than did poor spellers. The chi-square test was used to calculate the differences in frequency of responses between the two groups. The chi-square value was calculated at 28.551 with a probability level of .010. The results showed that the

differences on judgments of musical aptitude were statistically significant (see Table 4.22).

Table 4.22.--Self-assessment of musical ability.

Group Status	Yes (%)	No (%)	Total No. in Groups
1 (poor spellers)	17.00	83.00	41
2 (better spellers)	93.75	6.25	16
All			57

Chi-square = 28.551 df = 1 p < .010 Critical value = 6.634

Research Question 13. Will the self-assessment of artistic ability reveal significant differences between the judgments of poor spellers and those of better spellers?

The poorer spellers of Group 1 had a greater frequency of positive responses to the judgment of their artistic ability than did the better spellers of Group 2. Chi-square was used to test the difference between the two groups. The chi-square value of 15.731 with a probability level of .010 was statistically significant (see Table 4.23).

Table 4.23.--Self-assessment of artistic ability.

Group Status	Yes (%)	No (%)	Total No. in Groups
1 (poor spellers)	70.7	29.3	41
2 (better spellers)	12.5	87.5	16
All			57

Chi-square = 15.731 df = 1 p < .010 Critical value = 6.634

Summary. A comparison between the responses of Group 1 and Group 2 was made using the chi-square statistical procedure. The six areas investigated were as follows:

1. Pronunciation difficulties.
2. Dictionary skills in word pronunciation.
3. Spelling words by letter naming.
4. Spelling words by pronouncing or syllabizing.
5. Self-assessment of musical aptitude.
6. Self-assessment of artistic ability.

Each of the areas compared was found to be statistically significant. Poorer spellers of Group 1 revealed that they not only had difficulty with the pronunciation of words but also lacked the dictionary skills to determine pronunciations of new words or words of which they were uncertain. Better spellers were more likely to pronounce words or syllabicate as they wrote than were poorer spellers, who were more likely to name letters. Finally, poorer spellers did not judge themselves as having musical aptitude, as did the better spellers of Group 2. Group 1, however, did have a greater percentage of responses in perceiving themselves as having artistic ability than did the better spellers of Group 2.

Chapter Summary

Statistical significance was found in each of the research questions that was investigated.

1. Poor spellers' low performances on the musical measurements of pitch, rhythm, and tonal memory were found to be statistically significant when compared to the scores of better spellers.

2. When compared to the population, poor spellers once again differed significantly from the population in the measurements of pitch and tonal memory. Good spellers differed significantly from the population only in the measurement of rhythm.

3. A strong correlation was found between the oral and visual spelling assessments, suggesting that either test could produce similar results.

4. Deficient spellers had a higher occurrence of phonetic misspellings than did better spellers.

5. The subjects with the higher occurrences of phonetic misspellings more frequently employed the letter-naming strategy than did better spellers.

6. A low self-assessment of musical ability was indicated by subjects with a high frequency of phonetic misspellings.

7. Subjects with high frequencies of phonetic misspellings judged themselves to have artistic ability significantly more often than did those with lower occurrences of phonetic misspellings.

8. The poor spellers of Group 1 admitted to having difficulty with word pronunciation.

9. The poor spellers indicated poor proficiency in the ability to determine the pronunciation of words through the aid of a dictionary pronunciation key.

10. The poor spellers used the letter-naming strategy significantly more often than did the better spellers.

11. Better spellers pronounced words or syllabicated as they spelled significantly more frequently than did poor spellers.

12. Responses on the judgment of musical ability revealed that better spellers perceived themselves as having significantly more musical ability than did poor spellers.

13. Poorer spellers judged themselves to have more artistic ability than did better spellers.

CHAPTER V

**DISCUSSION, IMPLICATIONS, REFLECTIONS,
AND RECOMMENDATIONS**

The purpose of this study was to collect, analyze, and compare data of various auditory and phonological characteristics shared by spelling-disabled adults who were competent readers. The researcher focused on six measurements of musical aptitude and four phonological spelling strategies, the data for which were collected by administering tests and a questionnaire. The musical abilities measured were pitch, loudness, rhythm, time, timbre, and tonal memory. The four phonological spelling strategies analyzed were pronunciation difficulties, dictionary pronunciation-key skills, spelling by letter naming, and spelling by syllabication. In addition, phonological misspellings and self-assessments of musical and artistic ability were analyzed and compared. The collected data were then compared to those from a second group of subjects, proficient in both reading and spelling, to whom the same measurements were administered.

Discussion

Group 1 was composed of poor spellers and Group 2 of better spellers, all of whom were competent adult readers. Specific

results are reported as correlated with the major research questions as follows:

1. Six measurements of musical aptitude: pitch, loudness, rhythm, time, timbre, and tonal memory.
2. Musical aptitude test scores compared to the population.
3. Correlation of spelling test assessments.
4. Frequency of occurrences of phonetic misspellings.
5. Phonetic misspellings and the letter-naming spelling strategy.
6. Phonetic misspellings and self-assessment of musical ability.
7. Phonetic misspellings and the self-assessment of artistic ability.
8. Pronunciation difficulties.
9. Proficiency of dictionary word-pronunciation skills.
10. Spelling by letter naming.
11. Spelling by syllabication or word pronunciation.
12. Self-assessment of musical aptitude.
13. Self-assessment of artistic ability.

Musical Aptitude Test Scores

The disabled and proficient spellers differed significantly on three of the six measurements of musical aptitude: pitch, rhythm, and tonal memory. ANOVA was used to determine statistical significance between the two groups in their performance on the Seashore Measures of Musical Talents.

1. The pitch scores of the spelling-disabled adults in Group 1 were analyzed and compared to those scores of the spelling-proficient adults in Group 2. The mean score for Group 1 was 33.049, as compared to a score of 41.313 for Group 2. ANOVA revealed statistically significant differences in the ability to determine whether for each of 50 pairs of tones presented the second was higher or lower than the first.

2. Loudness data indicated that there were no significant differences between Group 1 and Group 2 in the ability to determine whether the second tone of a given pair was stronger or weaker than the first.

3. The rhythm measurement revealed significant differences between the two groups in the ability to determine whether the two patterns in each pair of rhythmic patterns presented were the same or different. For the 30 pairs presented, the mean score for Group 1 was 26.195, as compared to 28.063 for Group 2.

4. The results of the time test were not statistically significant. In the 50 pairs of tones of different durations presented, the determination of whether or not the second was longer or shorter than the first revealed insignificant differences between the two groups.

5. Likewise, the results of the timbre test indicated that there was no significant difference between the two groups in the ability to discriminate the quality of tone in the 50 pairs of tones presented.

6. In the test of tonal memory, a significant difference was found between the two groups in the ability to identify which note was changed in the 30 pairs of tonal sequences presented. The mean score for Group 1 was 20.098, as compared to a mean of 25.063 for Group 2.

The statistical findings on the comparisons of performance on musical aptitude are summarized in Table 5.1.

Table 5.1.--Statistical findings on musical aptitude.

Test	Group	Mean	SD	F-Value
Pitch	1	33.049	8.523	11.25*
	2	41.313	7.897	
Loudness	1	43.244	3.604	0.06*
	2	44.063	3.130	
Rhythm	1	26.195	2.315	7.47**
	2	28.063	2.323	
Time	1	40.366	4.893	1.00**
	2	41.688	3.156	
Timbre	1	37.122	5.036	0.03**
	2	36.875	4.773	
Tonal Memory	1	20.098	6.324	7.26**
	2	25.063	6.049	

*p < .01.

**p < .05.

Nonproficient and proficient adult spellers differed significantly on the tests of pitch, rhythm, and tonal memory; the greatest difference in performance was in the ability to perceive differences in pitch. Both groups had similar results in the ability to distinguish differences in loudness, time, and timbre--the three areas of musical measurements that revealed no significant differences in aptitude between the two groups. Since subjects with known hearing losses were not allowed to participate in the study, this researcher was concerned about the possibility of undiagnosed hearing problems among the poor spellers. However, the ability of the poor spellers to perform well on the tests of loudness and timbre demonstrated the probability of good hearing acuity, thereby eliminating the necessity to test for hearing deficiencies. Although the researcher is not aware of studies investigating the spelling ability of the hearing impaired, hearing loss may not necessarily accompany auditory memory disability. It is known, for example, that Beethoven was nearly deaf when he wrote his ninth and final symphony, demonstrating that his auditory memory was not apparently affected by his loss of hearing.

Musical Aptitude Test Scores Compared to the Population

To investigate further the scores of nonproficient and proficient spellers, the mean scores were separately compared to the population in the Seashore measurement norms, which are based on the test results of more than 4,000 subjects. The poor spellers demonstrated significant differences from the population on only two

of the six measurements: pitch and tonal memory. The scores of the proficient spellers were found to be significantly different from the population on only the measurement of rhythm. Z-scores were used in a statistical analysis to compare the mean scores of the groups to those of the population. The statistical analysis of the z-score comparisons is summarized in Table 5.2.

Table 5.2.--Statistical analysis of Group 1 and Group 2 comparisons of musical aptitude to the population of the Seashore norms.

Test	Group	Mean	SD	Z-Score
Pitch	Population	40.40	6.60	
	1	33.05	8.52	-7.1317
	2	41.31	7.89	.9130
Loudness	Population	42.80	4.70	
	1	43.24	3.60	.6049
	2	44.00	3.10	1.0748
Rhythm	Population	26.50	2.80	
	1	26.20	2.30	.6974
	2	28.10	2.30	2.2330
Time	Population	40.30	5.10	
	1	40.36	4.89	.0829
	2	41.68	3.15	1.0886
Timbre	Population	38.60	5.10	
	1	37.12	5.04	1.8500
	2	36.87	4.77	1.3500
Tonal memory	Population	25.00	4.60	
	1	21.10	6.32	6.8300
	2	25.06	6.05	.0547

$p > .05$

Critical value = 1.96

Discussion of tests and analysis of musical ability. The scores of the nonproficient spellers on the two measurements of pitch and tonal memory differed significantly from those attained by both the proficient spellers of Group 2 and the population of the Seashore norms. C. Seashore (1938) asserted that, of the six measurements of musical aptitude, pitch was the most basic measure through which musical capacity or incapacity could be judged. That pitch is the most important measurement of musical ability was supported by the research of Lundin (1953), who reported that the ability to discern pitch discrimination was a necessary attribute for musicianship.

Tonal memory was thought to be an even more accurate measurement of musical ability by Drake (1933) and Mursell (1937). Although those researchers supported the claim that pitch is an essential measurement to predict musical ability, they believed that tests of tonal memory correlate even higher with the various criteria determining musical success. Drake (1942), Bienstock (1942), McLeish (1950), and Bachem (1954) reported that pitch and tonal memory constitute the two most important and fundamental criteria in the measurement of musical talent.

The poor spellers of Group 1 demonstrated poor performances on both the tests of pitch and tonal memory. When a comparison between groups was investigated, poor spellers had significantly lower scores than did better spellers in Group 2. Similarly, when compared to the population, the deficient spellers again performed

poorly, which also resulted in statistically significant differences.

As with the between-group data that indicated no significant differences in the measurement of loudness, poor spellers likewise had insignificant differences in loudness scores when compared to the population. The loudness measurement provided this study with a criterion to determine a possibility of hearing loss, but it was not significant in evaluating musical aptitude. Furthermore, Farnsworth (1931), Bienstock (1942), and Lundin (1953) reported that the low coefficients of the time, rhythm, timbre, and loudness tests of the Seashore measurement were too questionable to be sufficiently reliable for diagnostic value.

Correlation of Spelling Test Assessments

Two spelling tests were administered to the subjects: (a) an orally administered diagnostic test and (b) a visual selection of correctly spelled words. A strong correlation was determined through the application of the Pearson-r, which indicated a value of $r = .5730$, suggesting that both tests produce similar results.

Frequency in Occurrences of Phonetic Misspellings

An investigation of the percentages of occurrences of phonetic misspellings revealed that poor spellers made more than 12 times more phonetic misspelling errors than did better spellers. Using the ANOVA statistical procedure, the resulting F-value of 18.96 indicated a significant difference between the two groups.

Frequently mismatched phonemes to graphemes, which create not only misspelled words but phonetically misspelled words, may be an indication that low performances on the musical measurements of pitch and tonal memory among reading-proficient adults are, in themselves, predictors of phonological disorders which render spelling a difficult task.

Phonetic Misspellings and the Letter-Naming Spelling Strategy

The higher the occurrence of phonetic misspellings, the more likely the use of the letter-naming strategy for writing words. ANOVA produced an F-value of 26.06, indicating statistical significance when occurrences of phonetic misspellings were compared to the strategy of naming letters during the spelling of words.

Phonetic Misspellings and Self-Assessment of Musical Ability

Among the subjects with high occurrences of phonetic misspellings, there were accompanying low self-assessments of musical ability. Conversely, those subjects with lower occurrences of phonetic misspellings judged their musical aptitude to be high. An F-value of 23.94 indicated statistical significance between the two groups in occurrences of phonetic misspellings and the self-assessment of musical aptitude.

Phonetic Misspellings and Self-Assessment of Artistic Ability

The data indicated that there were significant differences between the two groups in the judgment of one's artistic ability and

the frequency of phonetic misspellings. The subjects with high occurrences of phonetic misspellings perceived themselves as having artistic ability more often than did those better spellers with lower occurrences of phonetic misspellings. The F-value of 21.26 indicated that the difference between the two groups was statistically significant.

Pronunciation Difficulties

The poorer spellers admitted to having significantly more difficulty with the pronunciation of words than did the better spellers. Of the 41 subjects in Group 1, 31 indicated that pronunciation was a problem, whereas of the 16 subjects from Group 2, only 2 responded affirmatively. Chi-square was used to test the differences of responses between the two groups, yielding a statistically significant value of 18.804.

Dictionary Pronunciation Skills

Not only did the poorer spellers indicate that they lacked the ability to use the dictionary to assist them in word pronunciations, but they further indicated that they either forgot or did not recall ever having been taught the use of the dictionary pronunciation key. When the poor spellers were compared to the better spellers, the chi-square value of 8.884 indicated there was a statistically significant difference between the two groups.

Spelling by Letter Naming

The correlation between phonetic misspellings and naming letters as words are spelled was discussed earlier in this chapter. However, answers to the questionnaire revealed that 56 percent of the poor spellers in Group 1 indicated "yes" to using the strategy of letter naming, as contrasted to only 6 percent of the better spellers in Group 2. The subjects in Group 1 further indicated that they did not recall being told by teachers to spell words by pronouncing them rather than by naming letters. The technique of spelling by letter naming, as encouraged in spelling bees in elementary school, was the same method the majority of the poor spellers continued to employ as adults. The resulting chi-square value of 11.731 indicated that the two groups differed significantly in the use of the letter-naming method of spelling.

Spelling by Syllabication or Word Pronunciation

Better spellers were more likely to syllabicate or pronounce words as they spelled than were less proficient spellers. The data also revealed that some of the subjects in Group 1 may have spelled both by letter naming and syllabication in that more than 58 percent responded "yes" to the question of syllabication and 56 percent responded "yes" to letter naming. More than 93 percent of the better spellers indicated that they spelled by syllabication. The difference between the groups was statistically significant, with a chi-square value of 6.605.

Self-Assessment of Musical Ability

Only 17 percent of the poor spellers indicated that they regarded themselves as having musical aptitude, in contrast to a nearly 94 percent affirmative response from proficient spellers. The data showed that the difference between the two groups in judgment of musical aptitude was statistically significant, with a chi-square value of 28.551. Furthermore, the results of the questionnaire indicated that the subjects from Group 2 had participated in musical activities or lessons more frequently and for longer periods of time than had the subjects from Group 1.

Self-Assessment of Artistic Ability

The high occurrence of phonetic misspellings among subjects who perceived themselves as having more artistic than musical ability was discussed earlier in this chapter. When comparing the differences of responses to the questionnaire from both groups, the results indicated that more than 70 percent of the poor spellers judged themselves as having some artistic ability, compared to only 12.5 percent of the better spellers. The difference between the two groups was statistically significant, with a chi-square value of 15.731.

Implications of the Study

The present study established that among competent adult readers a relationship existed between spelling proficiency and musical ability. The results indicated that poor spellers, unlike proficient spellers, had difficulty determining variations in the

musical measurements of pitch and tonal memory. The findings revealed that the more frequent the occurrence of phonetic misspellings, the lower the ability to discriminate pitch and recall tonal sequences. To this researcher's knowledge, no such link has previously been investigated.

Despite the agreement among poor spellers that they perceived themselves as more visual than auditory learners, the poor spellers of Group 1 had low performances on both the oral and visual spelling tests. Perhaps in the stages of spelling development, visual recall of correct spellings is a later acquisition, which follows only after success is attained in the earlier auditory stages. It was puzzling to note that, in many instances, poor spellers underlined the correct word on the visual test and then proceeded to transcribe an incorrect spelling (see Appendix D).

