# Spelling Improvement for College Students Who Are Dyslexic

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*Academic problems of the dyslexic child often persist in adult life. Such problems as spelling can interfere with the performance of such adult learners in college. Federal legislation requires reasonable accommodation for these students. At some colleges, this consists of allowing use of tape recorders in lectures and sometimes allowing extra time on examinations. Remediation of reading, writing, and spelling among dyslexic college students is often not addressed. This study reports the use of a modified Orton-Gillingham approach in comparison with a nonphonetic approach and with a group receiving no remediation. The results indicate a significant increase in spelling performance for the group receiving the modified Orton-Gillingham remediation. This contrasts with no significant change in the group receiving nonphonetic remediation and in the control group (no remediation), and indicates that adulthood is not too late for appropriate intervention for the dyslexic student. Colleges offering such intervention and the students receiving it will benefit from improved performance.*

Academic problems experienced by the dyslexic (learning-disabled) child often continue into adulthood. One such problem is spelling. Although most computer word processing programs now contain functions to check spelling, these aids do not assist dyslexic students to learn how words are spelled. In addition, many of these dyslexic students have reading deficiencies. Researchers regard spelling deficiencies as one of the dilemmas encountered by the dyslexic

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college student (Bruck 1987; Crank 1985; Dalke 1988; Gerber et al. 1990; Guyer 1985; Guyer and Sabatino 1989; O'Hearn 1989; and Reinhardtsen 1982). When spelling deficits are combined with reading deficits, a student is seriously handicapped in the college environment. Therefore, it is important to determine successful methods for teaching reading and spelling to the dyslexic college student.

Institutions of higher education have an obligation to assist the dyslexic student who has spelling deficiencies. The Rehabilitation Act, Section 504, requires colleges and universities to make reasonable accommodations for these students. This act, as well as other federal and state legislation, has assisted dyslexic students and has improved their academic lives (Guyer and Sabatino 1989; Hallahan and Kauffman 1991; Lerner 1988; Mangrum and Strichart 1984; and Mercer and Mercer 1987).

However, there continues to be little educational research concerning the specific problems encountered by the college-aged dyslexic student. A few authors report success in their specific programs. For example, Liberman and Shankweiler (1985) found that reading and writing ability were directly related to having an awareness of the underlying phonological structure of words. However, there remains a lack of statistical data that would allow one to generalize about the effectiveness of certain techniques (Bruck, 1985, 1987; Finucci, Gottfredson, and Childs 1985; Reinhardtsen 1982; and Zink 1982).

One method that has been explored is the Orton-Gillingham (O-G) approach for dyslexic college students. The O-G approach (Gillingham and Stillman 1960), originally devised by Gillingham and Stillman in 1929, has been used with students of all ages. It is a multisensory phonetic method of teaching reading, spelling, and written language to dyslexic students. With modifications, it has proven to be successful in remediating spelling and reading in a variety of learners (Enfield and Greene 1983; Traub 1982; and Wilson 1988). An adaptation of the O-G approach, the Wilson Reading System (Wilson 1988), was used in the current study.

The purpose of the study was to determine if college dyslexic students would make more progress when taught with the modified O-G approach, with a nonphonetic approach, or with no intervention.

The phonetic multisensory approach, The Wilson Reading System (WRS), is an alphabetic-synthetic and multisensory phonetic method (Wilson 1988). Developed primarily for students who have dyslexia or other problems that make reading and spelling difficult, WRS concentrates on fusing smaller units such as letters, sounds, and syllables, into more complex wholes (words). The primary difference between this technique and other techniques used for teaching the dyslexic student is the emphasis placed on reducing the English language to its

basic elements, the 44 sounds and 26 letters. Associative techniques are used when the student "links" the name and the sound of a letter with its printed symbol. A multisensory approach is used to assist in establishing these "linkages."

The WRS is targeted for the "older student." Its sequential color-coded structure teaches a strategy for word attack in encoding and decoding. The WRS structure is based on six syllable types. The first half of the WRS limits the exposure to sounds so that the learner will not become confused and so that he can establish a solid foundation before proceeding. Students are taught to use syllable division rules, thereby eliminating the need to memorize needlessly or guess. The second half of the program presents the sound option in the English language, as well as rules for adding suffixes to change base words.

