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WORD ANALYSIS, VISUAL MEMORY, SPELLING RECOGNITION AND READING
IN CHILDREN WITH QUALITATIVELY DISTINCT SPELLING ERRORS

by

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1977

A Thesis
Submitted to the Faculty of Graduate Studies
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ABSTRACT

Twenty-four grade 4 elementary school students (aged 9 to 11) were divided into three groups of spellers on the basis of their spelling percentile of phonetically accurate misspelled syllables. The three groups were, Normal spellers (Ns), Phonetically Accurate retarded spellers (PAs), and Phonetically Inaccurate retarded spellers (PIs). The groups were matched for age and WISC Performance IQ. Four tests of language-related abilities were administered to each group. These were, the Spelling Recognition Test, the Cloze Procedure, Vellutino's Visual Memory Test, and the Phonemic Segmentation Test. The significantly different performances of the groups on most of these tests were discussed in terms of the spelling level and error style differences between the groups. The findings provided support for discriminating the groups of retarded spellers on the basis of their percentage of phonetically accurate misspelled syllables, and are suggestive for steps to be taken in remediating the poor spelling performances of retarded spellers.

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CHAPTER I

INTRODUCTION

Sweeney and Rourke (1978) outlined some language related skills that seem to underly phonetically-inaccurate and phonetically accurate spelling errors in children classified as retarded spellers. The present study was designed to extend this line of inquiry further by focusing on the variables of phonemic segmentation, visual memory, and recognition of words with a low grapheme-phoneme correspondence in these two groups of retarded spellers.

PIs, PAs, and Ns

The sub-division of poor spellers into phonetically inaccurate spelling retardates (PIs) and phonetically accurate spelling retardates (PAs) originated from observations in clinical practice of qualitatively different spelling errors in children (Rourke, 1978). Basically, PIs spelled words in a manner that bears little resemblance to the stimulus word (e.g., "diltum" for "nature"), whereas PAs made spelling errors that were reasonable approximations of the phonetic content of words (e.g., "nacher" for "nature"). Normal spellers (Ns) produced the correct spelling of the word (e.g., "nature" for "nature"). Sweeney and Rourke (1978) devised an objective procedure

for classifying PIs, PAs, and Ns that is presented in the Method section of this paper.

Previous research on spelling errors has begun to suggest some of the patterns of abilities and deficits that may underly PI and PA spelling errors. For example, Nelson and Warrington (1974) found that a phonetically inaccurate spelling style (e.g., "DAL" for "DARE") occurred predominantly in children (8 to 14 years of age) who had a Verbal IQ score of 15 or more points below a Performance IQ score on the WISC. These phonetically inaccurate spellers were retarded in both spelling and reading. Children who made phonetically accurate spelling errors (e.g., "DAIR" for "DARE") seemed to have little or no WISC Verbal-Performance IQ discrepancy and significantly less retardation in spelling and reading.

PI errors also seemed to be related to a generalized language deficiency in studies by Newcombe (1969) and Kinsbourne and Warrington (1964). These researchers found that a disphasic group of patients differed significantly from a control group of patients in terms of their higher frequency of phonetically inaccurate spelling errors.

Boder (1973) observed that "dysphonetic dyslexics" (a group of retarded readers who spelled in a phonetically inaccurate manner), were unable to analyze the "auditory gestalt" of a spoken word and they were unable to decompose

the "visual gestalt" of these same words. The "dyseidetic dyslexics" (a group of retarded readers who spelled in a phonetically accurate manner), had a poor memory for "visual gestalts" but could analyze the "auditory gestalt" of a spoken word.

Part of the rationale for the Sweeney and Rourke (1978) study was based on the aforementioned studies. They found differences in the performance between Ns, PAs, and PIs on many language-related tasks at the grade 8 level. By interpreting those differences, they were able to suggest some of the ways in which Ns, PAs, and PIs differ in language-related skills. In short, PIs seemed to be generally impaired in many language abilities, and PAs seemed to have difficulties of a more specific and circumscribed nature than did PIs.

However, few differences were found between the younger groups of spellers (grade 4 level). In their discussion of the results, Sweeney and Rourke (1978) suggested that the younger spellers would perform at different levels if tests were constructed in such a way that heavier demands were placed on their language abilities. Specific suggestions were made as to which skills should be examined. In the present study, tests were selected with these suggestions in mind.

Spelling Recognition

As previously mentioned, Boder (1973) has maintained that "dyseidetic dyslexics" have an ability to analyze words in a phonetic manner when reading. The phonetic style of spelling in these children (e.g., "nacher" for "nature") would seem to represent an attempt to exploit the usefulness of phonemic information.

Since PAs can utilize phonemic information as an aid to spelling, then their spelling retardation may be due to an inferior development in utilizing other cues to correct spelling. For example, Chomsky (1970) suggested that beyond phonemic information, a speller must consider such things as meaning relationships. This type of relationship occurs between the words "phone and phonic." The "o" has a different sound in each word, but the spelling has remained the same because the similarity in spelling also helps to convey the similarity in the meaning of phone and phonic. Venezky (1970) also shows that English spelling has a low grapheme-phoneme regularity because of other orthographic considerations. For instance, morphemic boundaries can alter the pronunciation of ph. In "phase," ph is pronounced as "f", but in "shepherd" it is not. The morphemic boundary between "shep" and "herd" designates the different pronunciation (Venezky, 1970).

Chomsky (1970) suggested that a good speller must internalize other rules of spelling, perhaps by inductive reasoning. In this connection, it may be that PAs have developed some notion of phonemic regularity (e.g., they know that "ch" represents the same sound as "t" in "nature") but they have difficulty in deriving further spelling rules, because they fail to look "beyond" the phonemic information.

Sweeney and Rourke (1978) did find some indication of restricted thinking in PAs at a grade 8 level, in that they seemed to have considerable difficulty in "going beyond" the information given in a question. For example, PAs may have problems with a question like "How many days in a week?" (WISC Information test) where they must rely on past experience, but the same PAs may be able to answer "At 7¢ each, what will 3 cigars cost?" (WISC Arithmetic test) where all the necessary information is present in the question and only a well learned rule must be applied in order to arrive at an answer.

Sweeney and Rourke (1978) did not obtain similar results for PAs at the grade 4 level. However, it is proposed that a task which is more directly concerned with phonemic utilization in spelling may reveal a similar inability in grade 4 PAs to go beyond the information given. The reason for this, as explained by Sweeney

(1978), is that at the lower grade level, it may be necessary to place linguistic demands on PAs and PIs which go beyond the more everyday demands of such tests as were administered in the Sweeney and Rourke (1978) study (e.g., WISC Vocabulary and Information). For this reason, a Spelling Recognition Test of words with a low phoneme-grapheme correspondence was constructed for the present study. Since phonemic information was not a reliable indication of spelling in this test, the PAs had to utilize other indications of correct spelling (e.g., orthographic rules) in order to recognize the correctly spelled word from among the phonetically equivalent, but incorrectly spelled, words (e.g., one of the items was: wun, one, wone, am, with the correct word being one). If PAs can not "go beyond" phonemic information, as previously suggested, they should make more errors than Ns who presumably can utilize other orthographic information and past experience.

PIs seem to be more generally impaired than PAs (Nelson & Warrington, 1974), and they seem to have problems with auditory analysis (Boder, 1973). Thus, it was expected, that the performance of PIs would be inferior to that of PAs and that the performance of PAs would be inferior to Ns on the Spelling Recognition Test (Hypothesis 1).

Cloze Procedure

Boder (1973, p. 670) also suggested that the dyseidetic dyslexic "has a poor memory for visual 'gestalts' and therefore, has difficulty learning what the letters look like." The "gestalt" mentioned by Boder was not more explicitly stated. However, the type of deficit in memory for letters would seem to suggest that the Cloze Procedure (based in part on the gestalt principle of closure [Anderson, 1976]) would be an appropriate test of a visual "gestalt" ability in PA type spellers.

The gestalt principle of closure states that "there is a tendency for individuals to constitute wholes" (Anderson, 1976, p. 13). In the present study, the items of the Cloze Procedure were constructed so that remembering individual letters would facilitate the reconstitution of the words to form wholes (e.g., In the example item, "The d_g had a b_ne," the subject would have to recall the letter "o" in order to form whole words). Thus, one of the abilities tapped by the Cloze Procedure would be the ability to recall individual letters.

The recall of individual letters would also require that the "visual gestalt" of the word be analyzed to the level of individual letters, an ability in which PIs are not proficient (Boder, 1973). Also the Cloze Procedure would necessitate phonemic retrieval and other linguistic

operations that cause problems for PIs but not for PAs (Sweeney & Rourke, 1978). Thus, it was expected that Ns would score higher than PAs, and PAs would score higher than PIs on the Cloze Procedure (Hypothesis 2).