Further investigation into the various spelling methods that characterize poor spellers revealed that although they shared the ability to read proficiently with the better spellers, they differed significantly in their use of spelling strategies. Phonological spelling strategies were explored and identified among nonproficient spellers, who were found to share the following characteristics: (a) difficulty with the pronunciation of words, (b) letter naming rather than syllabication (which may account for the high number of phonetic misspellings among poor spellers), and (c) inability to determine the pronunciation of words through the use of the dictionary pronunciation key. The fact that the disabled spellers

did not recall teachers' having instructed them to pronounce words rather than letters as they spell or to determine the pronunciation of words through the use of the dictionary pronunciation key may indicate a need for improvement in spelling instruction.

The following significant characteristics were found among reading-proficient adults with spelling disabilities: (a) low scores on the musical aptitude measurements of pitch and tonal memory, (b) high frequency of occurrences of phonetically misspelled words, (c) high frequency of spelling words by letter naming rather than by syllabication, and (d) inability to determine the pronunciation of words through the dictionary pronunciation key. Based on the review of the literature and the researcher's own experiences in the teaching of adult spelling improvement, the four characteristics listed above can each be improved with practice and instruction.

Reflections

In light of these findings, low aptitude in the musical abilities of pitch discrimination and tonal memory appears to coincide with a lack of linguistic awareness, which is necessary to the acquisition of spelling proficiency. One of the most important prerequisites to successful spelling is the ability to discriminate accurately the sounds of words. Although the reading-proficient/poor spellers demonstrated their ability to recognize such categories as plural and past tense inflections, roots, prefixes, and suffixes in reading, they were not able to perform an

adequate analysis of these categories when it came to writing. Good spellers demonstrated that they better attended to sounds in both language and music than did poor spellers.

An informal analysis of spelling errors revealed deficits in the ability to perceive differences in the quality of speech sounds as demonstrated in the erroneous phonological renderings of many of the misspelled words--errors that appear to coincide with the inability to discern differences in levels of pitch discrimination. Poor spellers were not able to produce successful grapheme-to-phoneme correspondences when they wrote. Better spellers made far more frequent successful phonetic substitutions (i.e., circumferunse) than did the poorer spellers, who made nearly 12 times more nonphonetic substitutions (i.e., circonfunse).

An investigation of phonetic misspellings also revealed that many of the subjects demonstrated difficulties in discerning the number of syllables. Of particular significance to low scores attained on the tonal memory test was the accompanying frequent misspelling of words written with too few or too many syllables. Poor spellers had difficulty segmenting or recalling the number of speech sounds that made up the syllables in the dictated words, just as they had difficulty recalling the sequences of tones on the test of tonal memory. Tonal memory and auditory recall of the number of syllables in a word orally presented appear to be related; poor spellers were not able to perform successfully in either situation. In some instances, poor spellers produced entire substitutions for words that had been dictated only a matter of seconds earlier (i.e.,

curious for courteous). Poor performance in auditory recall suggests a relationship between tonal memory in music and phonological deficits that interfere with the ability to spell.

The phonological spelling strategies of poor adult spellers may indicate the erroneous belief that alphabetic orthography represents the sounds of speech. The best spellers among kindergartners were found to have better skills in analyzing the phonemic constituents of words than were spelling-disabled adults (Liberman et al., 1985). In an effort to make correspondences between the names of letters (as the names are pronounced, e.g., ess for "s") and the pronunciation of phonemes (as they are pronounced, e.g., [s] for "s"), letter naming was found to be a prevalent spelling strategy among the most deficient of adult poor spellers. These poor spellers not only demonstrated the highest percentages of phonetic misspellings in this study but produced the lowest scores on the musical test of pitch discrimination. It appears that the most disabled of the adult spellers, despite their ability to read proficiently, had the lowest linguistic and pitch-discrimination abilities of all the subjects studied.

Music, then, is not a frill; rather, it is a necessary aid for enabling children in early elementary school to increase their ability to distinguish the sounds of their language. Several of the subjects in this study reported that they had not been allowed to participate in musical activities because of their low scores on tests of musical aptitude. The researcher suspects that the purpose

of administering tests on musical ability is to select potential band and choir members (Schwejdá, 1954), rather than to identify students who could benefit by improving their musical aptitude.

As cited in earlier studies in the review of the literature (Brody, 1949; Kwalwasser, 1936; C. Seashore, 1936; Semeonoff, 1940; Wolner & Pyle, 1933), the musical components of pitch and tonal memory can be improved with practice. Musical aptitude appears to make a difference in spelling acquisition. Similarly, Liberman et al. (1985) demonstrated that linguistic awareness can be taught. Recent studies have made it clear that phonological knowledge also makes a difference in spelling proficiency (Fischer, Shankweiler, & Liberman, 1985). The results of this study raise the possibility that improvement in the musical measurements of pitch and tonal memory, which are prerequisites of spelling proficiency, may even raise levels of linguistic abilities. Musical training may teach children to pay better attention to sounds--both in music and language. By acquiring a better aptitude for distinguishing various levels of pitch and recalling sequences of tones through a series of simple exercises, children may progress more successfully through the stages of spelling development, the first of which demonstrates linguistic awareness in the initial attempts to match their own phonemic sound system to the graphemes representing written words.

Although adults can profit from explicit instruction in pitch discrimination and tonal memory as well as in phonological awareness, they can be spared much embarrassment and frustration if their deficiencies are discovered and addressed in the early

elementary grades. It now seems reasonable to suggest that promoting better aptitude in several components of music may improve both linguistic awareness and spelling proficiency.

Recommendations for Future Research

1. Several studies should be conducted to replicate the findings of this study with children at various ages, ranging from 6 to 17 years, to determine whether the same shared characteristics exist among subjects other than adults.

2. Research should be conducted to examine the benefits of musical instruction as a remedial activity for the improvement of spelling.

3. Studies are needed to determine whether the capacity for improvement in musical aptitude varies with age.

4. Studies are warranted to compare the spelling proficiency of students who are enrolled in private music lessons to those who are not. Additional research should be conducted on a similar comparison between students who are enrolled in musical programs in schools and those who are not.

5. Studies are also warranted to investigate the musical aptitude of poor readers to determine whether musical instruction would be beneficial to becoming better readers.

6. Research should be conducted to investigate the effectiveness of teaching students to become proficient in the use of the dictionary pronunciation key as a technique to improve pronunciation and spelling ability.

7. Research is needed to determine the various developmental stages of spelling acquisition and the significance of each level. In addition, the consequences of missed steps should be investigated to provide an aid in determining a possible course of remediation.

8. Studies should be conducted to determine how well informed teachers are in the areas of language and spelling acquisition. The purpose of the research would be to determine whether the effectiveness of teaching spelling correlates with a teacher's knowledge of language and spelling acquisition.

APPENDICES

APPENDIX A

CORRESPONDENCE

**The Riverside Publishing Company**

April 20, 1990

Sophie McGee SC 301
Washtenaw Community College
4800 East Huron River Drive, PO Box D-1
Ann Arbor MI 48106-0978

Dear Ms. McGee:

Your desire to include a copy of Gates-MacGinitie Reading Test in your thesis or dissertation may be in conflict with the need to maintain test security unless access to the thesis or dissertation is restricted.

We normally only grant permission to describe tests in terms of content or objectives. We do not allow the reproduction of actual test items. This policy is required to prevent unauthorized access to the tests by potential examinees.

I will grant your request to include our test in your thesis or dissertation when I receive a written statement from the head of the department or the chair of your thesis or dissertation committee stating that this is a requirement of the university, the department, or the committee. The letter must also state that the thesis or dissertation containing a photocopy or original copy of the test will not be available to the general public, the general university population, or others who do not have a legitimate need for access to tests. Since University Microfilms International (UMI) or ERIC are not likely to meet this last requirement, permission is not granted to include the test in materials sent to UMI or ERIC. You may, however, include a copy of the cover of the test in the thesis or dissertation sent to UMI or ERIC, followed by a page stating that the remainder of the test is not included due to test security requirements. If you can meet the conditions outlined in this paragraph, you may proceed without waiting for us to receive the letter from the university.

I recognize that the above conditions may pose a challenge, but the problem, if any, results from university requirements that do not appear to take into account unique conditions pertaining to access to tests. Our policy is based on professional standards for tests.

Congratulations for having persevered to the point of completing your thesis or dissertation.

Sincerely,

Fredrick L. Finch
Vice President/Editor in Chief

FLF:mkk/22
enclosure

cc: Al Brennan



Washtenaw Community College

4/13/90

Greenwood Press
 88 Post Road, West
 P.O. Box 5007
 Westport, Connecticut 06881

Dear Greenwood Publishing Company,

The most recent publication of a work by Robert M. Rodney is with your company in 1982 entitled, Mark Twain International. I have used a spelling test he devised in a much earlier publication in 1967 entitled, Focus on Spelling and wish to reprint the test in Appendix A of my Ph.D. dissertation--Musical Aptitude Among Reading Proficient Adults with Spelling Disabilities. Focus on Spelling was co-authored with William R. Seat.

Would you be so kind as to help me track down the necessary connection so that I can request permission to reprint the diagnostic test? I would appreciate any information you may forward to me.

Yours truly,

Sophie S. McGee
 Reading Department
 Washtenaw Community College
 4800 E. Huron River Drive
 P.O. Box D-1
 Ann Arbor, Michigan 48106-0978



Washtenaw Community College

April 13, 1990

William R. Seat
Northern Illinois University
DeKalb, Ill. 60115

Dear Mr. Seat,

Several years ago a participant at the College Reading Association conference distributed copies of the diagnostic spelling test from Focus on Spelling which you co-authored with Robert M. Rodney. I would like to ask permission to reprint the test in Appendix A of my Ph.D. dissertation entitled, Musical Aptitude and Phonological Spelling Strategies Among Reading Proficient Adults with Spelling Disabilities.

The last address I was able to locate of yours is at Northern Illinois University. I am hopeful this letter reaches you so that I can request your permission for reprint.

Very truly yours,

Sophie S. McGee
Department of Reading
Washtenaw Community College
P.O. Box D-1
Ann Arbor, Mich. 48106



Washtenaw Community College

April 13, 1990

Robert M. Rodney
417 Silver Lane
Billings, Montana 59102

Dear Mr. Rodney,

Several years ago, a lecturer of the College Reading Association passed out a copy of your diagnostic spelling test from Focus on Spelling. The test has since become one from a battery of tests I use to determine spelling proficiency with my students. I am particularly determined to track you down because I would like to request permission to reprint the test, with appropriate acknowledgments to you and William Seat, in Appendix A of my doctoral dissertation entitled, Musical Aptitude and Phonological Spelling Strategies Among Reading Proficient Adults with Spelling Disabilities.

I envy your living in Billings, Montana and hope this letter finds you enjoying yourself. In my search of you, I have also discovered your publications on Mark Twain which adds an even greater dimension to your authorship in my estimation!

Very truly yours,

Sophie S. McGee
Department of Reading
Washtenaw Community College
P.O. Box D-1
Ann Arbor, Michigan 48106

April 19, 1990

Ms. Sophie S. McGee
Department of Reading
Washtenaw Community College
P.O. Box D-1
Ann Arbor, Michigan 48106

Dear Ms. McGee:

In answer to your letter of April 13, 1990, I see no reason why you should not reprint the diagnostic spelling test from Focus on Spelling for the purpose of your doctoral dissertation, so I am glad to grant permission for that purpose as long as none of the rest of the book is reprinted. I am hoping at the present time to find a press willing to republish the speller. Although this little text book was published twenty-two years ago at a time when professional educators were unwilling to do anything about spelling problems "until the need arises," the need has been widespread and long with us until now the schools are beginning to revive basics in their curricula. The speller that Dr. Seat and I co-authored was designed not merely to discuss the problem but to do something practicable about it. If it could gain widespread adoption, I am optimistic enough to think that it would end one of the writing miseries of high school and college students!

Yes, I have been working on Mark Twain for a long time, with a fourth study of him concerning "Mark Twain Overseas." Incidentally, I think he would be horrified at the semi-illiteracy that pervades America today.

In your work with the Reading Department and the diagnostic test in particular, I would be interested to learn what results you get in students' spelling improvement. I fought a discouraging battle with the problem for forty years in college composition courses and always wished I had an effective tool and the students a compelling motivation to overcome the problem.

All success to you with your dissertation and completing your degree (I may be a fellow alumnus from the University of Michigan, where I took my Masters degree many years ago).

Sincerely,


Robert M. Rodney

cc. Dr. William Seat

REQUEST FOR PERMISSION TO REPRINT

April 10, 1990

TO: The Psychological Corporation
Harcourt Brace Jovanovich
555 Academic Court
San Antonio, Texas 78204-095

FROM: Sophie S. McGee
Department of Reading
Washtenaw Community College
4800 E. Huron River Drive
Ann Arbor, Michigan 48106-0978

I hereby request permission to reprint the following material from your publication:

C. Seashore, D. Lewis, & J. Saetveit Seashore Measures of Musical Talents.

I am requesting permission to reprint the directions from the Manual and the norms which will appear in Appendix A of my Ph.D. dissertation entitled, Musical Aptitude and Phonological Spelling Strategies Among Reading Proficient Adults with Spelling Disabilities.

The undersigned agrees as follows:

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Date of Approval _____

Approved: The Psychological Corporation
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THE PSYCHOLOGICAL CORPORATION

555 ACADEMIC COURT, SAN ANTONIO, TEXAS 78204-2498
TELEPHONE: (512) 299-1061 TELEX: 5106015629 TPCSAT FAX: (512) 270-0327

May 1, 1990

Sophie S. McGee
Department of Reading
Washtenaw Community College
4800 E. Huron River Drive
Ann Arbor, Michigan 48106-0978

Dear Ms. McGee:

Please consider this letter formal authorization for you to reproduce the directions and cover sheet only of the Seashore Measures of Musical Talents in the appendix to your dissertation.

Please be sure the words "Reproduced by permission" precede the copyright notice on each page of these materials. Also, we would appreciate a copy of the final dissertation for our library.

Thank you for your interest.

Sincerely,

Christine Sauer
Supervisor
Rights & Permissions

REQUEST FOR PERMISSION TO REPRINT

TO:Permissions
Harcourt Brace Jovanovich
Orlando, Florida 32287

April 10, 1990

FROM: Sophie S. McGee , Department of Reading
Washtenaw Community College
4800 E. Huron River Drive
Ann Arbor, Michigan 48106-0978

I hereby request permission to reprint the following material from your publication:

J.N. Hook Spelling 1500 A list of the first 50 words from the Diagnostic Test on p. ix.

Form of publication Ph.D Dissertation

Reason for reprint request: The Diagnostic Test (items 1-50) was used as a part of a battery of tests to determine spelling proficiency among the subjects of the dissertation. A list of the 50 words will hopefully appear in Appendix A of the dissertation, entitled, Music Aptitude and Phonological Spelling Strategies Among Reading Proficient Adults with Spelling Disabilities.

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May 11, 1990

HBJ Ref; MCGEE

Sophie S. McGee
2039 Crooked Lane
Flint, MI 48503

Dear Ms. McGee:

In response to your April 10 letter, we are willing to grant permission for the reprinting of Items 1-50, page, ix, "Diagnostic Test," from SPELLING 1500, Third Edition, by J.N. Hook (Seq. Num: 13582) in your forthcoming dissertation, provided copyright credit is given as a footnote on each page on which the excerpt is reprinted, as follows:

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If your dissertation is committed for publication, we ask that you reapply.

Sincerely yours,


Betty Schlosberg
Permissions Assistant

APPENDIX B

INSTRUMENTS

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119-166

University Microfilms International

Diagnostic Spelling Test

- | | |
|-------------------------------|------------------------------------|
| 1. bookkeeper | 26. dropped |
| 2. disappear | 27. occurred |
| 3. monkeys | 28. continuous |
| 4. quality | 29. defendant |
| 5. bushes (plural) | 30. aren't |
| 6. attacked | 31. men's (as in men's work) |
| 7. candidate | 32. fourth (as in the fourth word) |
| 8. quantity | 33. forty-four |
| 9. studying | 34. potatoes |
| 10. hundred | 35. cemetery |
| 11. disgusted | 36. proceed |
| 12. destroy | 37. courteous |
| 13. boisterous | 38. devise |
| 14. conference | 39. analyze |
| 15. circumference | 40. embarrass |
| 16. confident | 41. grammar |
| 17. careful | 42. eighty |
| 18. severely | 43. definite |
| 19. loveliness | 44. optimist |
| 20. ladies (as in two ladies) | 45. flexible |
| 21. believe | 46. delicious |
| 22. coming | 47. narrative |
| 23. valuable | 48. testimonial |
| 24. accidentally | 49. acceptable |
| 25. frolicked | 50. villain |

Items 1-50 from "Diagnostic Test" in Spelling 1500,
Third Edition, by J. J. Hook, copyright 1986 by Harcourt
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PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the possibilities. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list. After you have finished the test, follow the directions at the end to determine the result.

