

Use and Modification of Cover, Copy, and Compare in Spelling for Three Middle-School Students with Multiple Disabilities

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Abstract

This paper evaluates the effects of a cover, copy, and compare (CCC) procedure for improving spelling of three middle-school students with multiple disabilities. A combination multiple baseline and reversal design was employed. A functional relationship was demonstrated between increasing each student's spelling accuracy and CCC for one participant. For our second participant, a modified CCC procedure is more effective than CCC alone. For another participant error drill was added to CCC and performance improved. The use of single case research methodology allowed us to monitor our interventions so that modifications could be successfully made with our participants.

Keywords: Cover, copy, and compare (CCC), spelling, middle school students, multiple disabilities, single case research designs, data-based decision making

Introduction

Spelling remains a very important skill for students to learn (McLaughlin, Weber, & Barretto, 2004). Spelling is one of the component skills crucial to written expression, which is an important part of nearly every academic area (MacArthur & Graham, 1987). When students are able to spell more words correctly, they may develop greater confidence in their writing and develop better overall quality writing (Graham, Harris, & Fink-Chorzempa, 2002). With an ability to express themselves in writing, students are able to elaborate on concepts, feelings, and information in a way that may lead to more concrete statements and longer prose. However, if a student struggles with spelling, it could interfere with the cognitive resources that are required for more complex writing skills and affect their ability to compose prose and develop style (Graham, 1990). In turn, they may well struggle to develop the planning and organizational skills with their writing, which could be generalized to other subject areas (Viel-Ruma, Houchins, & Fredrick, 2007).

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Possibly more important, than spelling for composition, is the spelling of core and high use words. For example, if students cannot spell basic core words that they use in their everyday vocabulary, their written expression may well be effected (Berninger, Vaughan, Abbott, Begay, Byrd, Curtain, Minnich, & Graham, 2002). It has been suggested that the 100 most frequently-used words in the English language account for over 60% of total words in common text. Also, the 1,000 most frequently used words account for over 90% of the running words used in any form of written media (Horn, 1924; Fitzsimmons & Loomer, 1978) Unfortunately, over time, spelling appears to have lost some of its importance in the schools or is being replaced by highly unstructured spelling procedures (Gettinger, 1985, 1994; Graham, 2000). Christenson, Thurlow, Ysseldyke, and McVicar (1989) indicated that when it comes to spelling instruction for students with learning disabilities, the time allotted for daily spelling instruction across instructional settings varies widely. Unfortunately, the average instructional time from their study came out to be only ten minutes per day. Allred (1987) suggested that such a time allotment would be beneficial for children with or without learning disabilities. In addition, it was found that teachers who worked with students with “mild academic disabilities” often used techniques that were supported and suggested by research conducted with non-LD students, as well as techniques that had no basis in research (Valecora, Zigmond, & Henderson, 1985).

A well-documented research-based intervention has been cover, copy, and compare (CCC) (McLaughlin & Skinner, 1996; McLaughlin et al., 2004; Skinner, McLaughlin, & Logan, 1997). Employing CCC procedures has been shown to be superior to practicing words in sentences or free independent study in spelling (Murphy, Hern, Williams, & McLaughlin, 1990). Some additional benefits of CCC procedures have included: (a) it is highly time efficient; (b) it allows for students’ to self-manage their academic work; and (c) is enjoyed by both students and staff. CCC procedures allow students to engage in error correction and to be provided with immediate feedback (McLaughlin & Skinner; 1996; Skinner et al., 1997). This provides a more efficient way for students, especially those with disabilities, to work on their spelling throughout the week. Since the students are engaging in his activity at a self-managed pace, they may gain both skills and confidence in their spelling (McLaughlin, Mabee, Reiter, & Byram, 1991; McLaughlin & Skinner, 1996; Nies & Belfiore, 2006; Rathvon, 2008; Skinner et al., 1997; Stading, Williams, & McLaughlin, 1996).

