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Effects of Self-Correction on the Spelling Performance of Junior High Students with Learning Disabilities[1]

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The purpose of this study was to compare the effects of Self-Correction and Traditional spelling on the acquisition, maintenance, and generalization of spelling words with five junior high school students with learning disabilities. During Traditional spelling students received a weekly list of 20 unknown words. Daily 20-minute assignments with these words varied among writing them, arranging them in alphabetical order, dividing the words into syllables, and using a dictionary to locate word meaning. Students were tested on the 20 words at the end of the week. During Self-Correction, students received 20 words on a 5-column sheet of paper. Columns were arranged so that stimulus words could be hidden by folding the paper back, and later exposed after the teacher dictated and the student wrote the words. Students used proofreading marks to self-correct. Sessions lasted 20 minutes, and weekly, delayed, and generalized assessments were conducted. Results indicated that for all five students the Self-Correction procedure was more effective for word acquisition than Traditional spelling. Also, for four of the five students, maintenance of words was higher under Self-Correction. Generalization occurred for three students. Finally, measures of social validity indicated that the students preferred Self-Correction over Traditional spelling, although two teachers in regular classrooms did not notice significant changes in the overall spelling

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performance for the students. Implications for the classroom practitioner are discussed.

KEY WORDS: self-correction; specialized spelling approach; spelling; spelling acquisition; traditional spelling.

Spelling is essential for students to master because it allows for the clear expression of thought in written form. DeStefano (1978) states that accurate spelling is considered one index of an educated person. Conversely, incorrect spelling can lead to miscommunication and perhaps misunderstanding on the part of the reader, and the poor speller may substitute a more easily spelled word, and sacrifice the explicit meaning intended for the reader. For instance, the speller may write, "The sunset was nice" instead of the "The sunset was gorgeous," because he or she did not know how to spell the word gorgeous.

Spelling is an integral part of the total language arts curriculum. Graham and Miller (1979) make this point succinctly stating, "While spelling is neither the most important nor the least important aspect in writing, it is a crucial ingredient. Good spellers are able to express their thoughts on paper without unnecessary interruptions. Poor spellers are hampered in their ability to communicate freely through the written word" (p. 1).

Still, in planning a spelling program, there are a variety of options for the teacher to consider. While Heron, Okyere, and Miller (1991) have classified these options into a formal descriptive taxonomy — Traditional, Remedial, and Specialized — current practitioners increasingly demand empirical verification of instructional programs (Tawney, 1982). Unfortunately, within the major approach categories, such verification is often lacking.

Commercial-based, traditional programs, for instance, are used predominantly in spelling instruction, but these programs invariably address skills other than specific spelling orthography. These programs are also generally sound- and pattern-based, and penalize students who do not learn well linguistically. Likewise, several remedial strategies are available that emphasize multisensory approaches to spelling (Fernald, 1943; Gillingham & Stillman, 1970), or phonovisual methods (Schoolfield & Timberlake, 1960). Clearly, students have learned under remedial approaches, but they are also labor intensive for practitioners.

As many special educators are aware, children with learning disabilities often experience extreme difficulty learning and remembering how to spell (Carpenter & Miller, 1982; Graham & Miller, 1979). Students with learning disabilities who have specific deficits in the visual modality are

truly "at risk" spellers because spelling requires revisualization skills or an adequate visual memory (Wallace, Cohen, & Polloway, 1987). They may achieve a good score on a weekly test, but when asked to spell those same words the next week or in another setting, such as science or social studies class, they are not able to do so. Failing to achieve maintenance or generalization of words means that the teacher has to reteach these words, consuming valuable time that could be used more efficiently on another subject or skill, or risk continuing with new words when previous words have yet to be mastered.

Self-Correction, on the other hand, is a specialized approach that research has suggested is one of the most important contributors to students' learning to spell (Allred, 1977; 1984; Christine & Hollingsworth, 1966; T. Horn, 1947; Schoephoerster, 1962). One reason for the success of Self-Correction is that the student immediately compares his or her spelling of a word with a correct model (Ganschow, 1983). Further, Ganschow has suggested that students use proofreader's marks when correcting their own spelling during the time they compare their orthography with the model. The marks serve as a discriminative stimulus to insert, omit, or transpose letters. Even though there appears to be consensus on the efficacy of Self-Correction (Heron, Okyere, & Miller, 1991; McNeish, 1985), there are few published studies that have empirically tested this assertion.