1. varius	varrius	various	varyous	<u>various</u>
2. wemen	wimen	women	wommen	<u>women</u>
3. usully	usualy	usally	usually	<u>usually</u>
4. octully	actually	actualy	acktully	<u>actually</u>
5. bussiness	bussiness	buisiness	bukness	<u>business</u>
6. studing	studeing	studying	studding	<u>studying</u>
7. jugement	judgmet	jugemet	judgment	<u>judgment</u>
8. competition	compitition	competion	comptition	<u>competition</u>
9. committee	committee	comittee	committe	<u>committee</u>
10. stoped	stoped	stopped	stopl	<u>stopped</u>
11. opposit	opposite	oposite	opposite	<u>opposite</u>
12. gramar	grammer	grammar	gramer	<u>grammar</u>
13. theories	theorys	thcores	theries	<u>theories</u>
14. beleive	beleeve	believe	beleve	<u>believe</u>
15. government	government	govermet	governmet	<u>government</u>
16. analysis	annalysis	analisis	annalasis	<u>analysis</u>
17. nieghbor	neighbor	nieghber	neighbor	<u>neighbor</u>
18. certinly	certainly	certianly	certainally	<u>certainly</u>
19. finally	finaly	finnally	finly	<u>finally</u>
20. activaties	activities	activatys	activitys	<u>activities</u>

PROFICIENCY TEST

21. oportunity	opportunity	oppertunity	oppurtunity	<u>opportunity</u>
22. opinion	opinion	oppinion	opininion	<u>opinion</u>
23. childeren	children	childern	childrun	<u>children</u>
24. especally	especialy	expecially	especialy	<u>especially</u>
25. eventully	eventualy	eventually	eventuly	<u>eventually</u>
26. allready	alredy	already	alreddy	<u>already</u>
27. labratory	laboratory	laboratory	labertory	<u>laboratory</u>
28. extremely	extreamly	extremely	extremally	<u>extremely</u>
29. disagree	disaggree	disagree	dissagre	<u>disagree</u>
30. concious	conscious	consious	consciuis	<u>conscious</u>
31. benifit	benafit	benefit	benfit	<u>benefit</u>
32. becomeing	beccomming	becomming	becoming	<u>becoming</u>
33. comitted	committed	comitted	comited	<u>committed</u>
34. immedately	imedately	immediately	immedially	<u>immediately</u>
35. fundamental	fundimental	fundmental	fundometal	<u>fundamental</u>
36. recceive	reclieve	receive	receeve	<u>receive</u>
37. studies	studys	studdies	studdys	<u>studies</u>
38. familar	fammilar	fanniliar	familiar	<u>familiar</u>
39. writeing	writting	riting	writing	<u>writing</u>
40. enviroment	environment	invironment	environmet	<u>environment</u>
41. quanety	qvanity	quantity	quandity	<u>quantity</u>
42. suprise	surprise	supprise	surprize	<u>surprise</u>
43. prosedure	procedure	proceedure	percedure	<u>procedure</u>
44. successful	successfull	succesful	succosfull	<u>successful</u>
45. neccessary	necessary	necessery	necessary	<u>necessary</u>
46. preformance	performence	preformence	performance	<u>performance</u>
47. practicky	pratically	practicaly	practically	<u>practically</u>
48. elementary	elementary	elementry	elanentary	<u>elementary</u>
49. asistance	assitance	asistence	assitance	<u>assistance</u>
50. interupt	interrupt	intrarupt	intarupt	<u>interrupt</u>

PROFICIENCY TEST

51. ocaasionally	occasionally	ocassionly	ocasionly	<u>occasionally</u>
52. oficiency	efficiency	effency	elliciancy	<u>efficiency</u>
53. criticize	critacizo	critisizo	critize	<u>criticize</u>
54. trully	truely	truly	trually	<u>truly</u>
55. seperate	separate	seperrate	separate	<u>separate</u>
56. explannation	explanation	explanation	explanation	<u>explanation</u>
57. rylhem	rythm	rhythm	rhythm	<u>rhythm</u>
58. approxamelly	approximately	aproximately	approximately	<u>approximately</u>
59. equipped	equiped	equipted	equipt	<u>equipped</u>
60. possess	posses	possess	pozess	<u>possess</u>
61. definatly	defanitely	defnitely	definitely	<u>definitely</u>
62. disapprove	dissapprove	disuprove	dissapprove	<u>disapprove</u>
63. appropriate	apropriate	apropiate	appropriate	<u>appropriate</u>
64. referred	refered	reffered	reffered	<u>referred</u>
65. choosen	chosen	chossen	choson	<u>chosen</u>
66. development	developement	developmet	developemet	<u>development</u>
67. undoubtably	undoubtully	undoubtedly	undoubtly	<u>undoubtedly</u>
68. amoung	ammoung	among	ammong	<u>among</u>
69. persuade	perswade	persuade	presuade	<u>persuade</u>
70. discription	discribition	description	description	<u>description</u>
71. influential	influenshal	influenical	influential	<u>influential</u>
72. ammatore	amnteur	amature	ammateur	<u>amateur</u>
73. benefical	benficial	benifical	beneficial	<u>beneficial</u>
74. Imaginary	immaginary	imagginary	imaginery	<u>imaginary</u>
75. achievment	acheivement	achievemet	achievement	<u>achievement</u>
76. analyze	analize	annalyze	annilize	<u>analyze</u>
77. ommitted	omitted	omited	omitted	<u>omitted</u>
78. prominent	prominent	prominate	promnent	<u>prominent</u>
79. fulfilled	fullfilled	fulfiled	fulfilled	<u>fulfilled</u>
80. prefered	preffered	preferred	preffered	<u>preferred</u>

PROFICIENCY TEST

81. ~~accidently~~ ~~accidentaly~~ ~~accidentally~~ ~~accidentably~~ accidentally
82. An ~~over-confident~~ team may (loss loose lose looze) the game. lose
83. Injuries to the team's players strongly (effectled affected affected effected) the conference championship. affected
84. ~~changable~~ ~~changible~~ ~~changeable~~ ~~changible~~ changeable
85. ~~eligble~~ ~~elligible~~ ~~elegible~~ ~~eligible~~ eligible
86. ~~athilete~~ ~~athelete~~ ~~athleat~~ ~~athalete~~ athlete
87. ~~absence~~ ~~abcense~~ ~~absence~~ ~~abcence~~ absence
88. Every cloud has (its its' its's its's) silver lining. its
89. ~~conscientous~~ ~~concientious~~ ~~conscientious~~ ~~concientous~~ conscientious
90. ~~argumet~~ ~~arguement~~ ~~argumet~~ ~~argument~~ argument
91. ~~aquaintance~~ ~~acquaintence~~ ~~acquaintence~~ ~~acquaintance~~ acquaintance
92. ~~privilege~~ ~~priviledge~~ ~~privledge~~ ~~privlege~~ privilege
93. ~~occured~~ ~~ocurred~~ ~~occurred~~ ~~ocured~~ occurred
94. ~~accomodate~~ ~~acommodate~~ ~~accomadate~~ ~~accommodate~~ accommodate
95. ~~similar~~ ~~similiar~~ ~~simalar~~ ~~simlar~~ similar
96. ~~immitate~~ ~~imitate~~ ~~imatate~~ ~~immatate~~ imitate
97. ~~existence~~ ~~existance~~ ~~exhistance~~ ~~exhistence~~ existence
98. ~~hindrence~~ ~~hinderence~~ ~~hindrance~~ ~~hinderance~~ hindrance
99. Over-population is one of the (principal principle principal princple) causes of war. principle
100. ~~occurance~~ ~~occurrence~~ ~~occurrence~~ ~~occurrence~~ occurrence

Percentage score _____

To determine your score and identify the words which you have misspelled, check your answers against the key on page 90. Subtract your total number of errors from 100 for your percentage score. If your test score is 77% or below, you probably have a serious problem in basic spelling. If your test score is approximately 86% (the average score for this test), you may consider yourself an average speller — Remember, however, that your aim is to be better than average. You still have room for much improvement. Even if your score is 95% or higher, this performance indicates that there are some words in the Master Word List which you still need to master.

Focus on Spelling, Rodney and Seat, Sernoll, Inc.

SEASHORE MEASURES OF MUSICAL TALENTS

Seashore — Lewis — Saelvelt

MANUAL

Revised 1960



Published by
The Psychological Corporation
New York

DIRECTIONS FOR ADMINISTRATION

TESTING CONDITIONS

The *Seashore Measures of Musical Talents* should be administered in a room that has good acoustics and where there will be no noise disturbances either in the room or in adjacent areas. The test may be administered to individuals or to groups of any size, even up to 100 or more. In testing one person or a very small group no one should sit closer to the loud speaker than about five feet. When one sits closer one hears more of the surface noises from the recording and electronic noises from the amplification system. For large groups, good testing conditions are particularly important; the acoustics must permit the stimulus sounds to be heard clearly in all parts of the room. A proctor is needed to assist the examiner when groups of 25 or more are tested.

MATERIALS NEEDED

Since the test is on a record, a good phonograph is needed in order to present the stimulus materials. The turntable of the phonograph should have no wobble and the sound reproduction of the machine should be of good fidelity. The examiner should try out the phonograph in the room where the test is to be given to assure that the volume, clarity, etc. are satisfactory. Loud playing should be avoided. It is essential that the examiner study the Manual before administering the test and he is encouraged to take the test himself before giving it to others. Before administering the test with the long-playing recording, the examiner should practice setting the needle in the groove between bands in order to avoid the confusing repetition of the last sounds of the preceding test or the cutting off of the first words and sounds of the test to be given. Often it is helpful to have the phonograph set up high and well illuminated, since this makes it easier to see where the needle should be set down.

Each subject needs to be supplied with a copy of the special IBM answer sheet on which to record his responses. He also needs at least one pencil and an eraser. Wooden or mechanical

pencils containing electrographic lead must be used if the answer sheets are to be scored with an electric scoring machine.

TESTING TIME AND SCHEDULE

The actual testing time for the six parts of the measures is about 30 minutes, but an hour should be allowed for the whole procedure, including instructions, demonstration, etc. It is recommended that younger subjects be tested in at least two sessions.

RETESTS

Whenever time and opportunity permit, giving a second trial of the test is a wise procedure. Of course, the first answer sheet should be removed before the second testing. It is particularly important that subjects making a poor or doubtful score be retested. When retesting a subject who has made a poor score, the examiner should exercise considerable patience in explaining the test, allowing adequate practice, and making certain that the subject knows what he is to do.

GIVING THE TEST

After the group has been assembled and properly seated, explain that this is a test to measure some aspects of ability to hear sounds which occur in music, speech, and many practical activities. Tell the subjects that the test is played on the phonograph and that they are to put their answers on the special papers that are now to be distributed.

Distribute the answer sheets. Have the examinees print their names and other desired information in the spaces provided. If the answer sheets are to be machine scored, furnish the examinees with electrographic pencils. Explain thoroughly the system of marking IBM answer sheets (including use of special pencils when the answer sheets are to be machine scored) with a statement such as:

"Notice the many sets of small spaces on these answer sheets. You are to show your answers by making a clear, heavy, black mark in the proper space like this (*draw an example on the board and mark it*). In each section, place your answers one below another in Column A until that is filled, then down Column B, and so on. For each part of this test you will be given further instructions, but I want to make sure now that you know how to show your answers and that you realize that you should make your marks clear and black and between the lines as I have shown you. If you want to change an answer, draw a light circle around the mark that is wrong, and mark the space that you mean as your choice; then, at the end of the test you can go back and erase thoroughly the marks with circles around them as well as the circles themselves. You will not have time to erase while the test is going on."

To provide a warning which some have requested, in the long-playing recording an announcer prefaces each test with the words "This is the _____ test. Ready now for Column A." To reduce the chance that an examinee may lose his place, the announcer also says, "Column B," "Column C," and so on at the appropriate places in each test.

PITCH

Say to the subjects,

"The first test measures your sense of Pitch. You will hear two tones, one right after the other. The second tone is either higher or lower in pitch than the first. Find the section of the answer sheet labeled 'Pitch.' You are to make a mark under the letter H on the answer sheet if the second tone is higher than the first; but mark under the L if the second tone is lower. Answer every time; if you are not sure, guess. Now we shall listen to a few practice notes. Do not mark any answers for these. Just see that you understand what you are to do. Ask any questions you want to during the practice."

Be sure that side 1 of the record is face up on the turntable. Give preliminary practice from different parts of band 1 demonstrating easy as well as difficult steps and allow the subjects to speak in competitive reaction to the sound. Ask everyone to respond at every trial, guessing in case of uncertainty. Continue this demonstration and the answering of questions until it is clear that everyone understands the nature of the procedure. Practice does not vitiate the actual test as long as consecutive items are not played and the subject does not know the scoring stencil. Provide similar practice sessions before each of the six tests.¹

Make certain that everyone understands how and where he is to record his answers. State that there will be 50 pairs of notes in the Pitch test without interruption, and that no questions may be asked during the actual test. When everyone is ready, start the record and complete the band without interruption.

If two or more sessions are used for the testing, repeat enough of the general introductory directions to assure that the examinees understand what they are to do.

Before starting each test, be sure that the appropriate side of

¹This is especially important when testing younger subjects (e.g., 4th, 5th, and 6th graders) who may have difficulty with words such as "Timbre," but will usually understand what is expected after they have heard enough examples.

the record is face up on the turntable, and the needle on the correct band.²

LOUDNESS

After the Pitch test is completed, say,

"The next part tests your sense of Loudness. You will hear two tones which differ in loudness or strength. If the second is stronger, you should make a mark under the letter S for that item in the section of your answer sheet labeled 'Loudness.' If the second tone of the pair is weaker, make the mark between the dotted lines under the letter W. There are 50 pairs in this test. There is always a difference; if you are not sure, guess."

Give a few demonstration selections from different parts of band 2, with the warning that responses are not to be marked for them. When everybody understands what he is to do, give the signal for the group to be ready to begin the test. Play the whole Loudness section without interruption.

RHYTHM

After the Loudness test is completed, say,

"The next part is a measure of sense of Rhythm. You will hear two rhythmic patterns, one right after the other. The second is either the same as the first or different from it. If they are the same, you should blacken the space under the letter S for that item in the section of your answer sheet labeled 'Rhythm.' If the two patterns are different, mark the space under the letter D. There are only 30 pairs of patterns in this test. You are to decide whether the rhythm in each pair is the same or different. Now listen to a few practice items, but do not make any marks on your papers for these."

Give a few demonstration items from different parts of band 3, and when everybody understands what he is to do, give the signal for the group to be ready to begin the test. Play the whole Rhythm section without interruption.

TIME

After the Rhythm measure is completed, turn the record over to side 2 and say,

"Turn over your answer sheet. The section you are to mark for the next test is on the other side of the answer sheet.³ (*Allow enough time for everyone to do this.*) The next part tests your sense of Time. You will hear two tones which are different in length. If the second tone is longer than the first, you should blacken the space under the letter L for that item in the section of the answer sheet labeled 'Time.' If the second tone is shorter than the first, mark the space under the letter S for that item. There is always a difference; if you are not sure, guess. There will be 50 pairs of tones on this test. Now listen to a few practice items to see how they go, but do not make any marks for these on your papers."

Give a few demonstration items from different parts of band 1, and when everyone understands what he is to do, give the signal for the group to be ready to begin the test. Play the whole Time section without interruption.

²If you are using the 78 rpm records, be sure the correct record is face up.

³If some other order of testing is given, be sure to tell when to turn the answer sheets.

TIMBRE

After the test of sense of Time is finished, say,

"The next part measures your sense of Timbre or tonal quality. You will hear two tones that are either the same or different in timbre. If they are the same, you are to blacken the space under the letter S for that item in the section of the answer sheet labeled 'Timbre.' If the second tone is different from the first, mark the space under the letter D. There are 50 pairs of tones in this test. You are to decide whether the two tones have the same tonal quality or not and mark your papers for same or different. Now listen to a few practice items to see how they go, but do not mark your papers for these."

Give a few demonstration selections from different parts of band 2. When everyone understands what he is to do, give the signal for the group to be ready to begin the test. Everyone should answer every item. Play the whole Timbre band without interruption.

TONAL MEMORY

After the Timbre section is completed, say,

"The next part is a test of Tonal Memory. In each trial you will hear a short series of notes played twice. In the second playing, one note is changed. You are to decide which note is changed; the first, the second, the third, and so on, and blacken the space under that number in the section of the answer sheet labeled 'Tonal Memory.' There is always some note in the second playing that is different from the corresponding note in the first playing. As you hear the notes in each set, count them silently to yourself, one, two, three, etc., so that you can identify the note that is changed. There are 30 sets of tones in this test. Now listen to a few practice sets, but do not mark your papers for these."

Give a few demonstration sets from different parts of the band. When everyone understands the task, give the signal for the group to be ready to begin the test. Play the whole Tonal Memory section without interruption.

DIRECTIONS FOR SCORING

The *Seashore Measures of Musical Talents* can be scored either by hand or by use of an IBM test scoring machine. The same set of scoring stencils is used for both methods.