Students with multiple disabilities need to acquire many of the same skills that other students learn. At this point in time, little research has been published on the use of CCC for students with multiple or severe disabilities. In fact, most of the previous research has employed either students in general education (Schermerhorn & McLaughlin, 1997) or students with mild disabilities (Becker, McLaughlin, Weber, & Gower, 2008; Hubbert, Weber, & McLaughlin,

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2000; Kearney, & Drabman, 1992; Lee & Tingstrom, 2006; McAuley & McLaughlin, 1992; McLaughlin et al., 1991; Murphy et al., 1990; Pratt-Struthers, Bartalamay, Williams, & McLaughlin, 1989; Stading et al., 1996), or high school students with severe behavior disorders (Carter, McLaughlin, Derby, Schuler, & Everman, 2011). Clearly, more research needs to be carried out with such students.

One of the many benefits of employing single case research designs and frequent measurement allows the teacher to make changes in interventions based on student performance (Barlow, Nock, & Hersen, 2007; Kazdin, 2010). Visual inspection of student data allows the educator to continue or to make modifications. The effects of changing or modifying interventions can be seen quickly. The use of single case research designs has been suggested by several authors (Alberto & Troutman, 2008; Barlow et al., 2007; Kazdin, 2010) to monitor and evaluate student. We have been employing such designs in several of our courses to teach our candidates (students) the importance of data collection and evidence-based decision-making (McLaughlin, Williams, Williams, Derby, Peck, Bjordahl, & Weber, 1999). Also, some of these efforts have appeared in the peer-reviewed literature (Bishop, McLaughlin, & Derby, in press; Carter et al., 2011; Erbey, McLaughlin, Derby, & Everson, 2011; Green, McLaughlin, Derby, & Lee, 2010; Kaufman, Derby, McLaughlin, & Waco, 2011; McGrath, McLaughlin, Derby, & Bucknell, in press; Ruwe, McLaughlin, Derby, & Johnson, 2011)

One purpose of this study is to determine if CCC procedures could improve the accuracy of spelling for three male participants with multiple disabilities. Each participant struggles with spelling, especially in spelling of core words below a middle-school level. A second purpose extends the use of CCC to middle school students with multiple/severe disabilities. Our final purpose documents the use of single subject methodology and evidence-based decision making regarding CCC.

Method

Participants and Setting

The three participants in this study were all enrolled in a self-contained, special education, middle-school classroom. All three students participated in electives in the afternoon, but were in the classroom at least four of the six class periods each day. Student A was a 12-year-old male diagnosed with intellectual disabilities. He was in 7th grade and attended a self-contained classroom throughout the day and one integrated 7th-grade general-education classroom for 5th period four days a week. Student B was a 12-year-old male diagnosed with other health impairments. He was in 7th grade and attended a self-contained classroom as well

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as an integrated 7th grade general-education classroom for 4th period four days a week. Student C was a 13-year-old male diagnosed with health-impairment, intellectual disabilities, and TBI. He was in the 8th grade and attended a self-contained classroom throughout the day as well as two integrated 8th-grade classrooms for 2nd and 5th period each day, four days per week. All students demonstrated deficits in spelling based on classroom observations. Due to the students' low performance in spelling of core words, an intervention was needed to increase their speed and accuracy in spelling.

This study was conducted in a self-contained middle-school special education classroom in the Pacific Northwest. There was an average of eight other students with multiple disabilities in the classroom during all sessions. Diagnostic labels in the classroom included cerebral palsy, autism, learning disabilities, intellectual disabilities, and oppositional defiant disorder (ODD). There was one certified teacher and three certified aides to assist the students with their academic and life skills. All of the students' daily classroom activities made use of classroom tables and desks to accommodate individual, small group, and whole group instruction.

Reward time options were already established at the beginning of the year as part of the classroom context. The consequences employed included, but were not limited to, computer time, drawing, puzzles, or reading (with assistance or on own). Because these reward activities were established prior to the study, no further rewards were created. Student A and B enjoyed computer time (as a reward for accomplishing the required morning work) and Student C often chose to draw in a notebook.

Materials

The spelling tests and CCC were integrated into classroom instruction and were part of the work students were expected to complete to earn rewards. Reward time materials included use of computers (four were in the classroom) and providing paper and pencils/crayons for drawing. Other materials included a spelling folder, for each student, which included lined paper for their tests. In addition to the lined paper, the students would have a blank cover, copy, and compare worksheet with their words on it tucked inside the first pocket of the folder. They would work on this each day and then hand in their work so that it would not be copied/used later, during a test. Spelling words were chosen from High-Frequency Word Lists (Kindergarten through Sixth Grade) that were part of an elementary spelling program developed by Sitton (1998).