The purpose of the present study was to examine the effects of Self-Correction compared to a Traditional procedure on the acquisition, maintenance, and generalization of written spelling of five junior high school students with specific learning disabilities (SLD).

METHOD

Subjects

Five seventh grade students, two males and three females, served as subjects for this study. The students were enrolled in a learning disabilities resource room in a rural middle school. All students had an identified severe discrepancy between their ability and achievement as required by the state of Ohio standards and they met the definition of learning disabled. Spelling ability level for the five students, as measured by the *Brigance Diagnostic Inventory of Skills,* ranged from the second to the fifth grade level. Four of the five students had been in the program for two or more years. All five students followed similar daily class schedules, and were mainstreamed for other subjects. The five students participated in spelling instruction during ninth period each day (1:47 p.m. - 2:32 p.m.).

Table 1. Characteristics of Study Participants

Subject	Gender	Age	Ethnicity	SES	IQ	Spelling[1]	Spelling[2]
1	F	14.3	black	low	100	2	3.1
2	F	13.9	white	middle	89	3	3.7
3	F	14.9	white	low	87	5	5.2
4	M	13.8	white	middle	89	5	4.8
5	M	14.1	white	middle	94	3	4.2

[1] Grade Equivalent: *Brigance Diagnostic Inventory of Basic Skills* (Brigance, 1977).
[2] Grade Equivalent: *Peabody Individual Achievement Test* (Dunn & Markwardt, 1970).

Table 1 provides a summary of student characteristics across a number of dimensions.

Setting

This study was conducted in a small, rural, low-to-middle socioeconomic class middle school in central Ohio. The school served approximately 320 students in grades six through eight. The learning disabilities resource room served 15 students, and measured 4.9 m × 2.8 m. The number of students in the classroom at any one time ranged from three to seven. The room contained two tables, each with three to four chairs, one teacher desk, one file cabinet, and one student desk. Spelling sessions were held at the two tables in the room.

Dependent Variables

The dependent variables included the number of spelling words written correctly on the 20-item weekly spelling posttests, delayed posttests, and generalization measures, and responses to social validity assessment questionnaires.

Weekly spelling test

Spelling accuracy was defined as the student writing the sequence of letters correctly (i.e., the orthography of the letters) for the stimulus words presented on the weekly spelling test. Any other variation was counted incorrect. All stimulus words were presented by saying the word, using the word in a sentence, then saying it again. Handwriting errors in words were considered misspellings.

Delayed posttest score (maintenance)

Two to three weeks (10 - 15 school days) following the administration of the weekly spelling test, all learned words (words spelled correctly on the previously administered weekly spelling test) were readministered to students. Hence, it was possible for students to have a delayed posttest on varying numbers of words. Words were scored in the same fashion as the weekly posttest.

Generalization measure

Students were prompted to use their spelling words in context outside of the special education room. Sometimes, teachers issued direct prompts by asking all students in the class to finish sentences or formulate paragraphs based on "starters" (e.g., "Safety rules are important in the lab because . . ."). Science and social studies teachers returned this work, and all other written work, to the first author. She, in turn, located previously learned spelling words (words spelled correctly on the weekly spelling test) and marked them correct or incorrect.

Social validity

Following the tenth week of data collection, questionnaires were given to each student and to their regular class (mainstream) teachers. Students responded to two questions: (a) Which condition did you like better?, and (b) Which condition do you feel helped you learn your words better? The mainstream teachers responded to the following questions: (a) Did you notice that (name of student) spelled more words correctly in his/her written work for the past 10 weeks?, (b) Did you notice any change in (name of student) spelling performance in the past 10 weeks?, and (c) Did you notice any change in attitude toward school work in general on the part of (name of student) in the past 10 weeks?

Interobserver Agreement

Dependent variables

Interobserver agreement checks were conducted every other week by the first author and an independent observer trained to score spelling words. Observers agreed on 492 of the possible 500 weekly words scored,

yielding an interobserver percentage agreement of 98%. For the delayed posttests, agreement occurred for 376 of the 380 words scored, yielding a percentage agreement of 99%. On the generalization measure, interobserver agreement checks were conducted on every fourth permanent product collected. Agreement occurred for 33 of the 33 generalization measures scored.

Independent variable

A perfect coefficient of reliability (i.e., 100%) was obtained for the independent variable. That is, when the Self-Correction condition was in effect (weeks two, three, six, eight, and nine), the five steps making up this phase were completed each time (i.e., set the timer, distribute the 5-column form, students engaging in self-correction, stop after 20 minutes, collect papers). Likewise, when the "Traditional" phase was in effect (weeks one, four, five, seven, and ten), all five steps constituting that phase were completed 100% of the time (i.e., set the timer, distribute the words, students engaging in syllabication, dictionary work, or alphabetizing, stop after 20 minutes, collect papers). Checks were completed by the first author and another independent observer every third day for the final five weeks of the study.