There are two scoring stencils, one for each side of the answer sheet. The stencil for Side 1, Front, contains keys for the Pitch, Loudness, and Rhythm measures, while the stencil for Side 2, Back, contains keys for the Time, Timbre, and Tonal Memory measures. For each of the six measures, the score is the number of items correctly answered.

HAND SCORING

Before scoring, the answer sheets must be inspected to determine whether more than one choice has been marked for any item. Where such multiple marking occurs, the item should be omitted from the scoring. A horizontal red line may be drawn through all multiple responses to an item; then, in scoring, items with red marks are omitted from the count.

In placing the scoring stencil over an answer sheet, care must be taken to assure that the proper stencil is being used for the side of the answer sheet to be scored and that the stencil is correctly placed on the answer sheet so that the four edges are even. This will bring the punched holes in the stencil directly over the appropriate answer spaces. Count and record the number of correct responses for each of the six measures separately. This procedure yields the raw score for each measure.

MACHINE SCORING

Every answer sheet should be scanned before it is scored. Light marks should be made darker and stray marks erased. Where more than one choice is marked for an item, all the

marks for that item should be completely erased. The A, B, and C formula switches should be set at R and left in that position for all scoring of this test. Three scores can be read with each pass of an answer sheet. With Side 1, Front, with the master control switch at A, the raw score for the Pitch test appears on the dial. By turning the master control switch successively to B and C, scores for Loudness and Rhythm, respectively, are registered. With Side 2, Back, scores for Time, Timbre, and Tonal Memory may be read with the master control switch at A, B, and C, respectively. These switch settings are summarized in the following table:

Measure	Master Control Switch	Formula Switch
Pitch (Side 1 — Front)	A	R
Loudness (Side 1 — Front)	B	R
Rhythm (Side 1 — Front)	C	R
Time (Side 2 — Back)	A	R
Timbre (Side 2 — Back)	B	R
Tonal Memory (Side 2 — Back)	C	R

It is suggested that four check sheets be used in setting the scoring machine. They should be made in advance with predetermined scores. Various numbers of right answers should be used so that one check sheet will yield a high score, another a low score, and two will yield scores in the middle range. When scoring for large groups, it is wise to use check sheets not only in setting the machine, but also at periodic intervals during the course of scoring to check the accuracy of the machine. To further insure accuracy, all rescoring should be done by a second scorer.

Prepared by Sophie S. McGee

SPELLING QUESTIONNAIRE

1. How do you rate your overall spelling ability?
excellent___ very good___ good___ fair___ poor___
2. How would you rate your overall reading ability?
excellent___ very good___ good___ fair___ poor___
3. Do you read everyday--newspapers, magazines, books, etc?
yes___ no___ almost everyday___
4. Approximately how many books do you read a year? _____
5. Do you experience any of the following difficulties as you pronounce words? (You may check as many as apply)
 - a. I find I mispronounce words frequently___
 - b. I generally am aware when I mispronounce words___
 - c. I am not aware when I mispronounce words. Someone usually tells me___
 - d. I attribute many of my misspelled words to my mispronunciation of them___
 - e. I frequently substitute easier words for those words I am afraid I will mispronounce___ and/or misspell___
6. Were you taught to use the pronunciation key of a dictionary?
yes___ no___ can't remember___
7. Are you able to determine the pronunciation of a word you don't know with the help of a dictionary?
always___ usually___ seldom___ never___

8. When you refer to the dictionary to check the spelling or meaning of a word you do not know, do you also refer to the pronunciation guide?

always___ usually___ seldom___ never___

9. When you write (spell) a word, which of the following strategies do you use? (You may choose more than one)
- I say the names of the letters in the word as I write the word___
 - I hear the word in my head as I write it___
 - I visualize the word in my head as I write and try to write it as I remember seeing it ___
 - I write difficult to spell words several ways then choose the one that looks right to me___
 - I frequently refer to the dictionary for the correct spelling before attempting to write it___

Questions 10 through 14 are to be answered by those of you who considered yourselves to be "poor spellers". Please continue to question #15 if questions do not apply:

10. What types of strategies have you used in an effort to compensate for poor spelling? Check more than one if necessary.
- I usually have someone proofread my written work. ___
 - I use a computer program that detects spelling errors. _____
 - I look up words that I think may be misspelled. ___
 - I avoid writing as much as possible. _____
 - I ask others to write my assignments. _____
 - I substitute words I know I can spell for those I would prefer to use. _____
 - What other strategies have you used, if any?

11. Do you find that you substitute words that are easy to spell for those words which are difficult to spell when the more difficult words would better express your thoughts?
- often___ sometimes___ rarely___
12. I feel that I would be a more proficient speller if I had received better spelling training in elementary and/or high school.
- yes___ no___
13. I feel that I was given adequate spelling training but do not have the capacity to be a proficient speller.
- yes___ no___
14. Does your poor spelling ability cause any of the following problems for you?
- a. I avoid writing as much as possible___
 - b. My lack of good spelling skills makes me question my intelligence at times___
 - c. I need to refer to a dictionary whenever I write___
 - d. Sometimes I have trouble finding words in the dictionary even though I know how to pronounce them___
 - e. Spelling errors cause me embarrassment___

Musical or Artistic Ability?

15. Do you consider yourself to have musical aptitude?
yes___ no___ don't know___
16. Have you ever played a musical instrument?
yes___ no___ If yes, what instrument_____
- For how long?_____
17. Have you ever sung in a choir or choral group?
yes___ no___ If yes, for how long?_____
18. Do you consider yourself to have artistic ability?
yes___ no___ don't know___
19. Do you think you have better visual recall than
auditory?
yes___ no___ don't know___
20. Do you think you have better auditory recall than
visual?
yes___ no___ don't know___
21. I feel I have very little of either musical or
artistic ability_____

APPENDIX C

NORMS

GATES-MACGINITIE NORMS

Level 10/12, Form K
Grade 12

Vocabulary

Raw Score	Grade 12									All Grades	
	Fall			Winter			Spring			GE	ESS
	S	NCE	PR	S	NCE	PR	S	NCE	PR		
0	1	01	01	1	01	01	1	01	01	1.5	378
1	1	01	01	1	01	01	1	01	01	1.6	392
2	1	01	01	1	01	01	1	01	01	1.7	406
3	1	01	01	1	01	01	1	01	01	2.2	420
4	1	01	01	1	01	01	1	01	01	2.4	434
5	1	01	01	1	01	01	1	01	01	2.7	447
6	1	01	01	1	01	01	1	01	01	3.2	460
7	1	01	01	1	01	01	1	01	01	3.5	473
8	1	01	01	1	01	01	1	01	01	3.9	484
9	1	01	01	1	01	01	1	01	01	4.4	495
10	1	02	01	1	02	01	1	02	01	4.7	506
11	1	07	02	1	07	02	1	07	02	5.2	515
12	1	10	03	1	10	03	1	10	03	5.5	524
13	2	13	04	2	12	04	2	12	04	5.8	533
14	2	18	05	2	14	05	2	14	04	6.3	541
15	2	17	06	2	16	06	2	16	05	6.6	548
16	2	19	07	2	18	07	2	18	06	6.9	555
17	2	21	08	2	20	08	2	20	08	7.2	561
18	2	23	10	2	23	10	2	22	09	7.5	568
19	3	26	12	3	28	12	3	24	11	7.8	574
20	3	27	14	3	27	13	3	26	13	8.2	579
21	3	30	17	3	29	16	3	28	15	8.5	585
22	3	31	19	3	31	18	3	30	17	8.7	590
23	3	34	22	3	33	21	3	32	19	9.3	596
24	4	36	25	4	35	23	3	34	22	9.6	601
25	4	38	28	4	36	26	4	35	24	9.9	606
26	4	40	31	4	39	29	4	37	28	10.3	612
27	4	42	35	4	40	32	4	39	30	10.5	617
28	4	44	39	4	43	36	4	41	34	10.7	623
29	5	46	42	5	44	40	4	43	37	11.2	628
30	5	48	46	5	47	43	5	45	41	11.5	634
31	5	50	50	5	49	47	5	47	44	12.1	640
32	5	52	55	5	51	52	5	49	48	12.5	646
33	5	55	59	5	53	56	5	51	52	12.9	652
34	6	57	63	5	55	59	5	53	56	PHS	658
35	6	59	67	6	57	63	6	55	60	PHS	664
36	6	62	71	6	60	68	6	58	64	PHS	671
37	6	65	76	6	63	73	6	61	69	PHS	680
38	7	69	81	7	66	78	6	64	74	PHS	689
39	7	72	85	7	70	83	7	67	79	PHS	699
40	8	77	90	7	74	87	7	71	84	PHS	711
41	8	81	93	8	78	91	8	76	89	PHS	724
42	8	85	95	8	83	94	8	80	93	PHS	738
43	9	89	97	9	87	96	8	86	95	PHS	755
44	9	99	99	9	99	99	9	92	98	PHS	776
45	9	99	99	9	99	99	9	99	99	PHS	799

Scores in the colored band may be chance level scores; see "Chance Level Scores" in the section "Using the Norms Tables."

Comprehension

Raw Score	Grade 12									All Grades	
	Fall			Winter			Spring			GE	ESS
	S	NCE	PR	S	NCE	PR	S	NCE	PR		
0	1	01	01	1	01	01	1	01	01	1.3	299
1	1	01	01	1	01	01	1	01	01	1.4	311
2	1	01	01	1	01	01	1	01	01	1.4	323
3	1	01	01	1	01	01	1	01	01	1.5	335
4	1	01	01	1	01	01	1	01	01	1.5	347
5	1	01	01	1	01	01	1	01	01	1.6	359
6	1	01	01	1	01	01	1	01	01	1.6	372
7	1	01	01	1	01	01	1	01	01	1.7	385
8	1	01	01	1	01	01	1	01	01	1.9	399
9	1	01	01	1	01	01	1	01	01	2.2	413
10	1	01	01	1	01	01	1	01	01	2.3	426
11	1	08	02	1	08	02	1	08	02	2.5	440
12	1	11	03	1	11	03	1	11	03	2.7	454
13	1	11	03	1	11	03	1	11	03	3.2	467
14	2	12	04	2	12	04	2	12	04	3.5	480
15	2	13	04	2	13	04	2	13	04	4.2	493
16	2	16	05	2	16	05	2	16	05	4.5	505
17	2	18	07	2	18	07	2	18	07	5.1	516
18	2	21	08	2	21	08	2	21	08	5.4	526
19	3	24	11	3	24	11	3	24	11	5.7	536
20	3	26	13	3	26	13	3	26	13	6.3	545
21	3	29	16	3	29	16	3	29	15	6.7	554
22	3	31	19	3	31	18	3	31	18	7.3	562
23	3	33	22	3	33	21	3	33	21	7.7	570
24	4	36	25	4	35	24	4	35	23	8.2	577
25	4	37	28	4	37	27	4	37	26	8.5	584
26	4	39	31	4	39	30	4	38	29	9.2	591
27	4	41	34	4	41	33	4	40	32	9.6	598
28	4	43	37	4	43	36	4	42	35	10.3	605
29	5	45	41	5	45	40	4	44	39	10.6	613
30	5	48	45	5	47	44	5	46	43	11.4	621
31	5	50	49	5	49	48	5	48	47	12.0	629
32	5	52	53	5	51	52	5	50	50	12.7	636
33	5	54	57	5	53	56	5	52	54	PHS	644
34	6	56	61	6	55	60	5	54	58	PHS	652
35	6	58	65	6	57	63	6	56	62	PHS	660
36	6	60	69	6	59	67	6	58	65	PHS	668
37	6	63	73	6	62	71	6	61	69	PHS	677
38	6	65	76	6	64	75	6	63	73	PHS	686
39	7	68	80	7	67	79	7	66	77	PHS	696
40	7	71	84	7	70	83	7	69	81	PHS	707
41	7	74	88	7	73	86	7	72	85	PHS	719
42	8	78	91	8	77	90	7	75	88	PHS	732
43	8	82	93	8	80	92	8	79	91	PHS	746
44	8	85	95	8	84	95	8	82	94	PHS	761
45	9	89	97	9	88	96	9	86	96	PHS	778
46	9	94	98	9	92	98	9	91	97	PHS	797
47	9	99	99	9	99	99	9	99	99	PHS	819
48	9	99	99	9	99	99	9	99	99	PHS	844

GATES-MACGINITIE NORMS

Level 10/12, Form K
Grade 12

Raw Score	Total Score									All Grades	
	Grade 12										
	Fall			Winter			Spring			GE	ESS
S	NCE	PR	S	NCE	PR	S	NCE	PR	GE	ESS	
0	1	01	01	1	01	01	1	01	01	1.2	323
1	1	01	01	1	01	01	1	01	01	1.2	327
2	1	01	01	1	01	01	1	01	01	1.3	331
3	1	01	01	1	01	01	1	01	01	1.3	335
4	1	01	01	1	01	01	1	01	01	1.3	339
5	1	01	01	1	01	01	1	01	01	1.3	343
6	1	01	01	1	01	01	1	01	01	1.4	347
7	1	01	01	1	01	01	1	01	01	1.4	352
8	1	01	01	1	01	01	1	01	01	1.4	357
9	1	01	01	1	01	01	1	01	01	1.5	362
10	1	01	01	1	01	01	1	01	01	1.5	368
11	1	01	01	1	01	01	1	01	01	1.5	374
12	1	01	01	1	01	01	1	01	01	1.6	380
13	1	01	01	1	01	01	1	01	01	1.6	387
14	1	01	01	1	01	01	1	01	01	1.7	394
15	1	01	01	1	01	01	1	01	01	1.8	401
16	1	01	01	1	01	01	1	01	01	2.0	408
17	1	01	01	1	01	01	1	01	01	2.1	416
18	1	01	01	1	01	01	1	01	01	2.3	424
19	1	01	01	1	01	01	1	01	01	2.4	432
20	1	01	01	1	01	01	1	01	01	2.5	440
21	1	01	01	1	01	01	1	01	01	2.7	448
22	1	01	01	1	01	01	1	01	01	2.9	456
23	1	04	01	1	04	01	1	04	01	3.2	464
24	1	06	02	1	06	02	1	06	02	3.4	471
25	1	08	02	1	07	02	1	07	02	3.6	479
26	1	08	02	1	08	02	1	07	02	4.0	487
27	1	08	02	1	08	02	1	08	02	4.3	495
28	1	10	03	1	09	03	1	09	03	4.5	503
29	1	11	03	1	11	03	1	10	03	4.7	511
30	2	13	04	2	12	04	1	12	03	5.2	518
31	2	14	04	2	13	04	2	13	04	5.4	524
32	2	16	05	2	15	05	2	15	05	5.6	530
33	2	17	06	2	17	06	2	16	05	6.0	535
34	2	19	07	2	18	07	2	17	06	6.2	539
35	2	20	08	2	20	07	2	19	07	6.3	543
36	2	21	09	2	21	08	2	20	08	6.5	547
37	2	23	10	2	22	09	2	21	09	6.6	551
38	3	24	11	2	23	10	2	23	10	6.9	555
39	3	26	12	3	25	12	3	24	11	7.2	559
40	3	27	14	3	26	13	3	25	12	7.3	563
41	3	28	15	3	27	14	3	26	13	7.5	566
42	3	29	16	3	28	15	3	27	14	7.6	570
43	3	30	17	3	29	16	3	28	15	7.8	573
44	3	31	19	3	30	18	3	29	16	8.0	576
45	3	32	20	3	31	19	3	30	18	8.2	579
46	3	33	21	3	32	20	3	31	19	8.4	582
47	4	34	23	3	33	21	3	32	20	8.5	585
48	4	35	24	3	34	22	3	33	21	8.6	587
49	4	36	25	4	35	24	3	34	22	9.1	590