Visual Memory

The importance of visual memory in spelling has been emphasized in previous studies (Day & Wedell, 1972; Farnham-Diggory & Simon, 1975). However, there has been some disagreement over what type of visual memory is important.

Some of the confusion may be due to the difficulty of testing visual memory without involving some other factor. For instance, in studies of reading retardation, it has sometimes been found that visual memory tests that require an auditory-visual association will not discriminate between good and poor readers. Visual memory tests that require a verbal-visual association will discriminate between reading groups (Vellutino, Steger, Harding, & Phillips, 1975). In studies of retarded readers, the auditory and verbal factors that accompanied visual memory could be manipulated. However, in some retarded speller studies, a verbal factor may have accompanied the test of visual memory without the experimenter's awareness. For example, in studies of visual memory in retarded spellers, some researchers have utilized the Illinois Test

of Psycholinguistic Abilities Visual-Motor Sequencing subtest as a test of visual memory (ITPA; Kirk & McCarthy, 1961). However, the results of factor analytic studies have been interpreted to suggest that the Visual-Motor Sequencing subtest may involve some receptive and representational language components (Belfort & Blumberg, 1975; Hammil, Parker, & Newcomer, 1975; Newcomer, 1974).

The total contribution of linguistic variables in studies of retarded spellers utilizing the ITPA is unknown. However, it may be preferable to reduce the effects of this variable in studies of visual memory in retarded spellers, since PAs and PIs are both considered to be linguistically disadvantages as compared to Ns (Sweeney & Rourke, 1978). Thus, the present study incorporated a test that was designed to attenuate the influence of orthographic and linguistic familiarity when testing for visual memory. This test was designed by Vellutino, Steger, DeSotto, and Phillips (1975). The observations of Boder (1973) would suggest that a visual memory test that utilizes "whole" figures (also used in the Vellutino et al., [1975] test) should reveal a visual memory deficit in PAs as compared to Ns. Boder's (1973) observations suggested that PIs were better than PAs in remembering the visual "gestalt" of words. However, Boder (1973) indicated that the PIs visual memory was

poorer than Ns. Thus, it was expected that PAs would score lower than PIs, and that PIs would score lower than Ns on Vellutino's visual memory test.

Phonemic Segmentation

Phonemic segmentation is a word-analytic skill that involves the discrimination of the phonemic elements in words. For example, the word, "cat," can be considered equivalent to the phonetic sequence, k/ae/t. In a phonemic segmentation task, the subject hears "cat" and then he is required to pronounce the parts of sound that make up the word (i.e., "k-ae-t"), with appropriate pauses at the hyphens to indicate that each sound part is separate from the rest.

The linguistic nature of the phonemic segmentation task should place children with language difficulties at a disadvantage in its execution, as compared to children with normal linguistic skills. Thus, if PIs and PAs have language difficulties, their performance on a phonemic segmentation task should be inferior to linguistically skilled Ns.

Previously mentioned studies (e.g., Kinsbourne & Warrington, 1964) have raised the possibility that PIs are generally more impaired than PAs. In addition, Boder (1973) maintained that "dysphonetic dyslexics" (PI type spellers) were unable to decode words that were relatively

unfamiliar (her measure of this was their inability to read a word that was presented to them for only one second and, upon re-presenting the word for 10 seconds, the PIs could not decode the word). Boder (1973) also speculated that since PI type spellers could not analyze the "auditory gestalt," they would be deficient in word analytic skills such as "sounding out" and blending letters and syllables.

The rationale for the Sweeney and Rourke (1978) study was based, in part, on conclusions derived from the observations of Boder (1973). They found that PIs were significantly inferior to Ns in carrying out relatively rudimentary operations on language (e.g., the comprehension of short word strings, synthesis of sounds, and the reversal of digit sequences). However, for the most part, these deficiencies were evident only at a grade 8 level. At the grade 4 level, the PIs were significantly inferior compared to Ns and PAs only on the WISC Arithmetic measure (Wechsler, 1949). Since Arithmetic appears to require some ability in the use of structured logic, Sweeney and Rourke (1978) hypothesized that a specific difficulty with mathematical rules might reflect a broader problem that would include other educational tasks requiring systematic problem solving procedures. Thus, they suggested that PIs might be deficient in utilizing rules for word analysis.

The possibility emerges from the results of the previous studies that PIs have greater language difficulties than do Ns and PAs, and that one of their main difficulties is the area of auditory analysis, including phonemic segmentation. Therefore, it was expected that the performance of PIs would be significantly inferior to that of Ns and PAs, and that PAs would be significantly inferior to Ns on the Phonemic Segmentation Test used in this study (Hypothesis 4).

CHAPTER II

METHOD

Subjects

The subjects for this study were 21 males and 3 females, aged 9 to 11. The subjects were selected from schools in the Windsor area. They were tested from April to July, 1979. All subjects spoke English as their primary home language, and were right handed. Subjects who had an impairment in vision or hearing, or who had a history which included cultural deprivation or emotional disturbances were excluded from the study.

Groups of retarded spellers were established on the basis of a centile score of 25 or below on the Spelling subtest of the Wide Range Achievement Test (WRAT; Jastak & Jastak, 1965). A group of normal spellers was selected from those subjects who had a centile score of 50 or above on the Spelling subtest of the WRAT. Each group was composed of 7 males and 1 female.

One group of retarded spellers was made up of subjects who spelled 40% or less of syllables misspelled on the Spelling subtest of the WRAT in a phonetically accurate manner (PIs). Another group of spelling retardates were composed of subjects who spelled 60% or

more of syllables misspelled in a phonetically accurate manner (PAs).

The groups were equated for age and Performance IQ on the Wechsler Intelligence Scale for Children (WISC; Wechsler, 1949). The Mazes subtest was substituted for the Coding subtest in the determination of the WISC Performance IQ (see Sweeney & Rourke [1978] for the rationale for this procedure).

Measure for Subject Selection

The Spelling subtest of the WRAT was administered by using a list of pronunciation guide words devised by Sweeney and Rourke (1978). The dictation of a Windsor elementary school teacher was recorded and used for the group administration of the WRAT.

Phonetic Accuracy

A method developed by Sweeney and Rourke (1978) was used to determine the phonetic accuracy of misspelled syllables. The misspelled words were partitioned on the basis of pronunciation guide words. A misspelled syllable was then classified as "phonetically accurate" only if it corresponded to one of the common spellings for that specific combination of sounds. Subsequent to this procedure, a score representing the overall percentage of phonetically accurate misspelled syllables was calculated for each subject. The criteria for selecting PAs and PIs were then applied.

Dependent Measures

The Spelling Recognition Test consisted of 35 items. Each item was made up of three words that were characterized by a low sound-to-letter correspondence. This meant that sounds in the word read out loud could be written in many different ways (e.g., one, wun, wone).

Boder (1973) suggested that PIs sometimes guess at words on the basis of minimal cues (e.g., word length). Thus, a fourth word, unrelated to the other three was included as a distractor item to examine the possibility that PIs would choose it as the correct alternative (e.g., one, wun, wone, "am").

The words were presented (as shown in Appendix A) via the tape-recorded dictation of a Windsor elementary school teacher. The word was read, then a sentence that used the word was read, and then the word was read again. There was an interval of six seconds between the presentation of each word. These words (which were arranged in an order of increasing difficulty determined by the grade level assigned to each word) were derived from a list of 333 most commonly misspelled words from the Macmillan Spelling Series (Shack, Bornhold, Hall, & Mann [1961]). The subject was required to underline one of four alternatives as to correct spelling. A sample word was used as a practice item for the subject. The number of words correctly identified was the score for this test.

A type of Cloze Procedure was used to get an indication of the children's ability to use a gestalt analysis in reading. A Cloze Procedure is usually constructed by deleting a few words from a paragraph in some pre-arranged order (Anderson, 1976); the subject must decide which words are missing so that the paragraph can be read. In the present study, vowels were dropped from some words in a sentence (e.g., The d_g had a b_ne). These sentences were composed with the use of a list of 1000 most frequently used words in the English language (Carrol, David, & Richman, 1971). The subject had to determine which letters were missing and then read the sentence out loud. The examiner wrote every word that the subject said. An attempt was made to order the items along a scale of increasing difficulty by placing the items with few vowels missing first, followed by items with many vowels missing.

If a subject read correctly a word that had one letter missing, then he received one point for that word. If he read correctly a word that had two letters missing, then he received two points for that word. The score for each subject was the total number of points obtained.