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Dependent Variable

Correct spelling of core words was the dependent measure in the research. A correct word was defined as such if every letter matched the specific word as printed on the teacher's correction key. Any deviation was scored as an error.

Data Collection and Interobserver Agreement

The first author administered three tests per week. These occurred typically on Monday, Wednesday, and Friday afternoon. When CCC was in effect, each student was given a worksheet with their ten words and three columns (standard cover, copy, and compare sheet). If time allowed, they would write two to five sentences containing one of the spelling words in each sentence. However, the main focus was on the ten target spelling words and the cover, copy, and compare procedure. Spelling tests were given with the standard procedure of saying the word, repeating it, using it in a sentence, repeating the sentence, and saying it again in isolation. When the tests were completed, the teacher would correct them and record the results on a worksheet placed in a main folder. The students would be told how many they spelled correctly – but not which words they missed. This was done as a way to not affect their performance on the next test.

Interobserver agreement was measured by employing the classified instructional assistants (aides) or the primary certified classroom teacher. This was done a total of 33% of the sessions – meaning that it was completed once a week. Because the test was given with all ten words at once and the results corrected later, there was no need to have the interobserver at the actual test but instead to read the results and agree/disagree with the scoring. This ensured a quick testing procedure and one that was as non-disruptive as possible. The formula for computing interobserver agreement was the smaller number divided by the larger number and multiplying by 100. Reliability was 100% over the duration of the study.

Experimental Design and Conditions

The interventions were evaluated using a multiple baseline and an ABC or ABCD single design (Barlow et al., 2008; Kazdin, 2010).

Baseline: During baseline, the students were moved to a designated table, separate from the other students and educators in the classroom. This was done to reduce the effects of classroom noise and distractions. Participants were asked to get a pencil and to sit quietly as they were handed their spelling folders (small folders of different colors with the students'

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initials on them. Each folder also had lined paper for the students to use for their inclass spelling tests. Students were seated near the first author, and attention was paid so that the students sat across from each other or with enough distance so that they could not glance at another student's paper and copy their spelling. Each student was asked to write down – to the best of their ability – 30 words. The first 25 words were compiled from the 2nd and 3rd grade CORE spelling lists. When they finished this task, an additional five core spelling words from the Second Grade list were given. This was done to attempt to provide our participants with success in spelling. When the test was administered, the first author said each word aloud twice, used it in a sentence, repeated the sentence, and then repeated the word. There were sometimes variations in the exact amounts of repetition due to the students' familiarity or speed at picking up the word. Some of the more difficult words required careful sentences while others required a simple sentence to reaffirm context for the students. Throughout the test, students received no feedback on their speed or accuracy. This included no praise given if they spelled the word correctly and certainly no comments made if they spelled the word incorrectly. If the student asked about the accuracy of their spelling, the first author would simply say "I cannot give you the answer. Do your best."

After the initial 30-word test, a list of 10 words was compiled, drawing mostly from the top of the second-grade core word list. Careful attention was made that there were at least two or three words, which the students could spell correctly so that there was some data to work with and build upon. From that point on, all tests consisted of these same 10 words. After the students completed their test, they were thanked for their hard work and transitioned into another classroom activity. The tests were then later compiled and their scores recorded on individual worksheets.

Cover, copy, and compare (CCC). When the intervention began with each student, they were given a standard cover, copy, and compare worksheet that included their ten core words, three columns next to each word for the cover copy, compare procedure, and five lines at the bottom of the page. These lines were used to write each word in a sentence. However, this was not required for any of our participants. Student B had difficulty writing coherent sentences that actually included the spelling words. Student C had little difficulty constructing sentences, despite repetitive spelling miscues (though the spelling words themselves were spelled correctly). Student A had difficulty constructing the sentences and often ran out of time or completed two (as allowed by the first author). The cover, copy, and compare worksheet was completed everyday at the beginning of the day in homeroom (their classroom time before 1st period started). When there was no homeroom before 1st period, the students would do it as soon as they got back from 1st period (as 1st period was P.E. and took place in the gym; not in the classroom). With CCC, each word had three columns spread horizontally