Raw Score	Total Score									All Grades	
	Grade 12										
	Fall			Winter			Spring			GE	ESS
S	NCE	PR	S	NCE	PR	S	NCE	PR	GE	ESS	
50	4	37	26	4	36	25	4	35	23	9.3	593
51	4	38	28	4	37	26	4	36	25	9.5	596
52	4	39	30	4	38	28	4	37	26	9.6	599
53	4	40	31	4	39	29	4	38	28	10.1	602
54	4	41	33	4	40	31	4	38	29	10.2	605
55	4	42	34	4	40	32	4	39	31	10.3	608
56	4	43	36	4	41	34	4	40	32	10.4	611
57	4	44	38	4	43	36	4	41	34	10.6	615
58	5	45	40	4	44	38	4	42	36	10.7	618
59	5	46	42	5	45	40	4	44	38	11.2	622
60	5	47	45	5	46	42	5	45	40	11.4	626
61	5	48	47	5	47	45	5	46	42	11.6	630
62	5	50	49	5	48	47	5	47	44	11.9	634
63	5	51	52	5	50	49	5	48	47	12.3	638
64	5	52	55	5	51	52	5	50	49	12.6	643
65	5	54	57	5	52	54	5	51	52	12.9	647
66	6	55	60	5	54	57	5	52	54	PHS	652
67	6	56	62	5	55	59	5	54	57	PHS	656
68	6	58	65	6	57	62	5	55	59	PHS	661
69	6	59	67	6	58	64	6	56	62	PHS	665
70	6	60	69	6	59	66	6	57	64	PHS	669
71	6	62	71	6	60	69	6	59	66	PHS	673
72	6	63	74	6	62	71	6	60	68	PHS	678
73	6	65	76	6	63	73	6	61	70	PHS	682
74	7	66	77	6	64	75	6	63	72	PHS	686
75	7	67	80	7	66	77	6	64	75	PHS	691
76	7	69	81	7	67	79	7	65	77	PHS	695
77	7	70	83	7	69	81	7	67	79	PHS	700
78	7	72	85	7	70	83	7	68	81	PHS	704
79	7	73	87	7	72	85	7	70	83	PHS	709
80	7	75	88	7	73	86	7	71	84	PHS	713
81	8	76	89	7	75	88	7	73	86	PHS	718
82	8	78	91	8	76	89	7	74	88	PHS	723
83	8	80	92	8	78	91	8	76	89	PHS	728
84	8	82	93	8	80	92	8	78	91	PHS	734
85	8	84	95	8	82	94	8	80	93	PHS	741
86	9	87	96	8	85	95	8	83	94	PHS	749
87	9	90	97	9	88	96	9	86	96	PHS	757
88	9	94	98	9	92	98	9	89	97	PHS	767
89	9	99	99	9	96	99	9	92	98	PHS	778
90	9	99	99	9	99	99	9	96	99	PHS	792
91	9	99	99	9	99	99	9	99	99	PHS	807
92	9	99	99	9	99	99	9	99	99	PHS	825
93	9	99	99	9	99	99	9	99	99	PHS	846

Raw Score	Number correct	GE Grade Equivalent
S	Stanine	ESS Extended Scale Score
NCE	Normal Curve Equivalent	
PR	Percentile Rank	PHS Post High School

GATES-MACGINITIE NORMS

Level 10/12, Form L
Grade 12

Vocabulary

Raw Score	Grade 12						All Grades	
	Fall		Winter		Spring		GE	ESS
	S	NCE PR	S	NCE PR	S	NCE PR		
0	1	01 01	1	01 01	1	01 01	1.5	378
1	1	01 01	1	01 01	1	01 01	1.6	391
2	1	01 01	1	01 01	1	01 01	1.7	404
3	1	01 01	1	01 01	1	01 01	2.1	417
4	1	01 01	1	01 01	1	01 01	2.4	430
5	1	01 01	1	01 01	1	01 01	2.6	443
6	1	01 01	1	01 01	1	01 01	3.0	456
7	1	01 01	1	01 01	1	01 01	3.4	469
8	1	01 01	1	01 01	1	01 01	3.7	481
9	1	01 01	1	01 01	1	01 01	4.3	493
10	1	01 01	1	01 01	1	01 01	4.6	504
11	1	07 02	1	07 02	1	07 02	5.2	514
12	1	10 03	1	09 03	1	09 03	5.4	523
13	2	12 04	2	12 04	1	12 03	5.7	532
14	2	15 05	2	14 04	2	13 04	6.3	540
15	2	17 06	2	16 06	2	16 05	6.6	548
16	2	19 07	2	18 07	2	18 06	6.9	555
17	2	21 09	2	21 08	2	20 08	7.2	562
18	3	24 11	2	23 10	2	22 09	7.6	569
19	3	26 13	3	25 12	3	24 11	7.9	575
20	3	28 15	3	27 14	3	27 13	8.3	581
21	3	30 18	3	30 17	3	29 16	8.6	587
22	3	33 20	3	32 19	3	31 18	9.1	593
23	4	34 23	3	34 22	3	33 20	9.4	598
24	4	37 26	4	36 25	4	35 23	9.8	604
25	4	39 30	4	38 28	4	37 26	10.2	610
26	4	41 34	4	40 32	4	39 30	10.4	616
27	4	44 38	4	42 36	4	41 33	10.7	622
28	5	46 42	5	44 40	4	43 37	11.2	628
29	5	48 46	5	47 43	5	45 41	11.5	634
30	5	50 50	5	49 47	5	47 44	12.1	640
31	5	52 55	5	51 52	5	49 48	12.5	646
32	5	55 59	5	53 56	5	51 52	12.9	652
33	6	57 63	6	55 60	5	54 57	PHS	659
34	6	60 68	6	58 65	6	56 61	PHS	666
35	6	63 72	6	60 69	6	58 65	PHS	673
36	6	65 76	6	63 73	6	61 69	PHS	680
37	7	68 80	7	65 77	6	63 73	PHS	687
38	7	71 84	7	69 81	7	66 78	PHS	696
39	7	74 88	7	72 85	7	69 82	PHS	705
40	8	78 91	8	75 89	7	73 86	PHS	715
41	8	82 94	8	79 92	8	77 90	PHS	727
42	8	86 95	8	83 94	8	81 93	PHS	740
43	9	90 97	9	88 96	9	86 96	PHS	757
44	9	99 99	9	99 99	9	93 98	PHS	777
45	9	99 99	9	99 99	9	99 99	PHS	799

Scores in the colored band may be chance level scores; see the section "Chance Level Scores."

Comprehension

Raw Score	Grade 12						All Grades	
	Fall		Winter		Spring		GE	ESS
	S	NCE PR	S	NCE PR	S	NCE PR		
0	1	01 01	1	01 01	1	01 01	1.4	316
1	1	01 01	1	01 01	1	01 01	1.4	329
2	1	01 01	1	01 01	1	01 01	1.5	342
3	1	01 01	1	01 01	1	01 01	1.6	355
4	1	01 01	1	01 01	1	01 01	1.6	368
5	1	01 01	1	01 01	1	01 01	1.7	381
6	1	01 01	1	01 01	1	01 01	1.9	394
7	1	01 01	1	01 01	1	01 01	2.1	407
8	1	01 01	1	01 01	1	01 01	2.2	418
9	1	01 01	1	01 01	1	01 01	2.4	429
10	1	08 02	1	08 02	1	08 02	2.5	440
11	1	10 03	1	10 03	1	10 03	2.6	450
12	1	11 03	1	11 03	1	11 03	3.1	461
13	1	11 03	1	11 03	1	11 03	3.3	471
14	2	12 04	2	12 04	2	12 04	3.6	481
15	2	13 04	2	13 04	2	13 04	4.2	492
16	2	15 05	2	15 05	2	15 05	4.4	502
17	2	17 06	2	17 06	2	17 06	4.7	512
18	2	20 08	2	20 08	2	20 08	5.3	522
19	2	23 10	2	23 10	2	23 10	5.6	532
20	3	25 12	3	25 12	3	25 12	6.1	541
21	3	28 15	3	28 15	3	28 15	6.6	551
22	3	31 18	3	30 18	3	30 17	7.2	560
23	3	33 21	3	33 21	3	33 20	7.6	569
24	4	36 25	4	35 24	4	35 23	8.2	577
25	4	38 28	4	37 27	4	37 26	8.6	585
26	4	40 32	4	39 31	4	39 30	9.3	593
27	4	42 35	4	42 34	4	41 33	10.1	601
28	4	44 39	4	43 38	4	43 37	10.4	608
29	5	46 42	5	45 41	5	45 40	10.7	615
30	5	48 46	5	47 45	5	46 43	11.4	622
31	5	50 49	5	49 48	5	48 47	12.0	629
32	5	52 54	5	51 52	5	50 51	12.8	637
33	5	54 57	5	53 56	5	52 54	PHS	644
34	6	56 61	6	55 60	5	54 58	PHS	652
35	6	58 65	6	57 63	6	56 62	PHS	660
36	6	61 69	6	60 68	6	59 66	PHS	669
37	6	63 73	6	62 72	6	61 70	PHS	678
38	7	66 77	6	65 76	6	64 74	PHS	688
39	7	69 81	7	68 80	7	66 78	PHS	699
40	7	72 85	7	71 84	7	70 82	PHS	711
41	8	76 89	7	74 88	7	73 86	PHS	724
42	8	79 92	8	78 91	8	76 89	PHS	737
43	8	83 94	8	82 93	8	80 92	PHS	752
44	9	87 96	8	85 95	8	84 95	PHS	768
45	9	91 97	9	89 97	9	88 96	PHS	785
46	9	96 99	9	95 98	9	93 98	PHS	803
47	9	99 99	9	99 99	9	99 99	PHS	823
48	9	99 99	9	99 99	9	99 99	PHS	845

GATES-MACGINITIE NORMS

Level 10/12, Form L
Grade 12

		Total Score									
		Grade 12									
Raw Score	S	Fall		Winter		Spring		All Grades			
		NCE	PR	S	NCE	PR	S	NCE	PR	GE	ESS
0	1	01	01	1	01	01	1	01	01	1.2	316
1	1	01	01	1	01	01	1	01	01	1.2	321
2	1	01	01	1	01	01	1	01	01	1.2	326
3	1	01	01	1	01	01	1	01	01	1.3	331
4	1	01	01	1	01	01	1	01	01	1.3	336
5	1	01	01	1	01	01	1	01	01	1.3	341
6	1	01	01	1	01	01	1	01	01	1.4	346
7	1	01	01	1	01	01	1	01	01	1.4	352
8	1	01	01	1	01	01	1	01	01	1.5	359
9	1	01	01	1	01	01	1	01	01	1.5	367
10	1	01	01	1	01	01	1	01	01	1.6	375
11	1	01	01	1	01	01	1	01	01	1.6	383
12	1	01	01	1	01	01	1	01	01	1.7	391
13	1	01	01	1	01	01	1	01	01	1.7	399
14	1	01	01	1	01	01	1	01	01	1.9	407
15	1	01	01	1	01	01	1	01	01	2.1	416
16	1	01	01	1	01	01	1	01	01	2.3	424
17	1	01	01	1	01	01	1	01	01	2.4	432
18	1	01	01	1	01	01	1	01	01	2.5	440
19	1	01	01	1	01	01	1	01	01	2.7	447
20	1	01	01	1	01	01	1	01	01	2.9	455
21	1	03	01	1	03	01	1	02	01	3.2	462
22	1	06	02	1	05	02	1	05	02	3.3	469
23	1	07	02	1	07	02	1	06	02	3.5	476
24	1	08	02	1	08	02	1	07	02	3.7	483
25	1	08	02	1	08	02	1	08	02	4.1	489
26	1	08	02	1	08	02	1	08	02	4.3	495
27	1	09	03	1	09	03	1	08	02	4.4	500
28	1	10	03	1	09	03	1	09	03	4.6	506
29	1	11	03	1	11	03	1	10	03	4.7	511
30	2	12	04	1	12	03	1	11	03	5.2	516
31	2	13	04	2	13	04	2	12	04	5.3	521
32	2	15	05	2	14	05	2	14	04	5.5	526
33	2	16	05	2	15	05	2	15	05	5.6	530
34	2	17	06	2	17	06	2	16	05	5.8	534
35	2	19	07	2	18	07	2	17	06	6.2	539
36	2	20	08	2	20	07	2	19	07	6.3	543
37	2	21	09	2	21	08	2	20	08	6.5	547
38	2	22	10	2	22	09	2	21	08	6.6	550
39	3	24	11	2	23	10	2	22	09	6.8	554
40	3	25	12	3	24	11	3	24	11	7.1	558
41	3	27	13	3	26	12	3	25	12	7.3	562
42	3	28	14	3	27	13	3	26	13	7.4	565
43	3	29	16	3	28	15	3	27	14	7.6	569
44	3	30	17	3	29	16	3	28	15	7.7	572
45	3	31	19	3	30	18	3	29	16	8.0	576
46	3	33	20	3	32	19	3	31	18	8.3	580
47	3	34	22	3	33	20	3	32	19	8.4	583
48	4	35	24	3	34	22	3	33	21	8.6	587
49	4	36	25	4	35	24	4	34	23	9.2	591

		Total Score									
		Grade 12									
Raw Score	S	Fall		Winter		Spring		All Grades			
		NCE	PR	S	NCE	PR	S	NCE	PR	GE	ESS
50	4	37	27	4	36	25	4	35	24	9.3	594
51	4	38	29	4	37	27	4	36	26	9.6	598
52	4	40	31	4	39	29	4	38	28	10.1	602
53	4	41	33	4	40	31	4	39	30	10.3	606
54	4	42	35	4	41	34	4	40	32	10.4	610
55	4	43	38	4	42	36	4	41	34	10.6	614
56	5	45	40	4	44	38	4	42	36	10.7	618
57	5	46	42	5	45	40	4	44	38	11.2	622
58	5	47	45	5	46	42	5	45	40	11.4	626
59	5	48	47	5	47	45	5	46	42	11.6	630
60	5	50	49	5	48	47	5	47	44	11.9	634
61	5	51	52	5	50	49	5	48	47	12.3	638
62	5	52	54	5	51	52	5	49	49	12.6	642
63	5	53	56	5	52	54	5	51	51	12.9	646
64	5	55	59	5	53	56	5	52	53	PHS	650
65	6	56	61	5	54	58	5	53	56	PHS	654
66	6	57	63	6	56	61	5	54	58	PHS	658
67	6	58	65	6	57	63	6	55	60	PHS	662
68	6	60	67	6	58	65	6	57	62	PHS	666
69	6	61	70	6	59	67	6	58	64	PHS	670
70	6	62	72	6	61	69	6	59	66	PHS	674
71	6	63	74	6	62	71	6	60	68	PHS	678
72	6	65	76	6	63	73	6	61	70	PHS	682
73	7	66	77	6	64	75	6	63	72	PHS	686
74	7	67	79	6	65	76	6	63	74	PHS	689
75	7	68	81	7	66	78	6	65	76	PHS	693
76	7	70	83	7	68	80	7	66	78	PHS	698
77	7	71	84	7	69	82	7	67	80	PHS	702
78	7	72	86	7	71	84	7	69	81	PHS	706
79	7	74	87	7	72	85	7	70	83	PHS	711
80	8	75	89	7	74	87	7	72	85	PHS	715
81	8	77	90	8	75	89	7	74	87	PHS	721
82	8	79	92	8	77	90	8	75	89	PHS	726
83	8	81	93	8	79	92	8	77	90	PHS	732
84	8	83	94	8	82	93	8	80	92	PHS	739
85	9	86	96	8	84	95	8	82	94	PHS	746
86	9	89	97	9	87	96	8	85	95	PHS	754
87	9	92	98	9	90	97	9	88	96	PHS	762
88	9	97	99	9	94	98	9	91	97	PHS	772
89	9	99	99	9	97	99	9	94	98	PHS	783
90	9	99	99	9	99	99	9	97	99	PHS	795
91	9	99	99	9	99	99	9	99	99	PHS	809
92	9	99	99	9	99	99	9	99	99	PHS	826
93	9	99	99	9	99	99	9	99	99	PHS	846

Raw Score	Number correct	GE	Grade Equivalent
S	Stanine	ESS	Extended Scale Score
NCE	Normal Curve Equivalent		
PR	Percentile Rank	PHS	Post High School

APPENDIX D

EXAMPLES OF SPELLING TEST RESULTS

Diagnostic Spelling Test

- | | |
|-------------------------------|------------------------------------|
| 1. bookkeeper | 26. dropped |
| 2. disappear | 27. occurred |
| 3. monkeys | 28. continuous |
| 4. quality | 29. defendant |
| 5. bushes (plural) | 30. aren't |
| 6. attacked | 31. men's (as in men's work) |
| 7. candidate | 32. fourth (as in the fourth word) |
| 8. quantity | 33. forty-four |
| 9. studying | 34. potatoes |
| 10. hundred | 35. cemetery |
| 11. disgusted | 36. proceed |
| 12. destroy | 37. courteous |
| 13. boisterous | 38. devise |
| 14. conference | 39. analyze |
| 15. circumference | 40. embarrass |
| 16. confident | 41. grammar |
| 17. careful | 42. eighty |
| 18. severely | 43. definite |
| 19. loveliness | 44. optimist |
| 20. ladies (as in two ladies) | 45. flexible |
| 21. believe | 46. delicious |
| 22. coming | 47. narrative |
| 23. valuable | 48. testimonial |
| 24. accidentally | 49. acceptable |
| 25. frolicked | 50. villain |

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publisher.

Examples of Phonetic Misspellings From the
Spelling 1500 Diagnostic Spelling Test

Phonetic misspellings were determined by the following criteria:

1. Addition or deletion of syllables.
2. Letter omissions, deletions, or substitutions that change the pronunciation of the word (nonphonetic substitution).
3. Deletion or addition of suffixes.
4. Failure even to attempt the spelling of a word.
5. Word substitution (i.e., curious for courteous).

Phonetic misspellings were marked by an asterisk (*), the total number of which were noted separately from the number of overall misspellings on each of the tests included in Appendix D. The list of words dictated, from Spelling 1500, appears on page 136.