The Visual Memory Test used by Vellutino et al., (1975) was administered according to the method used in that study.

On initial contact, the examiner gave each subject the following instructions: "I am going to show you some symbols on these cards. I want you to look at each card until I take it away and I want you to try to remember what it looks like."

The experimenter then presented each of the nine cards for 5 sec per card. The stimuli were always presented sequentially to each subject in the same order. The single letters were presented first, followed by the double letters and finally the triple letters.

Immediately after all of the stimulus cards had been shown, the experimenter presented each subject with the response chart, pointed to the column of single letter items and instructed him to select from it, the "three symbols in this column that you just saw on the cards that had only one symbol on them." The experimenter then proceeded to the two and three columns in turn, and in each instance, asked the subject to demonstrate memory of those stimuli in each set just presented. The subjects' responses were recorded by the examiner after every choice.

The test is said to measure a visual recognition aspect of visual memory, which seems appropriate since spelling involves the ability to recognize whether or not the "visual-gestalt" of a word just written corresponds to the "visual-gestalt" of the dictated word.

For the Phonemic Segmentation Test, a sequence of phonemes was determined for each of the words as spoken by a Windsor elementary school teacher (e.g., the word, "cat," was equivalent to the phonemic sequence k/ae/t). The phonemes were represented by a symbol system provided by Cassano (Note 1).

A tape recording was made of the list of words read by the elementary school teacher. An attempt was made to deliver the words in a monotonic, emphatic manner. Sounds represented by ligatures and digraphs were avoided. The list of words (taken from the Macmillan Spelling Series [Shack et al., 1961]) was then presented via a tape recorder, one word at a time, to each subject.

The test began with four items that served as examples to show the subject what was required. Assistance and encouragement were provided on the first four words, but nothing was said after that.

Scoring began at the fifth word. As the subject worked through the word, each phoneme he or she produced was checked against the phoneme represented on the scoring form. One point was given for every phoneme that corresponded to the phoneme represented on the scoring form. The score was the total number of points obtained.

The list of words used in the Diagnostic Screening Procedure for Developmental Dyslexia (Boder [1973], adapted to accommodate grades seven and eight in order to attenuate ceiling effects) was employed to obtain an estimate of the school grade reading level of the three groups.

CHAPTER III

RESULTS

The statistical packages available in SAS (Barr, Goodnight, Sall, & Helwig, 1976) and SPSS (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) were used to analyze the data.

A two-way analysis of variance (Groups x Tests) for repeated measures yielded significant groups, test, and interaction effects. The means, standard deviations, and levels of significance of contrasts for the control measures are presented in Table 1. Simple effects tests with a priori contrasts (Nie, et al., 1975) revealed that there were no significant differences between group means on the control measures of age and IQ. The groups differed significantly on the WRAT Spelling subtest, Ns were significantly different from PAs and PIs. PAs were not significantly different from PIs. The groups differed significantly in the order Ns > PAs > PIs in the percentage of phonetically accurate misspellings (abbreviated to "phonetic accuracy" in Table 1).

The means, standard deviations, and levels of significance of contrasts for the dependent measures are presented in Table 2. A priori contrasts on the dependent

TABLE I

Means, standard deviations, and levels of significance of contrasts for age, WISC Performance IQ, phonetic accuracy, and WRAT Spelling scores.

Variables	Groups (n = 8 for each)		
	N	PA	PI
Age (in months)			
<u>M</u> (a)	122.10	125.25	118.50
<u>SD</u>	2.19	8.10	11.40
WISC PIQ			
<u>M</u> (b)	102.50	99.10	95.75
<u>SD</u>	9.50	10.96	9.60
Phonetic accuracy			
<u>M</u> (c)	85.75	71.63	24.00
<u>SD</u>	5.95	11.22	9.40
WRAT Spelling (centile)			
<u>M</u> (d)	61.75	13.13	8.73
<u>SD</u>	3.73	4.05	7.60

a) No significant differences ($p > .05$).

b) No significant differences ($p > .05$).

c) $Ns > PAs > PIs$ ($p < .01$).

d) $Ns > PAs$ ($p < .001$); PAs not significantly different from PIs ($p > .05$).

Table 2 continued (level of significance for contrasts)

a) $Ns > PAs > PIs$ ($p < .05$)

b) $Ns > PAs > PIs$ ($p < .05$).

c) $Ns > PIs$ ($p < .05$).

e) $Ns > PAs > PIs$ ($p < .05$).

Note. Abbreviated; Recognition = Spelling recognition test;

Memory = Vellutino's memory test.

TABLE 2

Means, standard deviations and levels of significance of contrasts for each dependent measure.

(Dependent variables were measured by the number of correct items, except for reading grade level.)

Variables	Group (n = 8 for each)		
	N	PA	PI
Recognition			
<u>M</u> (a)	31.80	23.60	16.90
<u>SD</u>	2.4	6.93	3.98
Cloze Procedure			
<u>M</u> (b)	28.90	21.90	5.50
<u>SD</u>	3.70	7.10	4.04
Memory			
<u>M</u> (c)	3.90	2.75	2.00
<u>SD</u>	1.60	1.83	.53
Phonemic segmentation			
<u>M</u> (d)	95.25	122.13	85.50
<u>SD</u>	39.80	32.97	25.80
Reading grade level			
<u>M</u> (e)	7.10	4.10	.90
<u>SD</u>	.83	1.60	1.13

measures revealed significant differences in the order Ns PAs PIs on the Spelling Recognition Test and the Cloze Procedure. In the case of Vellutino's Memory Test (abbreviated to memory in Table 2), the differences between Ns and PIs were significant; those between Ns and PAs and PAs and PIs were not. On the Phonemic Segmentation Test, the differences between PAs and PIs were significant; those between PIs and Ns and PAs were not.

Additional analysis with Newman-Keuls post hoc tests were done on the scores obtained on the reading grade level measure of the Diagnostic Screening Procedure for Developmental Dyslexia (abbreviated to reading grade level in Table 2). The differences between groups were significant in the order Ns > PAs > PIs.

Pearson product-moment correlation coefficients were obtained between percentage of phonetically accurate misspellings (phonetic accuracy) and Vellutino's Memory Test, the Cloze Procedure, the Phonemic Segmentation Test, the Diagnostic Screening Procedure for Developmental Dyslexia reading grade level, and the WRAT Spelling subtest. There were no significant correlations within the PA group. In the N group, phonetic accuracy was significantly correlated with Vellutino's Memory Test ($r = -.77, p .05$).

The data for the four dependent variables were converted to T scores to permit comparisons between test performances. The values are arranged so that good performance is represented by a score over 50 and poor performance is represented by a score below 50. A graphic illustration of these converted scores is presented in Figure 1.