In the WRS, students are taught to associate a concrete object with each sound they do not know. This includes all possible letter combinations such as digraphs, diphthongs and suffixes. For example, specific words are related to letter combinations: /wh/whistle; /br/broom; /-sion/ mansion; and /-lk/bulk. The WRS was selected for this study because the first author had found it to be effective in teaching a college student with severe dyslexia to read and spell. Through testing we learned that as a freshman the student was reading on a 2.0 grade level. At the time tutoring began, the student was unable to read such words as "ham, late, track, and bran," although he had been tutored throughout his school career by a wide assortment of teachers. Using the WRS, he was successfully tutored for more than four years. He recently earned a Bachelor's degree in Business Management, and at the time of his graduation he was able to read his college textbooks with only occasional assistance.

The nonphonetic approach used in this study was based on Spelling Power (Goodman 1987). Goodman states the program is designed to teach students to master frequently misspelled words while simultaneously building reading power. When using this approach, the author tells students there is no one best way to study spelling and that research has found different approaches effective with different students.

The following are examples of methods for improving spelling that Goodman recommends: Look carefully at the word. Write the word over and over. Divide the word into syllables. Identify the difficult parts of the word and focus on them. Find hints or clues in the word to help remember the spelling ("a rat" in "separate"). Say the word, then spell it aloud. Close your eyes and visualize the word. Keep a list of words you often misspell. Review the words often.

To summarize, the present study focused on measuring the effectiveness of two intervention procedures for remediating disabilities in spelling in comparison with a control group.

## Method

### Subjects

Subjects in the study were 30 Marshall University students diagnosed as dyslexic who were enrolled in the Higher Education for Learning Problems (H.E.L.P.) program at Marshall University. Ages ranged from 18 to 32 years, with a mean of 21.2 years. There were 26 males and 4 females, with 2 black and 28 white subjects. At the time of the study, cumulative grade point averages ranged from 1.8 to 3.8 with a mean of 2.9. Participants included 12 freshmen, nine sophomores, and nine juniors. H.E.L.P. is a tutorial support program for Marshall dyslexic students. With a staff of more than 50 employees, H.E.L.P. has existed since 1981 and has 175 students currently enrolled.

The majority of employees who tutor students in course work are graduate assistants seeking advanced degrees in various fields. However, the tutors who participated in the study are employed part-time or full-time, have Master's degrees in Learning Disabilities, and are certified as Learning Disabilities Specialists. All tutors have participated in training programs designed to teach them various teaching techniques. These tutors worked with students in Groups 2 and 3 and received instruction for both phonetic and nonphonetic procedures.

Twenty-four subjects for the study were identified as dyslexic by state and public school system criteria, using the Wechsler Adult Intelligence Scale-Revised (WAIS-R) (Wechsler 1981) and a variety of diagnostic achievement tests. Full-scale IQs ranged from 90 to 131, with a mean of 110. The difference between ability and achievement exceeded one standard deviation and sensory acuity was normal in all subjects. Subjects reported that when they were in high school they received assistance in preparing written reports and in completing homework as well as accommodations in testing. Further, they reported they had received no remediation in spelling or reading after elementary or middle school. The remaining six subjects were diagnosed as dyslexic at Marshall University.

Twenty students were randomly selected who had contracted to receive remedial assistance through H.E.L.P. in reading and spelling. Ten of these students were assigned randomly to Group 2 and ten to Group 3. Group 1 consisted of ten H.E.L.P. students who selected no intervention for the semester. They were randomly selected from a group of 70 students who were not going to receive remediation for the semester of the study. It is assumed by the investigators that these students were not participating in remediation for one of two reasons: 1) they were not motivated to participate in remediation; or 2) they did not feel that they needed the remediation. It should be noted that the students in Group 1 achieved the highest level on the pretest, although

this group's scores were not significantly different from the other two groups. The students in Group 2 were taught spelling using the Wilson Reading System (WRS). The ten students in Group 3 were taught spelling using a non-phonetic approach described in Spelling Power (Goodman 1987). There were two one-hour sessions per week for the 16 weeks of the semester.

## Measurement

The Spelling subtest of the Wide Range Achievement Test-Revised (WRAT-R) (Jastak and Wilkinson, 1984), was used to measure subjects' achievement in this study. The WRAT-R is an individually administered achievement test that measures skill in the areas of reading (word recognition), spelling, and arithmetic. The spelling subtest of WRAT-R was administered at the beginning and at the end of the semester. The WAIS-R was used to evaluate intelligence of the subjects only to ensure the subjects were of normal or higher intelligence. WAIS-R results provided by the subjects were used if testing had occurred not more than two years before the current study.