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across the paper. In the first column, the student would simply copy the word. For the second column, the student folded the left side of the paper towards the middle so that it covered the first column but left the second and third columns visible. The student would then spell the word from memory (since the first column was covered and they could not see their writing or the typed word) and write it in the second column. Then they would open their paper to compare their first and second spellings. If an error was made they were required to re-write the word three times in the 3rd column (Skinner et al., 1997). If they were doing the intervention incorrectly (such as copying all the words first before doing anything with the second column of lines) they were quickly told how to do it correctly. If they completed the word list, then some assistance was given in sentence construction, if time allowed.

Adjustment CCC. A phase change was made after session 10 to increase the accuracy of Student A and Student C. Student A was consistently missing the same three to four words each test, and Student C was consistently missing the same five words. Since neither student seemed to be making any improvement regarding those words, a phase change was implemented to focus more on those words. In the phase change, Student A was asked to at first focus on the three words he missed. He would copy the word and spell it out loud (while being able to look at the word). Then the teacher/instructor would cover the word (as in the usual copy, cover, compare practice) and ask the student to spell the word out-loud without looking at the paper. After the student correctly spelled the word out loud, they would be asked to write the word. Then, the teacher/instructor flipped the paper over and asked the student to correctly spell the word out loud again. After completing this correctly, the student would write the word one last time and then repeat this procedure with the teacher/instructor for the other two focus words. After Student A performed this task with all three words, then he was asked to do standard copy, cover, compare with the other seven words for extra practice and retention. Student C, would do the same thing as Student A, but with the five words he regularly missed. The original phase change consisted of having Student C focus on two or three frequently misspelled words. Given his performance, Student C was allowed to practice with all five misspelled words followed by CCC.

Following a scheduled school holiday break (i. e. Christmas lasted over two weeks), the participants were scheduled to have a maintenance probe (Barlow et al., 2008). Student C was given the worksheet in the early afternoon for practice (as his intervention was to continue until a level of mastery was achieved and performed better on his oft-missed words. Because the student did well on a test the next day, without the intervention, it was then decided to have Student C be tested on words without CCC. The only intervention that took place was a quick verbal practice with two words – ‘people’ and ‘could’, his two most often-missed words – at least a half-hour before taking the test.

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Error drill and no CCC. A phase change was implemented after Session 10 for Student C. He was tested another three times that week and once the following week. Additional error drill was provided for the words he was missing, but no CCC was employed. He was to write each error over five times. This condition was in effect for four sessions.

Results

The results for each participant are shown in Figure 1. For Student A, he was only able to spell an average of just 1.33 correct words correctly in baseline. Student B averaged 4.2 correct words in baseline. Student C averaged 3.5 correct words in baseline.

When CCC was employed, Student A's performance improved ($M = 6.3$ words). When the CCC procedure was adjusted for Student A, he had perfect spelling performance on the last three spelling tests. Student B also made immediate gains when CCC was employed for tests 6 through 12. His average test score was 9.6 words correct (range 8 to 10 words). Student C's scores for CCC were similar found in baseline (range of 4 to 9 words correct). When his CCC procedure was adjusted, his spelling performance increased (range 4 to 9 words correct). When CCC was withdrawn and error drill employed, his spelling performance further improved ($M = 9.0$; range 8 to 10 correct words).

Maintenance probes. When the students returned from winter break, the intervention was continued with Student C while Students A and B were assessed with a maintenance probe. Student A spelled 7 out of 10 words correct, and Student B spelled 6 out of 10 words correct. This was a decrease for both Student A and B. However, it had been nearly a month since Student A and Student B were tested on these words (Dec. 7th and January 4th, respectively). A phase change was implemented after Test 18 (the maintenance probe). Student C was not given the intervention and was instead tested an additional three times that week and once on the following week. He scored a 9 on Test #19, an 8 on Test #20, a 10 on Test #22, and a 9 on Test 22. On all of his final tests, he consistently misspelled "people", and sometimes misspelled "could". These proved to be the two most difficult words for him to correctly spell.