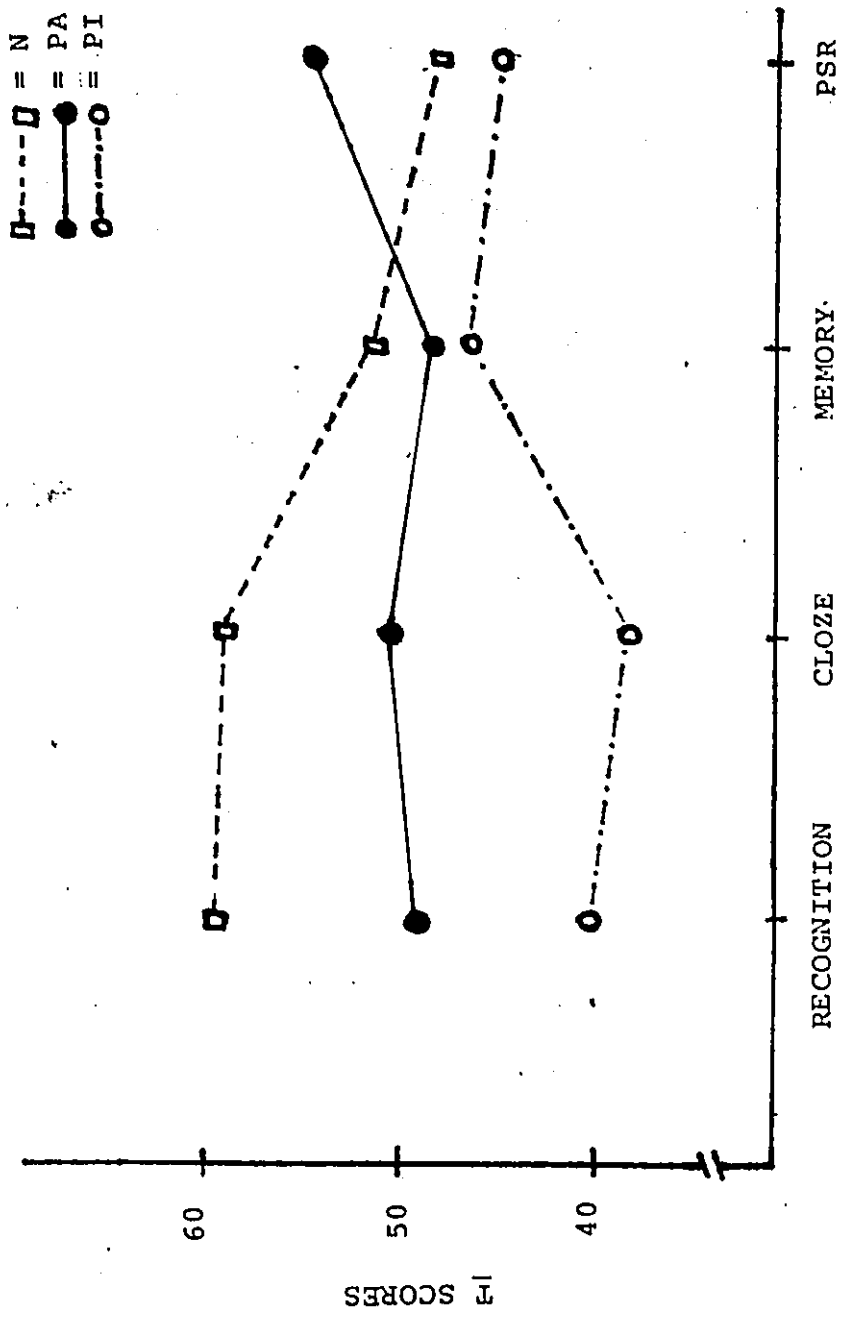


Figure 1. Mean T scores for Ns, PAs, and PIs.
 Note. Abbreviated; Recognition = Spelling recognition test;
 Cloze = Cloze Procedure; Memory = Vellutino's memory test;
 PST = Phonemic segmentation test.

CHAPTER IV

DISCUSSION

The validity of discussing the ability of separate spelling groups in terms of Ns, PAs, and PIs, has been questioned by some (e.g., Day & Wedell, 1971; Holmes & Peper, 1977). The performances of these groups in the present study suggest that stringent linguistic demands will differentiate between Ns, PAs, and PIs even at the younger age level used in the Sweeney and Rourke (1978) study. In the following discussion, these differences are examined with the intent of relating the results to the different spelling styles and levels of the groups.

The dependent variables are discussed in the same order as they are presented in Figure 1 and Table 2. Therefore, the discussion is divided into sections, with the dependent variables as section headings, to permit a clear connection and easier reference between the Results and the Discussion sections.

Spelling Recognition

The finding that Ns were significantly superior to PAs on the Spelling Recognition Test was consistent with the view expressed by Sweeney and Rourke (1978), i.e.,

that PAs would perform poorly on a task that requires carrying out additional linguistic operations beyond that of phonemic analysis.

English orthography requires that a good speller acquire many strategies to incorporate relationships that would provide clues as to the correct spelling of a word (Chomsky, 1970; Venezky, 1970). The PAs' difficulty in going beyond the phonemic information in words might represent a failure to develop other orthographic relationships.

In order to utilize other orthographic relationships, a speller may have to discover these relationships through some reasoning process like inductive logic (Chomsky, 1970). Sweeney and Rourke (1978) had suggested that PAs performed at a low level in situations that required "new" verbal responses (i.e., WISC Vocabulary and Information Tests). Sweeney (1978) suggested that the PAs poor performance on tasks that require "new" verbal responses was due to a difficulty with logical reasoning. Thus, the present results and the views expressed by Sweeney (1978) and Sweeney and Rourke (1978) seem to be consistent with the suggestion that one of the PAs' deficits may be a failure to develop orthographic relationships beyond that of phonemic analysis.

Although the items of the Spelling Recognition test meant to remove the advantage of phonemic analysis,

PAs performed significantly better than PIs. The poor performance of PIs may be due to their additional auditory problems (e.g., a difficulty in learning what letters and letter groups sound like), especially since the test was presented via a tape-recorder, so that other spelling cues would be minimal (e.g., lip movement or facial expression).

Cloze Procedure

As expected, Ns performed significantly better than PAs on the Cloze Procedure. This result is consistent with Boder's (1973) suggestion that PA type spellers have a poor memory for visual "gestalt."

The Cloze Procedure and the Spelling Recognition Test are similar in that both require a subject to judge the appearance of the graphic representation of a word. The judgement in both cases probably requires some degree of visual memory, in that the subject must compare the words in the task at hand to words which are stored in their memory.

As in the Spelling Recognition Test, PAs performed better than PIs on the Cloze Procedure. The higher score of the PAs suggests that they can utilize memory for visual "gestalts" to a greater extent than can PIs. Therefore, the differences between the PAs and PIs on the Spelling Recognition Test may have resulted because

PAs were able to utilize visual memory for graphemes more than were PIs in recognizing the correct spelling of a word.

Performance on the Cloze Procedure may also require the subject to carry out basic linguistic operations such as phonemic segmentation, phonemic retrieval, and phonemic synthesis. It has been suggested that PIs are deficient compared to PAs in all these skills (Boder, 1975; Sweeney & Rourke, 1978). Thus the results of the Cloze Procedure are also consistent with the hypothesis that PIs are deficient in carrying out basic linguistic operations.

Visual Memory

Vellutino's visual memory test differed from the Cloze Procedure in that it was designed so as to attenuate the influence of orthography and linguistic familiarity when testing for visual memory. In so designing the test, Vellutino et al. (1975) had intended to provide a clear demonstration that specific reading disability was not due to a deficit in long-term visual storage. As Vellutino et al. (1975) had predicted, no significant differences between good and poor readers were evident in their performances on this test.

In the present study, Ns did not differ significantly from PAs and PAs did not differ significantly from PIs, but Ns were significantly superior to PIs.

According to the Vellutino et al. (1975) description of the Visual Memory Test, these results suggest that PAs do not differ significantly from Ns in visual memory when the demands of language are reduced. The statistically significant differences obtained with the type of visual memory required by the Cloze Procedure may have occurred because heavy demands are placed on the language abilities of the subjects (Anderson, 1976).

The Cloze Procedure requires some familiarity with "social-cultural meanings" (Anderson, 1976). As in orthography, the subject may have to develop certain "social-cultural" relationships that would provide clues as to which letters were missing. For example, in the item, "The d_g had a b_ne," knowing the socially familiar association that dogs have bones would facilitate the task of discovering which letters were missing. Thus, the results for the Vellutino et al. memory test suggest that the more "verbal" or linguistic aspects of the Cloze Procedure may have contributed to the difference in performance between PAs and Ns rather than a basic deficit in visual memory.

Since PIs did not differ significantly from the PAs, it is possible that PIs also fail to perform well on tasks that make verbal demands. However, the PIs very low performance on the Cloze Procedure would suggest

that they are even more deficient than PAs with respect to verbal abilities (e.g., basic operations on language).

The significantly lower performance of the PIs suggest that they are deficient in visual memory as compared to Ns. Thus, the results for the PIs were also consistent with the hypothesis that they did poorly on the spelling recognition test because they were handicapped by poor visual memory as well as not being able to use phonetic analysis.

The retarded readers in the Vellutino et al. (1975) study may not have included PI type spellers. Both PIs and PAs were retarded in reading as compared to Ns (their mean reading grade level was at least 3 grades below that of the Ns). However, PI type spellers are very rare, thus a selection procedure, like that of Vellutino et al. (1975), that does not consider spelling style may result in a retarded reader sample that is composed mainly of the more abundant PA type spellers. Since in the present study, Ns and PAs did not differ significantly on the Vellutino Memory Test, it would seem likely that groups of retarded readers composed of mainly Ns and PAs would also not differ.

It appears that significant differences between good and poor readers would be obtained if the groups were selected on the basis of spelling errors. Groups

composed of Ns and PI type retarded readers-spellers would be expected to yield significantly different performances on Vellutino's Visual Memory Test.

Phonemic Segmentation

On the Phonemic Segmentation Test, the mean score of the PAs was significantly higher than that of the PIs. Although the differences were not statistically significant between the Ns and PAs, there was a trend suggesting superior performance by the PAs on this test.

One reason for the better performance of the PAs may be that they attempt to compensate for their poorer abilities in other linguistic areas by relying excessively on their word analytic abilities, thereby increasing their performance to a level higher than the Ns because of practice.