30

16 phonetic misspellings

1. bookkeeper ✓
2. disappear ✓
3. monkeys ✓
- * 4. quality ✓
5. bushes ✓
- * 6. attack ✓
- * 7. candidate ✓
- * 8. quantity ✓
9. studying ✓
10. hundred ✓
11. discustad ✓
12. destroy ✓
- * 13. boyenish ✓
- * 14. conference ✓
- * 15. sir conferrans ✓
16. confidant ✓
17. careful ✓
18. sexualy ✓
19. lovelyness ✓
20. ladies ✓
21. Believe ✓
22. comming ✓
- * 23. unvible ✓
- * 24. accindently ✓
- * 25. familic ✓
26. drooped ✓
27. occuaried ✓
- * 28. continas ✓
29. defendent ✓
30. arent ✓
31. menis ✓
32. fourth ✓
33. forty-four ✓
34. potatos ✓
35. comatary ✓
36. proceed ✓
- * 37. curtis ✓
38. deuse ✓
39. analysis ✓
- * 40. Emphaasis ✓
41. Gramma ✓
42. eighty ✓
- * 43. dealwite ✓
44. optimist ✓
45. flexible ✓
46. delesious ✓
47. narritive ✓
- * 48. Teatomonica ✓
49. exceptible ✓
- * 50. villian ✓

11 phonetic misspellings

-25

- | | | | | |
|--------|---------------------------|-----------------|--------|-------------------------------|
| 1 | bookkeeper | | (26) | protection accused |
| (2) | disappear | | * (27) | continuous |
| 3 | monkeys | | (28) | dependent |
| 4 | quality | | 29 | aren't |
| 5 | pushes | | (30) | |
| 6 | attacked | | (31) | mens |
| (7) | candidate | -1 | (32) | fourty-fourth |
| 8 | studying | quantity v | 33-61 | almost |
| 9 | hundred | (missed a word) | 34 | potatoes |
| * (10) | disquieted | 5.71'64 | * (35) | semestary |
| 11 | destroy | | 36 | proceed |
| (12) | boistrous | | * (37) | countous |
| 13 | conference | | 38 | devise |
| 14 | circumference | | (39) | analize |
| 15 | confident | | * (40) | emburassed |
| 16 | careful | | (41) | 90 grammer |
| * (17) | selvely | | 42 | eighty |
| (18) | lovelyness | | * (43) | defent |
| 19 | lides | | * (44) | ottomous |
| 20 | believe | | 45 | flexible |
| 21 | coming | | * (46) | delious |
| 22 | valuable | | 47 | manitive |
| (23) | accidently | | 48 | testimonial |
| * (24) | frack frockled | | 49 | acceptable |
| 25 | droop drooper | | * (50) | villian |

11 phonetic misspellings

-28

- | | | |
|-----------------|-----------------|--|
| 1) Bookkeeper | * ⑩) confereent | 31) men's |
| * ②) Disapper | 17) CAREFUL | ③②) fourty fourtr
thirty three-
Sixynine |
| 3) Monkeys | ⑪) sevierly | Almost |
| 4) QUALITY | ⑫) louliness | 34) potatoes |
| 5) Buses | 20) lAdies | ③⑤) cemetery |
| * ④) Attracted | 21) Believe | 36) proceed |
| 7) Candidate | ⑬) Comming | * ③⑧) Divies |
| 8) QUANTITY | 23) VALUABLE | * ③⑨) ANALies |
| ⑨) studing | ⑭) Accidently | ④⑩) embarASS |
| 10) Hundred | * ⑮) Fratic | ④⑪) Grammer |
| * ⑪) Discussed | 26) Dropped | 42) eighty |
| ⑫) Distroy | 27) Accured | * ④③) Denfinite |
| * ⑬) Bystines | * ⑯) continuous | * ④④) Optimous |
| ⑭) Confrence | 29) Defendant | 45) Flexible |
| ⑮) concumfrions | 30) Aren't | * ④⑥) Delicous |
| | | ④⑦) naritive |
| | | 48) testimonIAL |
| | | ④⑨) exceptible |
| | | ⑤①) villan |

-28

9 phonetic misspellings

-23-

- | | |
|----------------------------------|---------------------------------|
| 1 bookkeeper | (26) photos occurred |
| (2) disappear | * (27) continuous |
| 3 monkeys | (28) dependent |
| 4 quality | 29 aren't |
| 5 bushes | (30) |
| 6 attacked | (31) mens |
| (7) ? candidate | (32) forty-fourth |
| 8 studying | 33-61 almost |
| 9 hundred | 34 potatoes |
| * (10) disquieted | * (35) semestary |
| 11 destroy | 36 proceed |
| (12) boistrous | (37) countous |
| 13 conference | 38 devise |
| 14 circumference | (39) analize |
| 15 confident | (40) embarassed |
| 16 careful | (41) 930 grammer |
| * (17) selvely | 42 eighty |
| (18) lovelyness | * (43) defent |
| 19 lides | * (44) obtomous |
| 20 believe | 45 flexible |
| 21 coming | * (46) delious |
| 22 valuable | (47) munitive |
| (23) accidently | 48 testimonial |
| * (24) frack frockled | 49 .acceptable |
| 25 drooo dropper | * (50) vullian |

-31

8 phonetic misspellings

- | | | | |
|------|-----------------|------|--------------|
| 1 | Bookkeeper | 33 | forty fourth |
| 2 | disapper | 34 | potatoes |
| 3 | managers | 35 | cemetery |
| 4 | quality | 36 | proceed |
| 5 | hush | 37 | centious |
| * 6 | attacker | 38 | divisel |
| * 7 | candidate | 39 | antiles |
| 8 | quantity | 40 | embaras |
| 9 | studying | 41 | quahmer |
| 10 | hundred | 42 | eightly |
| 11 | disgusted | 43 | debinate |
| 12 | distray destroy | * 44 | optimous |
| * 13 | bortorous | 45 | flexible |
| 14 | confrance | 46 | delishous |
| 15 | cercompence | 47 | restive |
| 16 | confident | * 48 | testimant |
| 17 | careful | 49 | acceptable |
| 18 | severely | 50 | viler |
| 19 | lovelyness | | |
| 20 | ladies | | |
| 21 | believe | | |
| 22 | comming | | |
| 23 | valuable | | |
| 24 | accidently | | accidently |
| * 25 | fralic | | |
| 26 | droppel | | |
| 27 | accured | | |
| 28 | continuous | | |
| 29 | dependent | | |
| 30 | are it | | |
| 31 | meno | | |
| 32 | fourth | | |

8
phonetic misspellings

- .27
- | | |
|--------------------|----------------------|
| ① bookkeeper | 26 dropped |
| ② disappear | ✓27 occurred |
| ③ monkeys | *28 continuous |
| ④ quality | ✓29 defendant |
| ⑤ bushes | 30 avert |
| ⑥ attacked | 31 men's |
| ✓7 candidates | 32 fourth |
| 8 quantity | 33 fortyfour |
| 9 studying | 34 potatoes |
| 10 hundred | *✓35 secretary |
| 11 disgusted | 36 people |
| ✓12 destroy | ✓37 curious |
| *13 mysterious | 38 divide |
| 14 conference | ✓39 analyze |
| 15 circumference | ✓40 embarrass |
| 16 confident | ✓41 grammar |
| 17 careful | 42 eighty |
| ✓18 severely | *43 department |
| ✓19 loveliness | *44 opponent |
| 20 ladies | *45 fixable |
| 21 believe believe | *✓46 delicious |
| 22 coming | ✓47 narrative |
| ✓23 valuable | ✓48 testimonial |
| ✓24 accidentally | ✓49 exreptible |
| 25 frolicked | *✓50 William |

7 phonetic misspellings

29

1 Bookkeeper	33	patatoes
2 disapear	34	Cemetary
3 Monkeys	35	proceed
* 4 Quality	36	Couctious
5 Bushes	37	devisc
6 Attact	38	Anulize
* 7 Canidate	39	↳
8 Quantity	40	embaress
9 Studying	41	grammer
10 hundred	42	eighty
11 discusstid	43	definst
12 destroy	44	optimist
13 Boystres	45	flexable
14 Conference	* 46	deisus
* 15 Sirconference	* 47	anaritje
16 Confident	48	testimonial
17 Careful	49	exceptable
* 18 Civerally	50	Villen
19 Loveliness		
20 Ladies		
21 Believe		
22 Coming		
23 Valueble		
24 Accedently		
25 Fralict		
26 drojped		
27 Accured		
* 28 Continimas		
29 defendint		
30 Aren't		
31 Niens		
32. forth forty four		

30

12 phonetic misspellings

- | | | |
|---|-------------------------------------|--|
| 1. bookkeeper | | (27) occurred |
| 2. Disappear | | (28) continuess |
| 3. monkeys | | 29. defendent |
| 4. quality | | 30. aren't |
| 5. bushes bushes ^{bushes} | bushes ^{bushes} | (31) mens |
| 6. attacked | | (32) forth |
| * (7) candidate | | (33) forty four |
| * (8) quantity | | 34. potatoes |
| (9) studing | | (35) cemetary |
| 10. hundred | | (36) procede |
| * (11) disquistad | | (37) curties |
| 12. destroy | | (38) devize |
| * (13) boirstest | | * (39) cantha angelize |
| 14. conference | | (40) embarass |
| 15. circumference | | (41) grammer |
| 16. confident | | 42. est eighty |
| 17. careful | | * (43) definte |
| (18) severly | | (44) optamist |
| * (19) lowiness | | (45) flexable |
| 20. ladies | | (46) detrou ^{delicious} delicious delicious delicious |
| * (21) belive | | 47. narrow narrative |
| 22. coming | | * (48) testimonal |
| * (23) vauable | | * (49) accetable |
| (24) accidently | | (50) vilan |
| * (25) frolicted | | |
| 26. dropped | | |

13 phonetic
misspellings

- | | |
|----------------------|-----------------|
| ① bookkeeper | * 29. defentent |
| ② disappeared | 30. aren't |
| ③ monkeys | 31. men's |
| 4. Quality. | ③2 forth |
| 5. bushes | ③3 fortyfour |
| 6. attacked | 34 potatoes |
| * ⑦ Candidate | 35 Cemetery |
| * ⑧ quantity | ③6 procede |
| * ⑨ Studied | 37 Courteous |
| 10. hundred | * ③8 |
| 11. disqusted | * ③9 Anayfase |
| ⑫ destroyed | 40 embarrase |
| 13. boisterous | 41 grammar |
| 14. Conference | 42 eighty |
| * ⑮ Circumunce | * ④3 defenient |
| * 16. Confiendent | ④4 |
| 17. careful | * 45 feible |
| ⑰ severly | 46 delicious |
| 19. loveliness | 47 narative |
| 20. ladies | * ④8 testamonal |
| 21. believe | 49 acceptable |
| 22. Coming | * ⑤0 villian |
| ⑳ variable | |
| ㉑ accidently | |
| * ㉒ frocil | |
| 26. dropped | |
| 27. occurred | |
| ㉘ Contane Continuous | |

-29

15 phonetic misspellings

Voc. spell

1	bookkeeper -	31	men's
2	Disappear -	32	fourth, forty, four
3	mankies -	33	
4	quality	34	potatoes
5	bushes	* 35	cementary -
6	attacked	36	proceed
* 7	candidate -	* 37	conitions -
* 8	quantity -	38	deise
9	studing -	39	anylyze / anylyze
10	hundred	40	embrassas -
* 11	disaccused -	41	grammer -
12	distroy -	42	eighty
13	boistais -	* 43	deffient -
? * 14	confrence -	44	optimist
* 15	surcumfrence -	* 45	flexiable -
16	confident	46	delious, delicious
17	careful	* 47	romantic, narrative
18	severly -	* 48	testimonily -
19	loveliness -	49	exceptable -
20	ladies	* 50	villian -
21	believe		
22	comming -		
23	that valuable		
* 24	accidently -		
* 25	foolic -		
26	dropped		
27	accused -		
* 28	continuous -		
29	defendant		
30	aren't		

12 phonetic misspellings

- | | |
|---|-----------------------------------|
| 1. bookkeeper | 26 dropped |
| 2. Disappear | 27 occurred |
| ③ Monkeys | 28 Continuous |
| 4. Quality | 29 defendant defendant |
| 5. bushes | * ③⑩ ART |
| 6. attacked | 31 men's |
| 7. Candidate | 32 fourth |
| ⑧ Quantities Quantities | 33 forty-four |
| 9. Studying | 34 potatoes |
| 10. hunc hundred | 35 cemetary cemetery |
| * ⑪ discussed | 36 proceed |
| ⑫ distroy | * ③⑦ curious |
| * ⑬ boustry | 38 devise |
| 14. Conference | * ③⑨ Anterlize |
| * ⑮ Surconference | ④① Embarest - Embarest |
| 16. Confident | 41 Grammar |
| 17. Careful | 42 Eighty |
| * ⑱ Survicely - Survicely | 43 definite |
| * ⑲ Loveness | 44 Optimist Optimist |
| 20. ladies | 45 flexible |
| 21. believe | * ④⑥ delicious del |
| 22. Learning - Learning | ④⑦ narrative |
| 23. Valuable | * ④⑧ testamony |
| ④② accidently - accidently | 49 Acceptable - 18 |
| * ④⑤ flowlet | * ⑤⑩ villian villain |

Example of Severe Spelling Disability

- | | |
|--------------------------|--------------------------------|
| 1. Book Keeper | 33. sixty nine almost |
| * 2. disappear | * 34. potato potato |
| 3. monkeys | * 35. seremate |
| * 4. quashy | * 36. prosicore |
| * 5. burck | * 37. divine |
| * 6. atack | * 38. divine |
| * 7. candate | * 39. grammer |
| 8. qualite | * 40. es. thy |
| * 9. study | * 41. adigze |
| 10. hundred | * 42. flexible |
| * 11. disguide | * 43. dilice |
| * 12. dix | * 44. amafed |
| * 13. vious see | * 45. testormer |
| * 14. comf | * 46. oratable |
| * 15. surcomtum | * 47. vienz |
| * 16. convicted | |
| * 17. carform | |
| * 18. surrender | |
| 19. lovolynise | |
| * 20. lady | |
| * 21. Belived | |
| 22. coming | |
| * 23. valung | |
| * 24. actindy | |
| * 25. falney | |
| 26. dropped | |
| * 27. acurlid | |
| * 28. men | |
| * 29. de factod | |
| * 30. arn arn | |
| 31. mens mens | |
| * 32. forty | |

Examples of Focus on Spelling Diagnostic Spelling Test

(See pages 120-123 for a copy of the master test.)

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the possibilities. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list. After you have finished the test, follow the directions at the end to determine the result.

- | | | | |
|----------------|-------------|-------------|-------------|
| 1. various | various | various | various |
| 2. women | women | women | women |
| 3. usually | usually | usually | usually |
| 4. actually | actually | actually | actually |
| 5. business | business | business | business |
| 6. studying | studying | studying | studying |
| 7. judgment | judgment | judgment | judgment |
| 8. competition | competition | competition | competition |
| 9. committee | committee | committee | committee |
| 10. stopped | stopped | stopped | stopped |
| 11. opposite | opposite | opposite | opposite |
| 12. grammar | grammar | grammar | grammar |
| 13. theories | theories | theories | theories |
| 14. believe | believe | believe | believe |
| 15. government | government | government | government |
| 16. analysis | analysis | analysis | analysis |
| 17. neighbor | neighbor | neighbor | neighbor |
| 18. certainly | certainly | certainly | certainly |
| 19. finally | finally | finally | finally |
| 20. activities | activities | activities | activities |

PROFICIENCY TEST

- | | | | |
|-----------------|-------------|-------------|-------------|
| 21. opportunity | opportunity | opportunity | opportunity |
| 22. opinion | opinion | opinion | opinion |
| 23. children | children | children | children |
| 24. especially | especially | especially | especially |
| 25. eventually | eventually | eventually | eventually |
| 26. already | already | already | already |
| 27. laboratory | laboratory | laboratory | laboratory |
| 28. extremely | extremely | extremely | extremely |
| 29. disagree | disagree | disagree | disagree |
| 30. conscious | conscious | conscious | conscious |
| 31. benefit | benefit | benefit | benefit |
| 32. becoming | becoming | becoming | becoming |
| 33. committed | committed | committed | committed |
| 34. immediately | immediately | immediately | immediately |
| 35. fundamental | fundamental | fundamental | fundamental |
| 36. receive | receive | receive | receive |
| 37. studies | studies | studies | studies |
| 38. familiar | familiar | familiar | familiar |
| 39. writing | writing | writing | writing |
| 40. environment | environment | environment | environment |
| 41. quantity | quantity | quantity | quantity |
| 42. surprise | surprise | surprise | surprise |
| 43. procedure | procedure | procedure | procedure |
| 44. successful | successful | successful | successful |
| 45. necessary | necessary | necessary | necessary |
| 46. performance | performance | performance | performance |
| 47. practically | practically | practically | practically |
| 48. elementary | elementary | elementary | elementary |
| 49. assistance | assistance | assistance | assistance |
| 50. interrupt | interrupt | interrupt | interrupt |

PROFICIENCY TEST

- ~~81~~ accidentally accidentally accidentally accidentally
- ~~82~~ An over-confident team may (lose loose lose loose) loose
- 83. injuries to the team's players strongly (effected affected affected affected) the conference championship. affected
- ~~84~~ changeable changeable changeable changeable
- 85. eligible eligible eligible eligible
- 86. athlete athlete athlete athlete
- 87. absence absence absence absence
- ~~88~~ Every cloud has (its its' it's) silver lining. it's
- ~~89~~ conscientious conscientious conscientious conscientious
- ~~90~~ argument argument argument argument
- ~~91~~ acquaintance acquaintance acquaintance acquaintance
- 92. privilege privilege privilege privilege
- ~~93~~ occurred occurred occurred occurred
- 94. accommodate accommodate accommodate accommodate
- ~~95~~ similar similar similar similar
- ~~96~~ imitate imitate imitate imitate
- ~~97~~ existence existence existence existence
- ~~98~~ hindrance hindrance hindrance hindrance
- 99. Over-population is one of the (principal principle) causes of war. principle
- 100. occurrence occurrence occurrence occurrence

Percentage score 63.70

To determine your score and identify the words which you have misspelled, check your answers against the key on page 90. Subtract your total number of errors from 100 for your percentage score. If your test score is 77% or below, you probably have a serious problem in basic spelling. If your test score is approximately 88% (the average score for this test), you may consider yourself an average speller. Remember, however, that your aim is to be better than average. You still have room for much improvement. Even if your score is 95% or higher, this performance indicates that there are some words in the Master Word List which you still need to master.