Discussion

The present use of single case methodology allowed the first author to make changes in CCC with each participant. The efficacy and the applicability of employing single case designs in classroom research has been outlined elsewhere (Alberto & Troutman, 2008; Cates, Skinner, Watson, Meadows, Weaver, & Jackson, 2003; Barlow et al., 2008; Kazdin, 2010). With

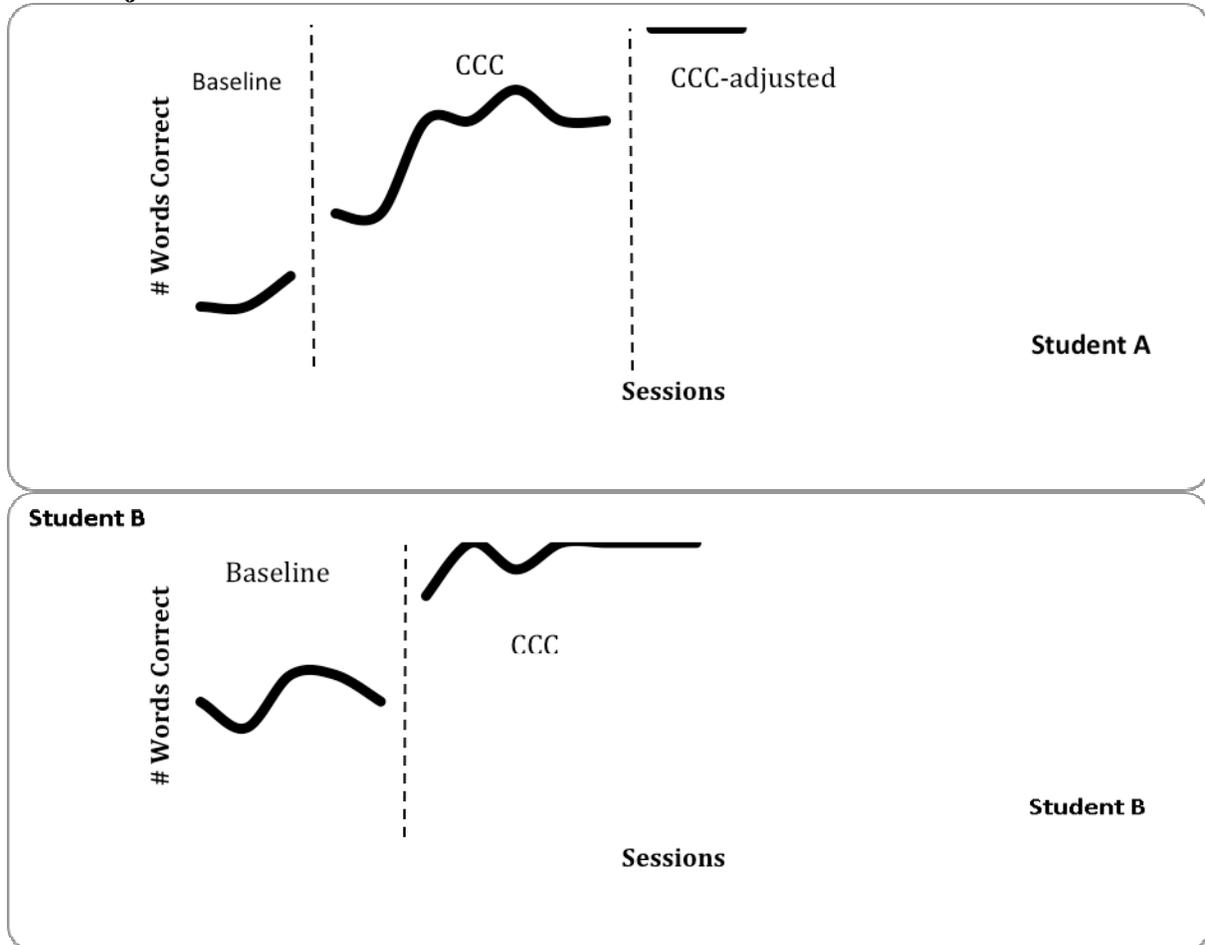
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Student A, a modification of CCC was necessary because the student seemed to always be missing the same words while getting the others right each time. The phase change, which added error correction, was employed and it improved his performance. While this change worked effectively for Student A, who scored 100%, it did not lead to complete mastery of his spelling words for Student C. This was why a careful verbal or oral prompt of how to spell the oft-missed words may have assisted Student A. Finally, Student C continued to misspell these same words even long after our intervention and later phase change had occurred.