In addition, the performance of the Ns may not be as high as it could be because they do not utilize phonemic analysis to the extent as do PAs. The reason for this may be that they can rely on other language abilities and, to some extent, on their superior visual memory when spelling.

The negative correlation within the N group between the percentage of phonetically accurate misspellings and Vellutino's memory test would seem to be consistent with the suggestion that Ns with good visual memory rely less on phonemic analysis. The differences in

performance of the PAs relative to the PIs on the Phonemic Segmentation Test may suggest that the degree of phonetic accuracy in misspellings may depend on the amount of attention that PA spellers attribute to the phonemic information in words. The negative correlation obtained within the N group would suggest that the Ns spellers who gave the least attention to phonemic information had the highest scores on Vellutino's Visual Memory Test. The implication, once again, is that normal spellers with good visual memory do not direct as much of their attention phonemic analysis because they may rely more on visual memory when spelling. The Ns would, therefore, not develop their phonemic segmentation ability to the same extent as do PAs.

The lower performance of the PIs compared to PAs was expected on the basis of the hypothesis that PIs are experiencing difficulties in carrying out relatively rudimentary operations on language (Sweeney & Rourke, 1978). However, it was not expected that the PIs would not differ significantly from Ns. The failure to find significant differences between Ns and PIs may be due to the likelihood that PIs in this study had received explicit instruction in phonemic segmentation (most of the PIs were receiving some type of special education). Thus, it may be speculated that the results

obtained in the present study may reflect the effect of the method of education, in that, with specific instruction, PIs may be able to learn to perform a task requiring a structured, systematic problem-solving approach. However, the PIs general deficit in carrying out relatively rudimentary operations on language may have prevented them from developing phonemic segmentation skills to the same extent as PAs.

The better performance of Ns relative to PAs and PIs on tests requiring the development of language skills other than phonemic analysis (i.e., on the Spelling Recognition Test and the Cloze Procedure) and the Ns lower performance on the Phonemic Segmentation Test compared to PAs, would suggest that the spelling deficit of PAs and PIs may be due to a failure to achieve an adequate balance between phonemic analysis and other language-related skills (e.g., a development of further orthographic relationships). At the very least, the superior performance of PAs on the phonemic segmentation test would suggest that this skill, in and of itself, is not sufficient to eventuate in a normal level of spelling.

The results of the present study would seem to suggest that phonemic segmentation may be sufficiently well developed in both PAs and PIs, but that the abilities necessary for the Spelling Recognition Test

and the Cloze Procedure (e.g., orthographic and social-cultural relationships, memory for visual gestalts, phonetic synthesis and retrieval) are the principal limiting features responsible for their poor spelling. The possibility of a visual memory deficit should also be considered, especially in the case of PIs.

General Conclusions

Sweeney and Rourke (1978) had found differences in the performance between Ns, PAs, and PIs on many language-related tasks at a grade 8 level. Few differences were found between the younger groups of spellers (grade 4 level). In the present study, tests with more stringent linguistic demands did differentiate between Ns, PAs, and PIs at the younger age level.

The patterns of performance obtained in the present study suggest that PAs are doing poorly in spelling because they experience difficulty in going beyond the phonemic information present in words and in utilizing visual gestalts. The visual memory requirements of these two tests cannot be held responsible for the observed deficit; since PAs and Ns did not differ significantly on Vellutino's Visual Memory Test.

The results revealed that PAs have good phonemic segmentation abilities, but it is suggested that they may devote too much attention to phonemic analysis at

the expense of other skills. In developing a remedial program for PAs, it may be useful to concentrate on an appreciation of orthographic relationships beyond those expressed by phonemic information (e.g., orthographic relationships). Further instruction on phonemic segmentation would not seem advisable, since this skill is already well developed in PAs.

The ability pattern of PIs on the Spelling Recognition Test, the Cloze Procedure, and the Phonemic Segmentation Test would suggest that they have a deficiency in carrying out basic linguistic operations such as phonemic segmentation, phonemic retrieval, and phonemic synthesis. In addition, they are deficient in visual memory as compared to Ns.

The performance of the PIs would suggest that they need specific remedial aid in a wider range of areas than do PAs (e.g., association of sounds to letters and phonemic synthesis). In addition, it may be helpful to attend to their visual memory deficit.

The differences observed in the performances of the groups of spellers suggests that the percentage of accuracy in misspellings is a useful method of categorizing groups of retarded spellers, and that their ability structure results in significant differences on language-related tests even at a grade 4 level.

APPENDICES

APPENDIX A

Directions for the Phonemic segmentation test and an example of the scoring form.

Phonemic segmentation test

Instructions to Examiner

The test begins with four items that serve as examples to show the subject what is required. Assistance and encouragement are provided on the first four words, but nothing is said after that. The scoring begins at the word "GOT". One point is given for every correct sound as indicated on the scoring sheet. The score is the total number of the sounds produced correctly by the subject.

Instructions to Subject

"You are going to hear some words on the tape recorder. Listen to each word carefully. All these words are made up of smaller parts of sound. I want you to say the parts of sound that make up the word you hear. Here are some examples of what I want you to do.

For instance, "IS" is made up of two parts of sound. The letter I = I and the S makes the sound z. When you hear the words on the tape recorder, I want you to break them up just like that."

PHONEMIC SEGMENTATION TEST

IS	I z	NEED	n ij d
TRY	t r a j	PETAL	p e t s l
IT	I t	CAME	k ej m
MADE	m ej d	DELEGATE	d e l e g ej t
GOT	g a t	MALE	m ej l
UTILIZE	juw t I l a j z	CEREAL	s ij r ij e l
GAME	g ej m	MEN	m e n
CASE	k ej s	FINE	f a j n
CEMETERY	s e m e t e r ij	MANY	m e n ij
DATE	d ej t	BED	b e d
VICINITY	v e s I n I t ij	VICE	v a j s
GIVE	g I v	LIVE	l I v
AGO	ae g ow	BABY	b ej bi j
FIVE	f a j v	HESITATE	h e z I t ej t
VANITY	v ae n I t ij	LIKE	l a j k
HIS	h I z	DEFY	d ij f a j
BIG	b I g	AS	ae z
DEVOTE	d ij v ow t	BALE	b ej l
UNITED	juw n a j t I d	FIRE	f a j r
DEVICE	d ij v a j s	CITY	s I t ij
RIDE	r a j d	INTO	I n t uw
MAKE	m ej k	CAT	k ae t
RED	r e d	DID	d I d
TO	t uw	IF	I f
LIFE	l a j f	LET	l e t
CAVITY	k ae v I t ij	IN	I n
TIME	t a j m		

APPENDIX B

Directions for the spelling recognition test and example
of the items.

Directions: "I will say a word, then I will use the word in a sentence and then I will say the word again. Please underline the word that I have said on the paper in front of you. Mark only one word per line and do not skip any lines. Here is an example word to show you what to do".

"Example": "two"

"We caught two fish".

"two"

(If the example is not done correctly, then the tape recorder will be shut off and the instructions reviewed.)

"Now here is the test, ready".

"The first word is, one".

"Take one apple".

"one"

"The second word is, first"

"The fastest runner came in first".

"first"

"The third word is, teacher".

"The teacher gives exams".

"teacher"

"The fourth word is, please".

"Pass the salt please".

"please"

"The fifth word is, because".

"We drink because we are thirsty".

"because"

"The sixth word is, letters".

"The mail man carries letters".

"letters"

"The seventh word is, again".

"Don't hurt yourself again".

"again"

"The eighth word is, brought".

"The dog brought home a bone"-

"brought"

"The ninth word is, across".

"Always walk across the road".

"across"

"The tenth word is, clothes".

"People wear clothes".

"clothes"

"The 11th word is, among".

"They hid among the trees".

"among"

"The 12th word is, break".

"Glasses break easily".

"break"

"The 13th word is, forty".

"The house was forty years old".

"forty"

"The 14th word is, already".

"The lights are already on".

"already"

"The 15th word is, loose".

"The dog broke loose".

"loose"

"The 16th word is, answer".

"We answer questions in class".

"answer"

"The 17th word is, pleasant".

"Spring days are pleasant".

"pleasant"

"The 18th word is, suppose".

"Do you suppose it will rain?"

"suppose"

"The 19th word is, business".

"People should mind their own business".

"business"

"The 20th word is, foreign".

"England is a foreign country".

"foreign"

"The 21th word is, certainly".

"Ice cream is certainly cold".

"certainly"

"The 22nd word is, neighbor".

"Be kind to your neighbor".