Procedures

Two conditions were manipulated in an alternating treatments design. During Traditional spelling, students received 20 words weekly and engaged in daily 20-minute assignments (e.g., writing the words, arranging words in alphabetical order, dividing words into syllables, using a dictionary to locate word meaning). A written spelling test was administered on Friday.

Prior to introducing Self-Correction, students learned four proofreader's marks (add, omit, reverse, wrong letter) to correct their work (McNeish, 1985). Then, students received 20 words, and they self-corrected for 20-minutes daily (Monday - Thursday). Column 1 contained the target words, and was folded back so that the students could not see them. The remaining columns were blank. Words were dictated and students wrote them in Column A-1. Students exposed Column 1 to self-correct using the proofreader's marks, and wrote the complete and correct orthography in Column A-2. Columns B-1 and B-2 allowed for a second practice trial of the words during the 20-minute period. A written test was given Friday.

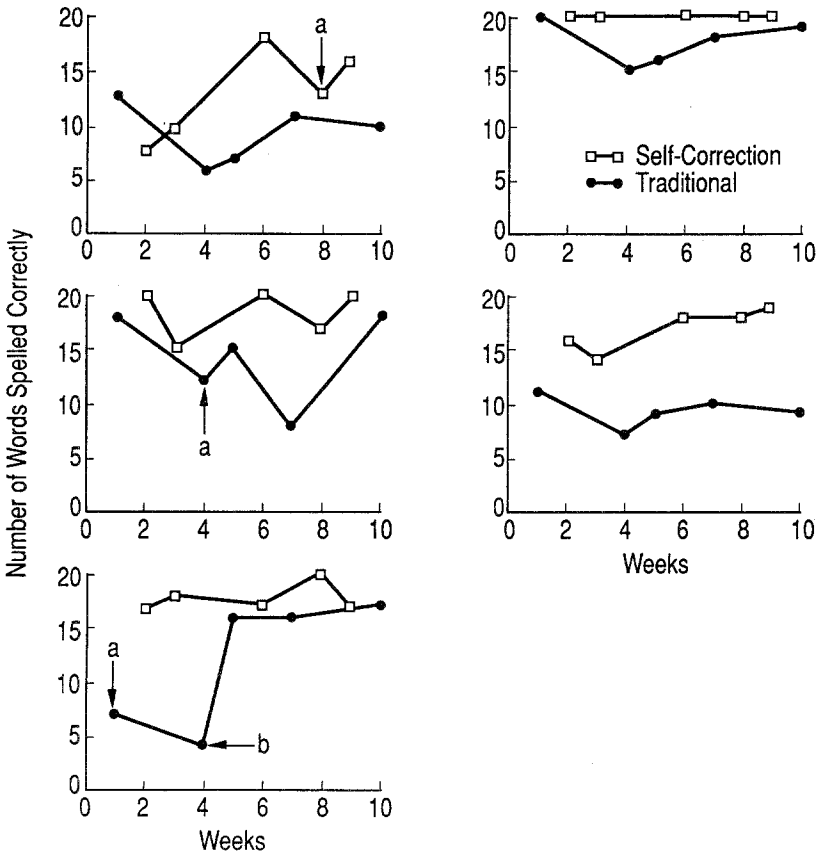

Fig. 1. Number of words spelled correctly on weekly posttests by each student across Self-Correction and Traditional approaches. (In the upper left-hand tier, [a] refers to Student 1 taking the posttest five days, rather than one day, after completing the final self-correction activity. In the middle left-hand tier, [a] refers to Student 2 taking the posttest three days after the final activity in Traditional spelling. In the bottom left-hand tier, [a] refers to Student 3 taking the posttest 10 days after completion of Traditional spelling, while [b] refers to this student taking the posttest three days after completion of Traditional spelling).