PROFICIENCY TEST

- 51. occasionally occasionally occasionally occasionally
- 52. efficiency efficiency efficiency efficiency
- 53. criticize criticize criticize criticize
- 54. truly truly truly truly
- ~~55~~ separate separate separate separate
- 56. explanation explanation explanation explanation
- 57. rhythm rhythm rhythm rhythm
- 58. approximately approximately approximately approximately
- 59. equipped equipped equipped equipped
- ~~60~~ possess possess possess possess
- 61. definitely definitely definitely definitely
- ~~62~~ disapprove disapprove disapprove disapprove
- ~~63~~ appropriate appropriate appropriate appropriate
- 64. referred referred referred referred
- ~~65~~ chosen chosen chosen chosen
- 66. development development development development
- ~~67~~ undoubtedly undoubtedly undoubtedly undoubtedly
- 68. among among among among
- 69. persuade persuade persuade persuade
- 70. description description description description
- ~~71~~ influential influential influential influential
- ~~72~~ amateur amateur amateur amateur
- ~~73~~ beneficial beneficial beneficial beneficial
- 74. imaginary imaginary imaginary imaginary
- 75. achievement achievement achievement achievement
- 76. analyze analyze analyze analyze
- 77. omitted omitted omitted omitted
- ~~78~~ prominent prominent prominent prominent
- ~~79~~ fulfilled fulfilled fulfilled fulfilled
- ~~80~~ preferred preferred preferred preferred

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the possibilities. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list.

- 1. veritas various women various
- 2. women woman women women
- 3. usally usually usually usually
- 4. actvly actually actually actually
- 5. business business business business
- 6. studing studying studying studying
- 7. jugement judgement judgement judgement
- 8. competition competition competition competition
- 9. committee committee committee committee
- 10. stoped stopped stopped stopped
- 11. opposit opposite opposite opposite
- 12. gramor grammar grammar grammar
- 13. theories theories theories theories
- 14. believe believe believe believe
- 15. government government government government
- 16. enalylis analysis analysis analysis
- 17. neighbor neighbor neighbor neighbor
- 18. certianly certainly certainly certainly
- 19. finally finally finally finally
- 20. activatys activities activities activities

- 21. oportunity opportunity opportunity opportunity
- 22. opinon opinion opinion opinion
- 23. children children children children
- 24. especally especially especially especially
- 25. eventully eventually eventually eventually
- 26. already already already already
- 27. labortory laboratory laboratory laboratory
- 28. extremly extremely extremely extremely
- 29. disagreee disagree disagree disagree
- 30. concious conscious conscious conscious
- 31. benefit benefit benefit benefit
- 32. becomming becoming becoming becoming
- 33. comitted committed committed committed
- 34. immedately immediately immediately immediately
- 35. fundamantal fundamental fundamental fundamental
- 36. receive receive receive receive
- 37. studys studies studies studies
- 38. familar familiar familiar familiar
- 39. writng writing writing writing
- 40. environment environment environment environment
- 41. quantity quantity quantity quantity
- 42. surprize surprise surprise surprise
- 43. procedere procedure procedure procedure
- 44. successfull successful successful successful
- 45. necessary necessary necessary necessary
- 46. performance performance performance performance
- 47. practicy practicaly practicaly practicaly
- 48. elementary elementary elementary elementary
- 49. assistance assistance assistance assistance
- 50. interrpt interrupt interrupt interrupt

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the possibilities. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list.

- 1. varies various
- 2. women women
- 3. usually usually
- 4. actually actually
- 5. business business
- 6. studying studying
- 7. judgement judgement
- 8. competition competition
- 9. committee committee
- 10. stopped stopped
- 11. opposite opposite
- 12. grammar grammar
- 13. theories theories
- 14. believe believe
- 15. government government
- 16. analysis analysis
- 17. neighbor neighbor
- 18. certainly certainly
- 19. finally finally
- 20. activities activities

- 21. opportunity opportunity
- 22. opinion opinion
- 23. children children
- 24. especially especially
- 25. eventually eventually
- 26. already already
- 27. laboratory laboratory
- 28. extremely extremely
- 29. disagree disagree
- 30. conscious conscious
- 31. benefit benefit
- 32. becoming becoming
- 33. committed committed
- 34. immediately immediately
- 35. fundamental fundamental
- 36. receive receive
- 37. studies studies
- 38. familiar familiar
- 39. writing writing
- 40. environment environment
- 41. quantity quantity
- 42. surprise surprise
- 43. procedure procedure
- 44. successful successful
- 45. necessary necessary
- 46. performance performance
- 47. practically practically
- 48. elementary elementary
- 49. assistance assistance
- 50. interrupt interrupt

Various
women
usually
actually
business
studying
Judgement
Competition
Committee
Stopped
opposite
grammar
theories
believe
government
analysis
Neighbor
certainly
finally
activities

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the possibilities. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list.

- | | | | |
|----------------|-------------|-------------|-------------|
| 1. varies | various | various | VARIOUS |
| 2. wemen | women | women | WOMEN |
| 3. evily | evenly | evenly | EVENLY |
| 4. actvily | actively | actively | ACTIVELY |
| 5. business | business | business | BUSINESS |
| 6. studing | studying | studying | STUDYING |
| 7. jdgement | judgment | judgment | JUDGMENT |
| 8. competition | competition | competition | COMPETITION |
| 9. committee | committee | committee | COMMITTEE |
| 10. stoped | stopped | stopped | STOPPED |
| 11. opposit | opposite | opposite | OPPOSITE |
| 12. gramor | grammar | grammar | GRAMMAR |
| 13. theorist | theories | theories | THEORIES |
| 14. believe | believe | believe | BELIEVE |
| 15. government | government | government | GOVERNMENT |
| 16. analysis | analysis | analysis | ANALYSIS |
| 17. neighbor | neighbor | neighbor | NEIGHBOR |
| 18. certnily | certainly | certainly | CERTAINLY |
| 19. finally | finally | finally | FINALLY |
| 20. activites | activities | activities | ACTIVITIES |

- | | | | |
|-----------------|-------------|-------------|-------------|
| 21. oportunity | opportunity | opportunity | OPPORTUNITY |
| 22. opinon | opinion | opinion | OPINION |
| 23. children | children | children | CHILDREN |
| 24. especaly | especially | especially | ESPECIALLY |
| 25. eventully | eventually | eventually | EVENTUALLY |
| 26. already | already | already | ALREADY |
| 27. labortory | laboratory | laboratory | LABORATORY |
| 28. extremly | extremely | extremely | EXTREMELY |
| 29. disagre | disagree | disagree | DISAGREE |
| 30. conscous | conscious | conscious | CONSCIOUS |
| 31. benefi | benefit | benefit | BENEFIT |
| 32. becomming | becoming | becoming | BECOMING |
| 33. comitted | committed | committed | COMMITTED |
| 34. immedately | immediately | immediately | IMMEDIATELY |
| 35. fundamantal | fundamental | fundamental | FUNDAMENTAL |
| 36. receive | receive | receive | RECEIVE |
| 37. studis | studies | studies | STUDIES |
| 38. familar | familiar | familiar | FAMILIAR |
| 39. writng | writing | writing | WRITING |
| 40. envierment | environment | environment | ENVIRONMENT |
| 41. quonty | quantity | quantity | QUANTITY |
| 42. surpris | surprise | surprise | SURPRISE |
| 43. procedur | procedure | procedure | PROCEDURE |
| 44. successul | successful | successful | SUCCESSFUL |
| 45. necessary | necessary | necessary | NECESSARY |
| 46. performace | performance | performance | PERFORMANCE |
| 47. practicy | practically | practically | PRACTICALLY |
| 48. elementry | elementary | elementary | ELEMENTARY |
| 49. assistace | assistance | assistance | ASSISTANCE |
| 50. interupt | interrupt | interrupt | INTERRUPT |

51. occasionally OCCASIONALLY
 52. efficiency EFFICIENCY
 53. criticize CRITICIZE
 54. truly TRULY
 55. separate SEPARATE
 56. explanation EXPLANATION
 57. rhythm RHYTHM
 58. approximately APPROXIMATELY
 59. equipped EQUIPPED
 60. process PROCESSES
 61. definitely DEFINITELY
 62. disapprove DISAPPROVE
 63. appropriate APPROPRIATE
 64. referred REFERRED
 65. chosen CHOSEN
 66. development DEVELOPMENT
 67. undeniably UNDENIABLY
 68. among AMONG
 69. persuade PERSUADE
 70. description DESCRIPTION
 71. influential INFLUENTIAL
 72. amateur AMATEUR
 73. beneficial BENEFICIAL
 74. imaginary IMAGINARY
 75. achievement ACHIEVEMENT
 76. analyze ANALYZE
 77. omitted OMITTED
 78. prominent PROMINENT
 79. fulfilled FULFILLED
 80. preferred PREFERRED
- occasionally occasionally
 efficiency efficiency
 criticize criticize
 truly truly
 separate separate
 explanation explanation
 rhythm rhythm
 approximately approximately
 equipped equipped
 process process
 definitely definitely
 disapprove disapprove
 appropriate appropriate
 referred referred
 chosen chosen
 development development
 undeniably undeniably
 among among
 persuade persuade
 description description
 influential influential
 amateur amateur
 beneficial beneficial
 imaginary imaginary
 achievement achievement
 analyze analyze
 omitted omitted
 prominent prominent
 fulfilled fulfilled
 preferred preferred
81. excitedly excitedly
 82. An over-confident team may (lose/beat/has/loss) the game. LOSE
 83. injuries to the team's players strongly (affected/affected effected/affected effected)-the conference championship. EFFECTED
 84. changeable changeable
 85. eligible eligible
 86. athlete athlete
 87. absence absence
 88. Every cloud has (in/has/is's/it's) silver lining. ITS
 89. conscientious conscientious
 90. argument argument
 91. acquaintance acquaintance
 92. privilege privilege
 93. occurred occurred
 94. accommodate accommodate
 95. similar similar
 96. imitate imitate
 97. existence existence
 98. hindrance hindrance
 99. Over-population is one of the (perpetrated/principled/principle/principled) causes of war. PRINCIPLE
 100. occurrence occurrence
 Percentage score 59%
- occasionally OCCASIONALLY
 efficiency EFFICIENCY
 criticize CRITICIZE
 truly TRULY
 separate SEPARATE
 explanation EXPLANATION
 rhythm RHYTHM
 approximately APPROXIMATELY
 equipped EQUIPPED
 process PROCESSES
 definitely DEFINITELY
 disapprove DISAPPROVE
 appropriate APPROPRIATE
 referred REFERRED
 chosen CHOSEN
 development DEVELOPMENT
 undeniably UNDENIABLY
 among AMONG
 persuade PERSUADE
 description DESCRIPTION
 influential INFLUENTIAL
 amateur AMATEUR
 beneficial BENEFICIAL
 imaginary IMAGINARY
 achievement ACHIEVEMENT
 analyze ANALYZE
 omitted OMITTED
 prominent PROMINENT
 fulfilled FULFILLED
 preferred PREFERRED
- excitedly excitedly
 An over-confident team may (lose/beat/has/loss) the game.
 injuries to the team's players strongly (affected/affected effected/affected effected)-the conference championship.
 changeable changeable
 eligible eligible
 athlete athlete
 absence absence
 Every cloud has (in/has/is's/it's) silver lining.
 conscientious conscientious
 argument argument
 acquaintance acquaintance
 privilege privilege
 occurred occurred
 accommodate accommodate
 similar similar
 imitate imitate
 existence existence
 hindrance hindrance
 Over-population is one of the (perpetrated/principled/principle/principled) causes of war.
 occurrence occurrence
 Percentage score 59%

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the possibilities. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list.

- | | | | |
|----------------|-------------|-------------|-------------|
| 1. various | various | various | various |
| 2. women | women | women | women |
| 3. usually | usually | usually | usually |
| 4. actually | actually | actually | actually |
| 5. business | business | business | business |
| 6. studying | studying | studying | studying |
| 7. judgement | judgment | judgment | judgment |
| 8. competition | competition | competition | competition |
| 9. committee | committee | committee | committee |
| 10. stopped | stopped | stopped | stopped |
| 11. opposite | opposite | opposite | opposite |
| 12. grammar | grammar | grammar | grammar |
| 13. theories | theories | theories | theories |
| 14. believe | believe | believe | believe |
| 15. government | government | government | government |
| 16. analysis | analysis | analysis | analysis |
| 17. neighbor | neighbor | neighbor | neighbor |
| 18. certainly | certainly | certainly | certainly |
| 19. finally | finally | finally | finally |
| 20. activities | activities | activities | activities |

- | | | | |
|-----------------|-------------|-------------|-------------|
| 21. opportunity | opportunity | opportunity | opportunity |
| 22. opinion | opinion | opinion | opinion |
| 23. children | children | children | children |
| 24. especially | especially | especially | especially |
| 25. eventually | eventually | eventually | eventually |
| 26. already | already | already | already |
| 27. laboratory | laboratory | laboratory | laboratory |
| 28. extremely | extremely | extremely | extremely |
| 29. disagree | disagree | disagree | disagree |
| 30. conscious | conscious | conscious | conscious |
| 31. benefit | benefit | benefit | benefit |
| 32. becoming | becoming | becoming | becoming |
| 33. committed | committed | committed | committed |
| 34. immediately | immediately | immediately | immediately |
| 35. fundamental | fundamental | fundamental | fundamental |
| 36. receive | receive | receive | receive |
| 37. studies | studies | studies | studies |
| 38. familiar | familiar | familiar | familiar |
| 39. writing | writing | writing | writing |
| 40. environment | environment | environment | environment |
| 41. quantity | quantity | quantity | quantity |
| 42. surprise | surprise | surprise | surprise |
| 43. procedure | procedure | procedure | procedure |
| 44. successful | successful | successful | successful |
| 45. necessary | necessary | necessary | necessary |
| 46. performance | performance | performance | performance |
| 47. practically | practically | practically | practically |
| 48. elementary | elementary | elementary | elementary |
| 49. assistance | assistance | assistance | assistance |
| 50. interrupt | interrupt | interrupt | interrupt |

various
women
usually
actually
business
studying
judgment
competition
committee
stopped
opposite
grammar
theories
believe
government
analysis
neighbor
certainly
finally
activities

- 51. occasionally occasionally occasionally occasionally occasionally
- 52. efficiency efficiency efficiency efficiency efficiency
- 53. criticize criticize criticize criticize criticize
- 54. truly truly truly truly truly
- 55. separate separate separate separate separate
- 56. explanation explanation explanation explanation explanation
- 57. rhythm rhythm rhythm rhythm rhythm
- 58. approximately approximately approximately approximately approximately
- 59. equipped equipped equipped equipped equipped
- 60. process process process process process
- 61. definitely definitely definitely definitely definitely
- 62. disapprove disapprove disapprove disapprove disapprove
- 63. appropriate appropriate appropriate appropriate appropriate
- 64. referred referred referred referred referred
- 65. chosen chosen chosen chosen chosen
- 66. development development development development development
- 67. undoubtedly undoubtedly undoubtedly undoubtedly undoubtedly
- 68. among among among among among
- 69. persuade persuade persuade persuade persuade
- 70. description description description description description
- 71. influential influential influential influential influential
- 72. amateur amateur amateur amateur amateur
- 73. beneficial beneficial beneficial beneficial beneficial
- 74. imaginary imaginary imaginary imaginary imaginary
- 75. achievement achievement achievement achievement achievement
- 76. analyze analyze analyze analyze analyze
- 77. omitted omitted omitted omitted omitted
- 78. prominent prominent prominent prominent prominent
- 79. fulfilled fulfilled fulfilled fulfilled fulfilled
- 80. preferred preferred preferred preferred preferred
- 81. occasionally occasionally occasionally occasionally occasionally
- 82. An over-confident team may (lose less lose losses) lose
- 83. injuries to the team's players strongly (affected affected affected affected affected) the conference championship. affected
- 84. changeable changeable changeable changeable changeable
- 85. eligible eligible eligible eligible eligible
- 86. athlete athlete athlete athlete athlete
- 87. absence absence absence absence absence
- 88. Every cloud has (its its its its its) silver lining. it's
- 89. conscientious conscientious conscientious conscientious conscientious
- 90. argument argument argument argument argument
- 91. equivalence equivalence equivalence equivalence equivalence
- 92. privilege privilege privilege privilege privilege
- 93. scored scored scored scored scored
- 94. accommodate accommodate accommodate accommodate accommodate
- 95. similar similar similar similar similar
- 96. imitate imitate imitate imitate imitate
- 97. existence existence existence existence existence
- 98. hindrance hindrance hindrance hindrance hindrance
- 99. Over-population is one of the (principal principle) causes of war. principle
- 100. occurrence occurrence occurrence occurrence occurrence Percentage score 88%