"neighbor"

"The 23rd word is, sandwiches".

"We take sandwiches on a picnic.

"sandwiches"

"The 24th word is, acquainted".

"Become acquainted with the neighbor".

"acquainted"

"The 25th word is, scissors".

"We cut paper with scissors".

"scissors."

"The 26th word is, conquered".

"Napoleon conquered Europe".

"conquered"

"The 27th word is, government".

"The government controls taxation".

"government"

"The 28th word is, happiness".

"Happiness is having a friend".

"happiness"

"The 29th word is, height"

"Trees can attain quite a height".

"height"

"The 30th word is, medicine".

"Doctors prescribe medicine":

"medicine"

"The 31th word is, prefer".

"Some people prefer not to smoke".

"prefer"

"The 32nd word is, quantity".

"The ocean contains a great quantity of water".

"quantity"

"The 33rd word is, tobacco".

"Cigarettes are made with tobacco".

"tobacco"

"The 34th word is, disguised".

"Bank robbers are often disguised".

"disguised"

"The 35th word is, patience".

"Fishing requires patience".

"patience"

Credit is given for each word underlined correctly, the
score is the total of the words underlined correctly.

Name _____ Date _____ Score _____

Underline the correct word.

Example: tou two tu here

- | | |
|---|---|
| 1. wun wan one am | 24. accwaintid akweinted jealous acquainted |
| 2. first furst ferst kraft | 25. sizers scissors scizzors mammal |
| 3. teecher teacher teicher fishy | 26. konkerd conkurd conquered gutter |
| 4. please pleaze plise glance | 27. government guvermint gouvernment north |
| 5. beqaz because becus stop | 28. happiness hapyness hapiniss damage |
| 6. lettars leatters knock letters | 29. hite heitt height eldest |
| 7. case again egain agen | 30. garden medicine medusin meadisun |
| 8. brot braught brought active | 31. prefur prefer preafir hatchet |
| 9. broken across akrauss ackross | 32. intrusion kwantity quantity cuantitea |
| 10. beagle cleause clothes kloze | 33. tobacco tubakau tebacko drapery |
| 11. among amung emoung capture | 34. thisgized disguised desguised blotter |
| 12. equip braike break braque | 35. patience pashunce pashenss special |
| 13. forty fowrty fourty busy | |
| 14. already collapse ollredy alreddy | |
| 15. lewse looss loose cake | |
| 16. ansuer answer anscer clamp | |
| 17. pleasant plezent carry pleasent | |
| 18. paper suppose supoze sepause | |
| 19. byznness bisness business pretend | |
| 20. foreine foreign forren carpenter | |
| 21. certenly sirtently certainly occasion | |
| 22. neighbor nabor kneber rare | |
| 23. sandwhitches sandwiches ivory sandwitiz | |

APPENDIX C

Directions for the Cloze Procedure and examples of items.

Cloze Procedure

Instructions to examiner

Present the example card first and give the instructions to the subject. Each card is exposed for a maximum of 10 seconds, whether or not the subject reads all the words. A point is given for each letter missing in the words correctly read. Thus, if only one letter is missing as in d_g the subject receives one point for saying "dog". When two letters are missing as in _ft_n, the subject receives two points for reading the word correctly (e.g., "often").

Items

Example; The d_g had a b_ne.

(The dog had a bone.)

1. C_ttle live on a f_rm.

(Cattle live on a farm.)

2. Fl_w_rs grow in the field.

(Flowers grow in the field.)

3. A f_sh is a live an_m_l.

(A fish is a live animal.)

4. The g_rl's n_me w_s Mary.

(The girl's name was Mary.)

5. Ch_ldren g_t_ school.

(Children go to school.)

6. The Un_ted St_tes _s a country.

(The United States is a country.)

7. B_rds fl_ south for the w_ nter.

(Birds fly south for the winter.)

8. A c_ntury is _ne h_n dr_d years.

(A century is one hundred years.)

9. The h_use w_s in a v_ll_ge by the r_v_r.

(The house was in a village by the river.)

10. P_ople _ft_n tr_v_l by train.

(People often travel by train.)

Instructions to Subject

"Here I have some cards with sentences on them. The sentences have words with letters missing, I want you to decide which letters should go in the words and then read the sentence to me. How would you read this sentence."

APPENDIX D

Directions for the Vellutino memory test and examples of items.

Directions for Vellutino's visual memory test

On initial contact, the examiner gave each subject the following instructions: 'I am going to show you some symbols on these cards. I want you to look at each card until I take it away and I want you to try to remember what it looks like.'

The experimenter then presented each of the nine cards for 5 sec. per card. The stimulus were always presented sequentially to each subject in the same order. The single letters were presented first, followed by the double and then the triple letters.

Immediately after all of the stimulus cards had been shown, the experimenter presented each subject with the response chart, pointed to the column of single letter items and instructed him to select from it, the 'three symbols in this column that you just saw on the cards that had only one symbol on them'. The experimenter then proceeded to the two and three columns in turn, and in each instance, asked the subject to demonstrate memory of those stimuli in each set just presented. The subjects' responses were recorded by the examiner after every choice.

(This method was copied from Vellutino et al., 1975, p. 227.)

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APPENDIX E

Original scores for Ns, PAs, and PIs, on all the variables measured.

The following are the original scores of the PAs on all the variables measured.

Age Sex	IQ	WRAT	Memory	Cloze	PST	Recognition	Reading gr.	%PA
(in months)		(Centile)						
132.00 M	87	10	4	22	155	20	4	60
111.00 M	85	16	1	6	77	10	2	63
131.04 M	111	16	5	25	78	28	4	76
132.00 M	108	19	4	25	154	27	6	63
123.00 M	87	10	3	25	138	28	6	68
131.04 M	107	8	0	22	125	29	4	90
126.00 M	101	10	1	20	150	18	2	86
115.92 F	107	16	4	30	100	29	5	67

The following are the original scores of the PIs on all the variables measured.

Age Sex	IQ	WRAT	Memory	Cloze	PST	Recognition	Reading gr.	%PA
(In months)	(Centile)							
135.00 M	94	4	2	9	61	16	1	15
126.00 M	86	3	2	8	87	15	1	31
119.04 M	86	3	3	1	95	13	0	23
111.96 M	101	1.8	1	0	144	14	0	40
111.00 M	100	16	2	10	70	19	0	21
104.04 M	103	21	2	2	77	14	0	16
108.96 M	111	16	2	9	75	19	2	14
132.00 M	85	5	2	5	75	25	3	32

The following are the original scores of the Ns on all the variables measured.

Age	Sex	IQ	WRAT	Memory	Cloze	PST	Recognition	Reading gr.	%PA
		(In months)		(Centile)					
123.00	M	111	66	5	27	121	33	6	87
117.96	M	101	66	4	27	129	33	8	92
120.96	M	108	58	5	33	49	35	6	82
125.04	M	113	61	2	26	97	28	7	92
120.96	M	103	66	4	26	157	31	8	88
121.92	M	90	58	4	29	84	29	7	75
123.96	M	107	58	6	36	34	7	89	
123.00	F	87	61	1	27	39	31	8	81

Note. Abbreviated; WRAT = WRAT Spelling test; Memory = Vellutino's memory test;

Cloze = Cloze Procedure; PST = phonemic segmentation test; Reading gr = reading grade level estimated through the Diagnostic Procedure for Developmental Dyslexia; % PA = percentage of phonetically accurate misspelled syllables.

APPENDIX F

Level 1 spelling test with pronunciation guide words
and the list of common spellings for the analysis of
phonetically accuracy of misspelled syllables.