RESULTS

Figure 1 shows that all students spelled more words correctly under Self-Correction than under Traditional Spelling. Students gained an average of 4.9 words correct per week during Self-Correction. Further, students learned to spell an average total of 86.2 of the possible 100 words under

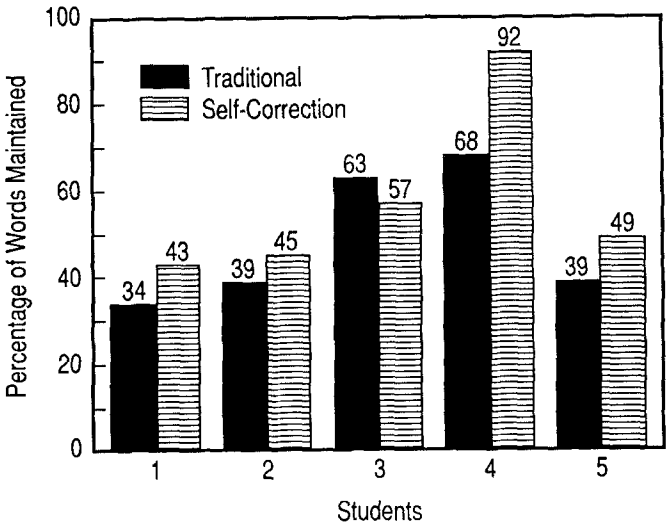

Fig. 2. Percentage of words maintained on delayed posttests by each student across Self-Correction and Traditional approaches.

Self-Correction, but only an average total of 62.4 of the possible 100 words under Traditional Spelling.

Delayed Posttest Scores

Figure 2 shows the delayed posttest scores for all students. Four of the five students showed higher maintenance scores under Self-Correction. Student 3 was the only student to maintain fewer words during Self-Correction. On average, students maintained 57.2% of the words under Self-Correction, whereas only 48.6% of the words were maintained during Traditional Spelling.

Generalization Measures

Written work samples in science, social studies, reading, and language arts were collected and analyzed throughout the 10-week period to determine if students spelled words accurately in their written work in settings other than the one in which the words were learned. Three of the five students produced a higher percentage of generalized words in other settings

Table 2. Number and Percentage of Words Generalized for Each Student for Each Condition

Spelling Conditions	S1	S2	S3	S4	S5
Self-correction	9/17* (53)**	9/16 (56)	4/8 (50)	16/24 (66)	9/15 (60)
Traditional	5/12 (42)	4/6 (66)	0/14 (0)	8/12 (66)	4/7 (57)

*Numerator shows the number of previously learned words spelled correctly during the generalization measure. Denominator shows the total attempts to spell previously learned words.

**The numbers in the parentheses show the percentage correct.

when Self-Correction was in effect. One student (Student 4) remained the same, and one student (Student 2) produced a higher percentage under the Traditional approach. These data need to be analyzed cautiously, however, because of the low number of total words found in the generalized settings. Findings for individual students are summarized in Table 2.

Social Validity

Students were interviewed at the conclusion of the study concerning their preferences for Self-Correction or Traditional spelling. All five students responded without hesitation that they preferred Self-Correction. When asked why, two stated that "It wasn't as boring." One student stated that she felt she "learned her words better," and another said that Self-Correction "was fun." When asked which condition they believed helped them learn more words, four of the five students said, "Self-Correction." The other student said she believed she learned her words well under both conditions.

A questionnaire was administered to the science and social studies teachers with whom all five students had class daily, asking them whether they noticed any changes in spelling performance. The teachers were unable to state definitively if spelling changes occurred. No spontaneous verbal or written comments regarding improved student spelling performance were obtained.

DISCUSSION

The results of this study showed that Self-Correction produced higher weekly posttest scores for all five students and higher delayed posttest

scores for four of the five students, confirming previous findings (Allred, 1977; Christine & Hollingsworth, 1966; Ganschow, 1983; T. Horn, 1926; Schoephoester, 1962). On weekly spelling tests. scores for all five students indicated that, on average, students learned 24 more words during the 5-week Self-Correction condition. This means that students learned an average of 4.8 more words per week — over a word per day — during the 5 weeks of Self-Correction than during the five weeks of Traditional spelling. Although an average of 4.8 words per week may not seem substantial, over a school year of 36 weeks the potential number of words that might be learned over and above a Traditional method of spelling instruction is high ($4.8 \times 36 = 173$ words).

On the delayed posttests, four of five students showed an increase in the average percentage of words spelled correctly. The average increase in favor of Self-Correction ranged from 6% to 24%.

On the generalization measure, three of the five students spelled more Self-Correction words correctly in other settings during the school day than words learned during Traditional spelling. Because all students learned more words during Self-Correction, an increased chance of spelling more of these words correctly existed. Still, as a percentage of words spelled correctly, three of the five students showed greater generalization of words learned under Self-Correction than the Traditional method.