### Results

Data were analyzed by the PROC GLM procedure from the Statistical Analysis System (Joyner 1986). An analysis of covariance procedure was performed. Unadjusted means for the three groups were determined. The means on the pre- and posttests are shown in Table I and Figure 1.

For the analysis of covariance procedure the independent variable was the type of intervention procedure. The covariate was the pretest scores from the spelling subtest of the WRAT-R. The dependent variable was the posttest scores from the spelling subtest of the WRAT-R. The analysis of covariance showed significant differences between the intervention procedures ($F = 87.11$, $p < .0001$). Using Fisher's LSD (Joyner 1986), a post hoc multiple comparison procedure, the significant differences were accounted for by Group 2 which received the

Table I
Pre- and Posttest Means on Spelling Tests for Three Groups (WRAT-R)

| Group | Pretest Mean | Posttest Mean |
|---|---|---|
| 1 | 86.9 | 88.8 |
| 2 | 76.7 | 91.0 |
| 3 | 83.8 | 86.0 |

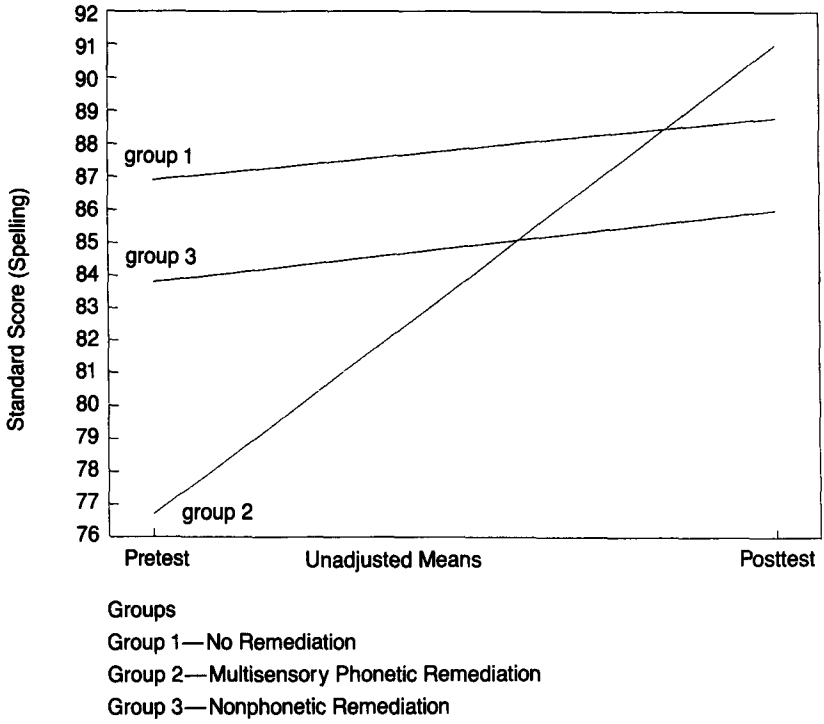


*Figure 1. Wide Range Achievement Test–Revised*

multisensory phonetic technique (O-G). This group was significantly higher on the adjusted posttest scores than were the other two groups. There were no significant differences between the pretest and posttest means of the other two groups. Thus, the post hoc test revealed that the Wilson Reading System, an adaptation of the O-G approach, significantly improved performance on the posttest. The nonphonetic and control groups did not significantly improve. These results seem to indicate that dyslexic college students will significantly improve in spelling with an adaptation of the O-G approach, in this case, the Wilson Reading System. It should be noted that Groups 1 and 3 scored higher on the spelling pretest than did the O-G group, Group 2. However, at the conclusion of the study, the O-G group was functioning on a higher level than the other two groups.

## Discussion

This study revealed that an integrated approach to teaching reading, spelling, and written language will improve spelling in the dys-

lexic college student. This method—reading what is spelled, spelling what is read, and applying the words and rules when writing—seems to promote improvement in spelling as well as in reading (Guyer and Sabatino 1989). Such multisensory synthetic phonetics lessons appear to have enabled subjects to use cognitive skills when learning to encode and decode words. Tutors noted that students who were successful in WRS were enthusiastic and appeared to benefit almost immediately from the WRS. Although specific examples were not documented for this study, there was a noticeable improvement in spelling and written language on papers written for English classes by subjects in Group 2. Several professors commented on improvement noted in spelling during the latter part of the semester. Students in this group appeared to read and spell with more confidence and needed less assistance than they did prior to the study. Results of this study seem to point to benefits from the multisensory synthetic phonetic approach for dyslexic students even at college age.

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