LEVEL I SPELLING LIST

PRONUNCIATION GUIDE WORDWORD

go	Children go to school	gōe
cat	The cat has fur	kāt
in	We are in the room	in
boy	The boy plays ball	boi
and	Bill and Bob play together	and
will	They will wait for you	wil
make	She can make a dress	make
him	They saw him in town	him
say	Say it slowly	say
cut	Mother will cut the cake	kut
cook	We cook our own dinner	kook
light	The light is bright	lite
must	We must do our work	must
dress	The dress fits well	dres
reach	He couldn't reach the ball	reēch
order	The captain's order was obeyed	ōr der
watch	My watch is fast	wauch
enter	Enter this way	en ter
grown	Potatoes are grown in the field	grōne
nature	The study of nature is interesting	nae cher
explain	Explain how it happened	eks plain
edge	He sat on the edge of the chair	ēj
kitchen	Our kitchen is small	kich en
surprise	He may surprise you	ser prize
result	The result of your work is good	ree zult
advice	My advice is forgotten	ad vise
purchase	We did not purchase the car	pur ohis
brief	I received a brief note	breef
success	Success makes people happy	suk sēs
reasonable	His request was reasonable and just	ree zen abul
imaginary	He told us an imaginary story	i māj i nari
occupy	We occupy a small apartment	ō kue pie
character	Her fine character was praised	kār ak ter
society	Every society has rules	su sy e ty
official	An official invitation came today	oh fi shil
recognize	He did not recognize me	rek og nize
familiar	We are familiar with the news	fa mil yer
commission	The commission reported to the mayor	ko mish un
beneficial	Good food is beneficial to health	ben e fi shul
appropriation	Congress made an appropriation for schools	a pro pri ay shun
enthusiasm	People showed enthusiasm for the hero	en thoo zi asem
criticize	It is easy to criticize others	krit i size
prejudice	Prejudice is harmful to people	prej e dis
belligerent	The soldier was belligerent and brave	be lij er ent
occurrence	War is a tragic occurrence	oh ker ens

COMMON SPELLINGS - LEVEL I
COMMON SPELLINGS

REGIONAL
PRONUNCIATIONS

g (g) (ge) (gh) (gu) (gue)
ow (o) (oe) (oa) (ou) (ow) (ev) (éau) (au) (oo) (oh)

k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cu) (gh) (ke) (kh) (lk) (q) (qu)
ae (a) (ai) (au)
t (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)

I (i) (a) (o) (e) (ea) (u) (ee) (ei)
n (n) (nn) (gn) (kn) (ne) (pn)

1. go

2. cat

3. in

in (cont'd)

4. boy

boj

(ui)
 (ia)
 (ie)
 (y)
 b
 (b)
 (bb)
 (bh)
 o
 (aw)
 (eu)
 (oi)
 (ois)
 (oy)
 (uoy)

5. and

aend

ae
 (a)
 (ai)
 (au)
 n
 (n)
 (nn)
 (gn)
 (kn)
 (mn)
 (nel)
 (pn)
 d
 (d)
 (dd)
 (de)
 (ed)
 (ld)

aen

an

ae
 (a)
 (u)
 (a)
 (o)
 (ou)
 (oo)
 n
 (n)

en

e
 (i)
 (e)
 (a)
 (o)
 (u)
 (ai)
 (au)
 (ea)
 (ei)
 n
 (n)

and (cont'd)

(eo)
(eou)
(ia)
(ie)
(oi)
(ou)
(y)
(eu)

n

6. will

will

n

w
(w)
(o)
(ou)
(u)

l
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(a)
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(ea)
(u)
(ee)
(ei)
(ui)
(ia)
(ie)
(y)

l
(l)
(ll)
(le)
(llc)
(sl)

7. make

mejk

m
(m)
(mm)
(mn)
(chm)
(gn)
(lm)
(mb)
(me)
(mh)

e
(ei)
(a)
(e)
(ai)
(ay)
(ea)
(et)
(ey)
(au)

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(cc)
(ch)
(cch)
(cq)
(cqu)
(cque)
(cu)
(gh)
(ke)
(kh)
(lk)
(q)
(qu)

hIm

h (h) (wh)

I (i) (a) (o) (e) (ea) (u) (ee) (ei) (ui) (ia) (ie) (y)

m (m) (mm) (mn) (clm) (gn) (lm) (mb) (me) (mh)

sej

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)

e (e) (ei) (a) (e) (ai) (ay) (ea) (et) (ey) (au)

9. say

kat

k (k) (c) (ck) (cc) (ch) (cch) (cq) (cque) (cu) (gh) (ke) (kh)

u (u) (a) (o) (ou) (oo)

t (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)

10. cut

cut (cont'd)

(lk)
(q)
(qu)

11. cook

kuk

k
(k)
(c)
(ck)
(cc)
(ch)
(cch)
(cq)
(cqu)
(cque)
(cu)
(gh)
(ke)
(kh)
(lk)
(q)
(qu)

u
(u)
(ou)
(oo)
(eu)
(o)

k
(k)
(c)
(ck)
(cc)
(ch)
(cch)
(cq)
(cqu)
(cque)
(cu)
(gh)
(ke)
(kh)
(lk)
(q)
(qu)

12. light

lajt

l
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(ll)
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(lle)
(sl)

aj
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(y)
(uy)
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(oy)

t
(t)
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(ght)
(phth)
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(th)

13. must

mast

m
(m)
(mm)
(mn)

u
(u)
(a)
(o)

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(s)
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(t)
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(bt)

must (cont'd)

(chm)
(m)
(lm)
(mb)
(me)
(mh)

(ou)
(oo)

(ss)
(ce)
(ps)
(sch)
(se)

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(phth)
(-te)
(th)

14. dress

drEs

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(eo)
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(c)
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(se)

15. reach

rijč

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(rrh)

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(eo)
(oe)

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(tch)
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(tu)

16. order

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order (cont'd)

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17. watch

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(tu)

18. enter

Enter

u (e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u)
n (n) (nn) (gn) (kn) (mn) (ne) (pn)
t (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)
a (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu) (-) (re)

Enter

E (u) (u) (ou) (oo) (eu) (o)
t
n
E

19. grown

g (g) (gg) (gh) (gu) (gue)
r (r) (rr) (rh) (wr) (re) (rrh)
ow (o) (oe) (oa) (ou) (ow) (ew) (eau) (au) (oo) (oh)

grown

20. nature

n (n) (nn) (gn) (kn) (mn) (ne) (pn)
e (e) (a) (ai) (ay) (ea) (et) (ey) (au)
v (ch) (tch) (c) (che) (te) (ti) (tu)

nej^vcer

r (r) (rr) (rh) (wr) (re) (rrh)

nej^vcur

v (re)

nej^vcir

v (i) (a) (o) (e) (ea) (u)

nature (cont'd)

21. explain

Eksplejn

(e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u)
 (k) (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque)
 (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
 (p) (p) (pp)
 (l) (l) (ll) (le) (lle) (sl)
 (ei) (a) (e) (ai) (ay) (ea) (et) (ey) (au)
 (n) (n) (nn) (gn) (kn) (mn) (ne) (pn)

[(--)]

(--)]

eksplejn

e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (io) (oi) (ou) (y) (eu)

k s

p l

n

Iksplejn

I (i) (a) (o) (e) (ea) (u) (ee) (ei) (ui) (ia) (ie) (y)

k

s

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l

ei

n

2. edge

E (e) (ea) (ai) (ei) (ay) (eo) (ie) (u)
 V (j) (gg) (dge) (ch) (d) (dg) (di) (ge) (gi) (jj) (E) (gh)

3. kitchen

kitchən

k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)
 I (i) (a) (o) (e) (ea) (u) (ee) (ei) (ui) (ia) (ie) (y)
 V (ch) (tch) (c) (che) (te) (tu)

e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)
 n (n) (nn) (gn) (kn) (mn) (ne) (pn)

24. surprise

səprəʒz

s (s) (c) (sc) (ss)
 e (i) (e) (a) (o)
 r (r) (rr) (rh) (wr)
 p (p) (pp)
 i (i) (ri) (rr) (rh) (wr)
 a (i) (ai) (ei) (ie) (ai)

z (z) (s) (sc) (ss)

surprise (cont'd)

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(ze)

surprajz

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25. result

result

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result (cont'd)

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advajs

26. advice

a j

a j

v

d

ae
(a)
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(au)

advajs

27. purchase

perçis

p
(p)
(pp)

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purçes

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purçes

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s

brief

b (b) (bb) (bh)
 r (r) (rr) (rh) (wr) (re) (rrh) (i) (y) (ey) (eo) (oe)
 ij (ea) (ei) (ie) (ee) (e) (i) (y) (ey) (eo) (oe)
 f (f) (ff) (gh) (ph) (lf) (fe)

success

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
 e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (cou) (ia) (ie) (oi) (ou) (y) (eu)
 k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cqud) (cu) (gh) (ke) (kh) (lk) (q) (qu)
 s' (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
 E (e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u)
 e (s) (c) (sc) (ss) (ce) (ps) (sch) (se)

success

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
 e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (cou) (ia) (ie) (oi) (ou) (y) (eu)
 k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cqud) (cu) (gh) (ke) (kh) (lk) (q) (qu)
 s' (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
 E (e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u)

success

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
 e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (cou) (ia) (ie) (oi) (ou) (y) (eu)
 k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cqud) (cu) (gh) (ke) (kh) (lk) (q) (qu)
 s' (s) (c) (sc) (ss) (ce) (ps) (sch) (se)
 E (e) (ea) (ai) (e) (ei) (ay) (eo) (ie) (u)