It is clear that students preferred the Self-Correction condition. Their verbal comments subsequent to the study were overwhelmingly in favor of Self-Correction. Changes in student spelling performance, however, may not have been robust enough within a 10-week period to produce corresponding changes in teachers' opinions of improved spelling behavior.

Several factors need to be taken in account when examining the results. For example, Students 1 and 3 were absent a number of times during the 10-week period, perhaps affecting their performance on tests or generalization measures. Also, this study was conducted during the last 10 weeks of the school year. Students were not as involved in written work, especially during the last three weeks when review for exams occurred, and motivation was probably a factor as the school year closed. Finally, since students learned more words under Self-Correction, they had more opportunity to respond on delayed posttests and in generalization activities.

This study has at least three implications for teachers. First, students learned, maintained, and to some extent generalized more spelling words under the Self-Correction. In essence, this procedure is functional in that it produces meaningful change in performance (Hawkins, 1984). Few spelling programs are able to claim the effects produced by this procedure, especially within a 10-week period. Second, although this study was

conducted with students with learning disabilities during their language arts class in the LD classroom, it is clear that the procedure can he used with any student or class as long as the words can be recorded. Self-Correction is easy to implement, and it is practical in terms of student time. Self-Correction sets the occasion for students to assume responsibility for their own learning, a critical variable in educational practice. Also, it puts them in "contact with the contingencies," which, for students with learning disabilities, is a vital factor in their total education. Finally, students preferred Self-Correction to other procedures. When students prefer an instructional system, learning is more likely to occur.

REFERENCES

Allred, R. A. (1977). *Spelling: The application of research findings.* Washington, DC. The National Education Association.

Allred, R. A. (1984). *What research says to the teacher: Spelling trends, contents and methods.* Washington, D.C.: National Education Association.

Brigance, A. H. (1977). *Brigance: Diagnostic inventory of basic skills.* N. Billerica, MA: Curriculum Associates.

Carpenter, D., & Miller, L. J. (1982). Spelling ability of reading disabled LD students and able readers. *Learning Disability Quarterly, 5,* 65-70.

Christine, R., & Hollingsworth, P. (1966). An experiment in spelling. *Education, 86,* 565-567.

DeStefano, J. S. (1978). *Language, the learner, and the school.* New York: John Wiley.

Dunn, L. M., & Markwardt, F. C. (1970). Peabody *Individual Achievement Test.* Circle Pines, MN: American Guidance Service.

Fernald, G. (1943). *Remedial techniques in basic school subjects.* New York: McGraw-Hill.

Ganschow, L. (1983). Teaching strategies for spelling success. *Academic Therapy, 19,* 185-193.

Gillingham, A., & Stillman, B. (1970). *Remedial training for children with specific difficulty in reading, spelling, and penmanship* (7th ed.). Cambridge, MA: Educators Publishing Service.

Graham, S., & Miller, L. (1979). Spelling research and practice: A unified approach. *Focus on Exceptional Children, 12,* 1-16.

Hawkins, R. (1984). What is "meaningful" behavior change in a severely/profoundly retarded learner. In W. L. Heward, T. E. Heron, D. S. Hill, & J. Trap-Porter (Eds.), *Focus on behavior analysis in education* (pp. 282-286). Columbus, OH: Merrill.

Heron, T. E., Okyere, B., & Miller, A. (1991). A taxonomy of spelling approaches. *Journal of Behavioral Education, 1,* 117-130.

Horn, T. D. (1947). The effects of the corrected test on learning to spell. *The Elementary School Journal, 47,* 277-285.

Larsen, S., & Hammill, D. D. (1976). *Test of Written Spelling.* Austin, TX: Pro-Ed.

McNeish, J. (1985). *Effects of self-correction on acquisition, maintenance, and generalization of spelling words with learning disabled students.* Unpublished masters thesis, The Ohio State University, Columbus.

Schoephoerster, H. (1962). Research into variations of the test-study plan of teaching spelling. *Elementary English, 39,* 460-462.

Schoolfield, L., & Timberlake, J. (1960). *The phonovisual method.* Washington, DC: Phonovisual Products.

Tawney, J. W. (1984). Empirical verification of instruction: A realistic goal. In W. L. Heward, T. E. Heron, D. S. Hill, & J. Trap-Porter (Eds.), *Focus on behavior analysis in education,* (pp. 246-253). Columbus, OH: Merrill.

Wallace, G., Cohen, S. B., & Polloway, E. A. (1987). *Language arts.* Austin, TX: Pro-Ed.