- occasionally occasionally occasionally occasionally occasionally
- efficiency efficiency efficiency efficiency efficiency
- criticize criticize criticize criticize criticize
- truly truly truly truly truly
- separate separate separate separate separate
- explanation explanation explanation explanation explanation
- rhythm rhythm rhythm rhythm rhythm
- approximately approximately approximately approximately approximately
- equipped equipped equipped equipped equipped
- process process process process process
- definitely definitely definitely definitely definitely
- disapprove disapprove disapprove disapprove disapprove
- appropriate appropriate appropriate appropriate appropriate
- referred referred referred referred referred
- chosen chosen chosen chosen chosen
- development development development development development
- undoubtedly undoubtedly undoubtedly undoubtedly undoubtedly
- among among among among among
- persuade persuade persuade persuade persuade
- description description description description description
- influential influential influential influential influential
- amateur amateur amateur amateur amateur
- beneficial beneficial beneficial beneficial beneficial
- imaginary imaginary imaginary imaginary imaginary
- achievement achievement achievement achievement achievement
- analyze analyze analyze analyze analyze
- omitted omitted omitted omitted omitted
- prominent prominent prominent prominent prominent
- fulfilled fulfilled fulfilled fulfilled fulfilled
- preferred preferred preferred preferred preferred
- occasionally occasionally occasionally occasionally occasionally
- lose
- affected
- changeable
- eligible
- athlete
- absence
- it's
- conscientious
- argument
- equivalence
- privilege
- scored
- accommodate
- similar
- imitate
- existence
- hindrance
- principle
- occurrence
- Percentage score 88%

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the correct spelling. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list.

- | | | | |
|----------------|-------------|-------------|-------------|
| 1. varies | various | various | VARIOUS |
| 2. women | women | women | WOMEN |
| 3. usually | usually | usually | USUALLY |
| 4. actually | actually | actually | ACTUALLY |
| 5. business | business | business | BUSINESS |
| 6. studying | studying | studying | STUDYING |
| 7. judgment | judgment | judgment | JUDGMENT |
| 8. competition | competition | competition | COMPETITION |
| 9. committee | committee | committee | COMMITTEE |
| 10. stopped | stopped | stopped | STOPPED |
| 11. opposite | opposite | opposite | OPPOSITE |
| 12. grammar | grammar | grammar | GRAMMAR |
| 13. theories | theories | theories | THEORIES |
| 14. believe | believe | believe | BELIEVE |
| 15. government | government | government | GOVERNMENT |
| 16. analysis | analysis | analysis | ANALYSIS |
| 17. neighbor | neighbor | neighbor | NEIGHBOR |
| 18. certainty | certainty | certainty | CERTAINTY |
| 19. finally | finally | finally | FINALLY |
| 20. activities | activities | activities | ACTIVITIES |

- | | | | |
|-----------------|-------------|-------------|-------------|
| 21. opportunity | opportunity | opportunity | OPPORTUNITY |
| 22. opinion | opinion | opinion | OPINION |
| 23. children | children | children | CHILDREN |
| 24. especially | especially | especially | ESPECIALLY |
| 25. eventually | eventually | eventually | EVENTUALLY |
| 26. already | already | already | ALREADY |
| 27. laboratory | laboratory | laboratory | LABORATORY |
| 28. extremely | extremely | extremely | EXTREMELY |
| 29. disagree | disagree | disagree | DISAGREE |
| 30. conscious | conscious | conscious | CONSCIOUS |
| 31. benefit | benefit | benefit | BENEFIT |
| 32. becoming | becoming | becoming | BECOMING |
| 33. committed | committed | committed | COMMITTED |
| 34. immediately | immediately | immediately | IMMEDIATELY |
| 35. fundamental | fundamental | fundamental | FUNDAMENTAL |
| 36. receive | receive | receive | RECEIVE |
| 37. studies | studies | studies | STUDIES |
| 38. familiar | familiar | familiar | FAMILIAR |
| 39. writing | writing | writing | WRITING |
| 40. environment | environment | environment | ENVIRONMENT |
| 41. quantity | quantity | quantity | QUANTITY |
| 42. surprise | surprise | surprise | SURPRISE |
| 43. procedure | procedure | procedure | PROCEDURE |
| 44. successful | successful | successful | SUCCESSFUL |
| 45. necessary | necessary | necessary | NECESSARY |
| 46. performance | performance | performance | PERFORMANCE |
| 47. practice | practice | practice | PRACTICE |
| 48. elementary | elementary | elementary | ELEMENTARY |
| 49. assistance | assistance | assistance | ASSISTANCE |
| 50. interrupt | interrupt | interrupt | INTERRUPT |

occasionally accidentally occasionally accidentally
 82. An over-confident team may (lose less loss) LOSE
 the game. effecte
 83. Injuries to the team's players strongly (affected af- fected affected affected) the conference champion- ship. changeable
 84. changeable changeable changeable changeable changeable
 85. eligible eligible eligible eligible eligible
 86. athlete athlete athlete athlete athlete
 87. absence absence absence absence absence
 88. Every cloud has (its its its its) silver lining. its
 89. conscientious conscientious conscientious conscientious CONSCIENTIOUS
 90. argument argument argument argument ARGUMENT
 91. equivalence equivalence equivalence equivalence equivalence
 92. privilege privilege privilege privilege privilege
 93. occurred occurred occurred occurred occurred
 94. accommodate accommodate accommodate accommodate accommodate
 95. similar similar similar similar similar
 96. imitate imitate imitate imitate imitate
 97. existence existence existence existence existence
 98. hindrance hindrance hindrance hindrance hindrance
 99. Over-population is one of the (principal principle principal principle) causes of war. principle
 100. occurrence occurrence occurrence occurrence occurrence
 Percentage score 61%

OCCASIONALLY
 OCCASIONALLY
 51. occasionally occasionally occasionally occasionally
 52. efficiency efficiency efficiency efficiency EFFICIENCY
 53. criticize criticize criticize criticize CRITICIZE
 54. truly truly truly truly truly
 55. separate separate separate separate separate
 56. explanation explanation explanation explanation EXPLANATION
 57. rhythm rhythm rhythm rhythm RYTHM
 58. approximately approximately approximately approximately APPROXIMATELY
 59. equipped equipped equipped equipped EQUIPT
 60. possess possess possess possess Possess
 61. definitely definitely definitely definitely DEFINITELY
 62. disapprove disapprove disapprove disapprove DISAPPROVE
 63. appropriate appropriate appropriate appropriate APPROPRIATE
 64. referred referred referred referred REFERRED
 65. chosen chosen chosen chosen CHOSEN
 66. development development development development DEVELOPMENT
 67. undoubtedly undoubtedly undoubtedly undoubtedly UNDOUBTEDLY
 68. among among among among AMONG
 69. persuade persuade persuade persuade PERSUADE
 70. description description description description DESCRIPTION
 71. influential influential influential influential INFLUENTIAL
 72. amateur amateur amateur amateur AMATEUR
 73. beneficial beneficial beneficial beneficial BENEFICIAL
 74. imaginary imaginary imaginary imaginary IMAGINARY
 75. achievement achievement achievement achievement ACHIEVEMENT
 76. analyze analyze analyze analyze ANALYZE
 77. embed embed embed embed EMBED
 78. prominent prominent prominent prominent PROMINENT
 79. fulfilled fulfilled fulfilled fulfilled FULFILLED
 80. preferred preferred preferred preferred PREFERRED

PROFICIENCY TEST

21. opportunity
22. opinion
23. children
24. especially
25. eventually
26. already
27. laboratory
28. extremely
29. disagree
30. conclude
- opportunity
opinion
children
especially
eventually
already
laboratory
extremely
disagree
conclude
- benefit
becoming
committed
immediately
fundamental
rectors
studies
familiar
writing
environment
- benefit
becoming
committed
immediately
fundamental
rectors
studies
familiar
writing
environment
31. benefit
32. becoming
33. committed
34. immediately
35. fundamental
36. rectors
37. studies
38. familiar
39. writing
40. environment
- benefit
becoming
committed
immediately
fundamental
rectors
studies
familiar
writing
environment
41. quantity
42. surprise
43. procedure
44. successful
45. necessary
46. performance
47. practically
48. elementary
49. assistance
50. interrupt
- quantity
surprise
procedure
successful
necessary
performance
practically
elementary
assistance
interrupt
- quantity
surprise
procedure
successful
necessary
performance
practically
elementary
assistance
interrupt
41. quantity
42. surprise
43. procedure
44. successful
45. necessary
46. performance
47. practically
48. elementary
49. assistance
50. interrupt
- quantity
surprise
procedure
successful
necessary
performance
practically
elementary
assistance
interrupt

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Circle the correct spelling. Do not use a dictionary. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list. After you have finished the test, follow the directions at the end to determine the result.

1. verbs
2. women
3. study
4. activity
5. business
6. studying
7. judgment
8. competition
9. committee
10. stopped
- verbs
women
study
activity
business
studying
judgment
competition
committee
stopped
11. opposite
12. theories
13. government
14. believe
15. analysis
16. neighbor
17. certainty
18. finally
19. activities
- opposite
grammar
theories
believe
government
analysis
neighbor
certainty
finally
activities
- opposite
grammar
theories
believe
government
analysis
neighbor
certainty
finally
activities
- opposite
grammar
theories
believe
government
analysis
neighbor
certainty
finally
activities
- opposite
grammar
theories
believe
government
analysis
neighbor
certainty
finally
activities
- various
woman
study
activity
business
studying
judgment
competition
committee
stopped
- various
woman
study
activity
business
studying
judgment
competition
committee
stopped
- various
woman
study
activity
business
studying
judgment
competition
committee
stopped
- various
woman
study
activity
business
studying
judgment
competition
committee
stopped
- various
woman
study
activity
business
studying
judgment
competition
committee
stopped

PROFICIENCY TEST

81. accidentally accidentally accidentally
 82. An over-confident team may (less loose loose) loose
 83. Injuries to the team's players strongly (effected effected) effected
 84. changeable changeable changeable
 85. eligible eligible eligible
 86. athlete athlete athlete
 87. absence absence absence
 88. Every cloud has (its its' its' its') silver lining.
 89. conscientious conscientious conscientious
 90. argument argument argument
 91. acquaintance acquaintance acquaintance
 92. privilege privilege privilege
 93. occurred occurred occurred
 94. accommodate accommodate accommodate
 95. similar similar similar
 96. imitate imitate imitate
 97. existence existence existence
 98. hindrance hindrance hindrance
 99. Over-population is one of the (principal principle) principal principle
 100. occurrence occurrence occurrence

PROFICIENCY TEST

51. occasionally occasionally occasionally
 52. efficiency efficiency efficiency
 53. criticize criticize criticize
 54. truly truly truly
 55. separate separate separate
 56. explanation explanation explanation
 57. rhythm rhythm rhythm
 58. approximately approximately approximately
 59. equipped equipped equipped
 60. possess possess possess
 61. definitely definitely definitely
 62. disapprove disapprove disapprove
 63. appropriate appropriate appropriate
 64. referred referred referred
 65. chosen chosen chosen
 66. development development development
 67. undoubtedly undoubtedly undoubtedly
 68. among among among
 69. persuade persuade persuade
 70. description description description
 71. influential influential influential
 72. amateur amateur amateur
 73. beneficial beneficial beneficial
 74. imaginary imaginary imaginary
 75. achievement achievement achievement
 76. analyze analyze analyze
 77. omitted omitted omitted
 78. prominent prominent prominent
 79. fulfilled fulfilled fulfilled
 80. preferred preferred preferred

To determine your score and identify the words which you have misspelled, check your answers against the key on page 90. Subtract your total number of errors from 100 for your percentage score. If your test score is 77% or below, you probably have a serious problem in basic spelling. If your test score is approximately 80% (the average score for this test), you may consider yourself an average speller. You still have room for much improvement. Even if your score is 95% or higher, this performance indicates that there are some words in the Master Word List which you still need to master.

Percentage score 54%

17
21
100

PROFICIENCY TEST

21. opportunity	opportunity	opportunity	opportunity	opportunity	opportunity
22. opinion	opinion	opinion	opinion	opinion	opinion
23. children	children	children	children	children	children
24. especially	especially	especially	especially	especially	especially
25. eventually	eventually	eventually	eventually	eventually	eventually
26. already	already	already	already	already	already
27. laboratory	laboratory	laboratory	laboratory	laboratory	laboratory
28. extremely	extremely	extremely	extremely	extremely	extremely
29. disagree	disagree	disagree	disagree	disagree	disagree
30. conscious	conscious	conscious	conscious	conscious	conscious
31. benefit	benefit	benefit	benefit	benefit	benefit
32. becoming	becoming	becoming	becoming	becoming	becoming
33. committed	committed	committed	committed	committed	committed
34. immediately	immediately	immediately	immediately	immediately	immediately
35. fundamental	fundamental	fundamental	fundamental	fundamental	fundamental
36. receive	receive	receive	receive	receive	receive
37. studies	studies	studies	studies	studies	studies
38. familiar	familiar	familiar	familiar	familiar	familiar
39. writing	writing	writing	writing	writing	writing
40. environment	environment	environment	environment	environment	environment
41. quantity	quantity	quantity	quantity	quantity	quantity
42. surprise	surprise	surprise	surprise	surprise	surprise
43. procedure	procedure	procedure	procedure	procedure	procedure
44. successful	successful	successful	successful	successful	successful
45. necessary	necessary	necessary	necessary	necessary	necessary
46. performance	performance	performance	performance	performance	performance
47. practice	practice	practice	practice	practice	practice
48. elementary	elementary	elementary	elementary	elementary	elementary
49. assistance	assistance	assistance	assistance	assistance	assistance
50. interrupt	interrupt	interrupt	interrupt	interrupt	interrupt

opportunity
 opinion
 children
 especially
 eventually
 already
 laboratory
 extremely
 disagree
 conscious
 benefit
 becoming
 committed
 immediately
 fundamental
 receive
 studies
 familiar
 writing
 environment
 quantity
 surprise
 procedure
 successful
 necessary
 performance
 practice
 elementary
 assistance
 interrupt

PROFICIENCY AND DIAGNOSTIC SPELLING TEST

The following test is designed to reveal your present ability to spell basic words, and to indicate those areas of spelling in which you may have particular difficulty. For each item in the test there are four possibilities. Only one of these possibilities is the correct spelling of the word. Do not puzzle over or experiment with the possibilities. Simply choose the form of the word which you habitually use in your own writing, and write it out in the space provided on the right-hand side of the page. Without being hasty or careless, work steadily through the complete list. After you have finished the test, follow the directions at the end to determine the result.

1. varies	various	various	various	various	various
2. women	women	women	women	women	women
3. usually	usually	usually	usually	usually	usually
4. actually	actually	actually	actually	actually	actually
5. business	business	business	business	business	business
6. studying	studying	studying	studying	studying	studying
7. judgment	judgment	judgment	judgment	judgment	judgment
8. competition	competition	competition	competition	competition	competition
9. committee	committee	committee	committee	committee	committee
10. stopped	stopped	stopped	stopped	stopped	stopped
11. opposite	opposite	opposite	opposite	opposite	opposite
12. grammar	grammar	grammar	grammar	grammar	grammar
13. theories	theories	theories	theories	theories	theories
14. believe	believe	believe	believe	believe	believe
15. government	government	government	government	government	government
16. analysis	analysis	analysis	analysis	analysis	analysis
17. neighbor	neighbor	neighbor	neighbor	neighbor	neighbor
18. certainty	certainty	certainty	certainty	certainty	certainty
19. finally	finally	finally	finally	finally	finally
20. activities	activities	activities	activities	activities	activities

various
 women
 usually
 actually
 business
 studying
 judgment
 competition
 committee
 stopped
 opposite
 grammar
 theories
 believe
 government
 analysis
 neighbor
 certainty
 finally
 activities

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