30. reasonable

rijzanebal

r (r) rr rh vr re rrrh
 ij (i) (j) ei ie ce e (e) (i) (y) ey eo oe
 z (z) s (s) sc ss zz se x (x) ze
 e (i) (e) a (a) o (o) u (u) ai (ai) au (au) ea (ea) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 n (n) nn gn kn mn ne pn
 e (i) (e) a (a) o (o) u (u) ai (ai) au (au) ca (ca) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 b (b) bb bh
 e (i) (e) a (a) o (o) u (u) ai (ai) au (au) ea (ea) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 l (l) ll le lle sl

31. imaginary

Imaejenerij

I (i) a (a) o (o) e (e) ea (ea) u (u) ee (ee) ei (ei) ui (ui) ia (ia) ie (ie) y (y)
 m (m) mm mn chm gn lm mb me mh
 ae (a) ai (ai) au (au)
 v (j) (j) (g) (g) dge (ch) (d) (d) (d) di (di) ge (gi) (jj)
 a (i) (e) a (a) o (o) u (u) ai (ai) au (au) ea (ea) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 n (n) nn gn kn mn ne pn
 a (i) (e) a (a) o (o) u (u) ai (ai) au (au) ea (ea) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 a (i) (e) a (a) o (o) u (u) ai (ai) au (au) ea (ea) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 I (r) rr rh vr re rrrh
 ij (i) (j) ei ie ce e (e) (i) (y) ey eo oe
 z (z) s (s) sc ss zz se x (x) ze
 e (i) (e) a (a) o (o) u (u) ai (ai) au (au) ea (ea) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 n (n) nn gn kn mn ne pn
 e (i) (e) a (a) o (o) u (u) ai (ai) au (au) ca (ca) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 b (b) bb bh
 e (i) (e) a (a) o (o) u (u) ai (ai) au (au) ea (ea) ei (ei) eo (eo) eou (eou) ia (ia) ie (ie) oi (oi) ou (ou) y (y) (eu) (eu)
 l (l) ll le lle sl

imaginary (cont'd) emaeJanEriJ

e
 (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (.eu)

mae^Ve

n

r

ij

32. occupy akjuwpaJ

a
 (a) (au) (aw) (o) (ou) (e) (ea) (oa) (ow)

k
 (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (fh) (ke) (kh) (lk) (q) (qu)

juw
 (u) (eu) (ue) (ew) (eau) (iew)

p
 (p) (pp)

aj
 (i) (ei) (ie) (ai) (y) (uy) (ay) (ey) (oy) (ye)

33. character ke jrekte r

k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)
e (ei) (a) (e) (ai) (ay) (ea) (et) (ey) (au)
r (r) (rr) (rh) (wr) (re) (rrh)
e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)
t (t) (tt) (bt) (cht) (ct) (ed) (ght) (phth) (te) (th)
r (r) (rr) (rh) (wr) (re) (rrh)

kErektur

k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)
e (e) (ea) (ai) (c) (ei) (ay) (eo) (ie) (u)
r (r) (rr) (rh) (wr) (re) (rrh)

kErektIr

k (k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)
e (e) (ea) (ai) (c) (ei) (ay) (eo) (ie) (u)
r (r) (rr) (rh) (wr) (re) (rrh)

society

sasajetij

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)

a (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)

a (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

i (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

t (t) (tt) (bt) (cht) (ct) (ed) (y) (phth) (ey) (eo) (oe)

i (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

l (l) (ll) (le) (lle) (sl)

sasajedij

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)

a (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

s (s) (c) (sc) (ss) (ce) (ps) (sch) (se)

a (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

i (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

t (t) (tt) (bt) (cht) (ct) (ed) (y) (phth) (ey) (eo) (oe)

d (d) (dd) (de) (ed) (ld)

i (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eu) (ia) (ie) (oi) (ou) (y) (eu)

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5. official

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6. recognize rIkagnajz

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g (g) (gg) (gh) (gu) (gue)
n (n) (nn) (gn) (kn) (mn) (ne) (pn)
aj (i) (ei) (ie) (ai) (y) (uy) (ay) (ey) (oy)
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37. Familiar

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femllyur

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38. commission

Kemlben

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commission (cont'd)

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39. beneficial

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3. appropriation

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 p (p) (pp)
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 ow (o) (oe) (oa) (ou) (ow) (ew) (eau) (au) (oo) (oh)
 p (p) (pp)
 r (r) (rr) (rh) (wr) (re) (rrh)
 ei (ei) (a) (e) (ai) (ay) (ea) (et) (ey) (au)
 s (sh) (sch) (ch) (ce) (ci) (sci) (si) (ss) (ssi) (ti) (chsi) (psh) (s) (se)
 e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)
 n (n) (nn) (gn) (kn) (mn) (ne) (pn)

eprowprijejsen

e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)
 p (p) (pp)
 r (r) (rr) (rh) (wr) (re) (rrh)
 ow (o) (oe) (oa) (ou) (ow) (ew) (eau) (au) (oo) (oh)
 p (p) (pp)
 r (r) (rr) (rh) (wr) (re) (rrh)
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 n (n) (nn) (gn) (kn) (mn) (ne) (pn)

41. enthusiasm

Enθuwiʒiæzəm

E (e) (ea) (ai) (e) (ei) (ay) (co) (ie) (u)

n (n) (nn) (gn) (kn) (mn) (ne) (pn)

θ (th) (chth)

uw (oe) (o) (oo) (ou) (ue) (ui) (ew) (u) (eu)

z (z) (s) (sc) (ss) (zz) (se) (x) (ze)

I (i) (a) (o) (e) (ea) (u)

ae (a) (ai) (au)

z (z) (s) (sc) (ss) (zz) (se) (x) (ze)

e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

m (m) (mm) (mn) (chm) (gm) (lm) (mb) (me) (mh)

e nθuwziʒæzəm

e (i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

n

θ

uw

z

i (i) (a) (o) (e) (ea) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

ae

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m

42. criticize

KrItIsajz

k (k) c (ck) cc (ch) cch) (cq) (cqu) (cque) cu) gh) ke) kh) lk) q) (qu)
r (r) rr) rh) wr) re) (rrh)
i (i) a) o) e) ea) u) ee) ei) ui) ia) ie) (y)
t (t) tt) bt) cht) ct) ed) ght) phth) te) th)
i (i) a) o) e) ea) u) ee) ei) ui) ia) ie) (y)
s (s) c) sc) ss) ce) ps) (sch) (sc)
a (a) i) ei) ie) ai) y) uv) ay) ey) oy)
z (z) s) sc) ss) zz) se) x) ze)

43. prejudice

prEjEdIs

p (p) (pp)
r (r) rr) rh) wr) re) (rrh)
e (e) ea) ai) (e) ei) ay) eo) ie) (u)
v (j) (j) (ge) (ch) d) dg) di) ge) gi) (jj) (g)
e (i) e) a) o) u) ai) au) ea) ei) eo) cou) ia) (ig) (oi)
d (d) dd) de) ed) (ld)
i (i) a) o) e) ea) u) ee) ei) ui) ia) ie) (y)
s (s) c) sc) ss) ce) ps) (sch) (se)
z

44. belligerent bellijerent

b
(b)
(bb)
(bh)

e
(i) (c) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

l
(l) (ll) (le) (lle) (sl)

l
(i) (a) (o) (e) (ea) (u) (ee) (ei) (ui) (ia) (ie) (y)

y
(j) (j) (gg) (dce) (ch) (d) (dg) (di) (ge) (gi) (jj) (g)

e
(i) (c) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

r
(r) (rr) (rh) (wr) (re) (rrh)

e
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(n) (nn) (gn) (kn) (mn) (ne) (pn)

t
(t) (tt) (bt) (cht) (ct) (ed) (ght) (pht) (te) (th) (ts)

45. occurrence owkarrens

ow
(o) (oc) (ou) (ow) (ew) (eau) (au) (oo) (oh)

k
(k) (c) (ck) (cc) (ch) (cch) (cq) (cqu) (cque) (cu) (gh) (ke) (kh) (lk) (q) (qu)

e
(i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

r
(r) (rr) (rh) (wr) (re) (rrh)

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(i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

n
(n) (nn) (gn) (kn) (mn) (ne) (pn)

s
(s) (c) (sc) (ss) (cc) (ps) (sch) (se)

occurrence (cont'd) akurans

si

ni

ei

ri

u
(u) (ou) (oo) (eu) (o)

ki

a
(i) (e) (a) (o) (u) (ai) (au) (ea) (ei) (eo) (eou) (ia) (ie) (oi) (ou) (y) (eu)

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