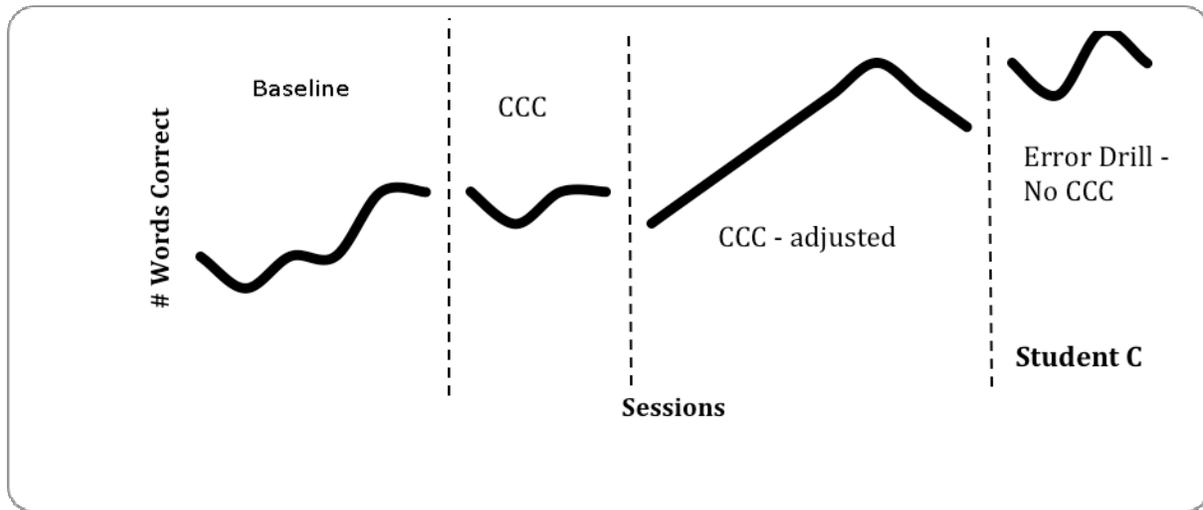
There were several limitations in the present research. The present outcomes provide only a partial replication of CCC with students a more severe disability than reported in previous research (Becker et al., 2009; Bishop et al., in press; Carter et al., 2011; Cates et al., Kaufman et al., 2011; Lee & Tingstrom 2006; Nies & Belfiore, 2006; Stading, Williams, & McLaughlin, 1996). However, one thing that became apparent, especially after the return from winter break, was that the actual intervention and practice might have helped Student C. When Student C came back from winter break, he was able to verbally spell his frequent missed words correctly on the first try. And yet, when he took the maintenance test only an hour later, he missed these same words he had orally spelled correctly just one hour earlier. This could indicate that the extra practice was actually confusing for him, and it may have been too long a time period for him to retain this information. As a result, it was decided to remove the intervention and to simply verbally recite/practice the two frequently missed words ('people' and 'could') at least a half-hour before his test. This way, the new information provided was kept to a minimum and it helped his spelling performance.

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Figure 1. The number of words correct for each participant during baseline, CCC, CCC-Adjusted or with error drill and no CCC.



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It could be also be argued that it was a mistake to have Student C learn to spell five words at a time. It could also be argued that, considering the student's disability (TBI), it was too much to be doing ten words at a time. However, when his data were examined Student C seemed to do fine with the 10 words. When the words practiced were reduced to a set of two ("people" and "could"), it. And the fact that Student C was still able to perfectly spell the other 8 words without extra practice goes to show that he could spell these words. It can suggest that, when working with students with TBI, it may well be important to realize that they have very difficult to teach due to their deficits in short-term memory (Heward, 2008). Clearly, employing CCC with similar students appears needed.

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