

Beverly A. Warde Reading Miscues of College Students With and Without Learning Disabilities

Using authentic materials, this study compared the oral reading miscues of 20 university students with reading related learning disabilities to 20 controls matched for age, gender, ethnicity, college GPA, reading achievement score, and college of major. All participants orally read two passages with different text structures from a college textbook. Miscues were analyzed quantitatively and qualitatively. The students with learning disabilities miscued significantly more words in both passages than the controls (1058 to 137 words) and had a significantly higher percentage of loss-of- textual meaning miscues. This study provides evidence that reading decoding difficulties persist for students with learning disabilities even into college, and documents the reading decoding difficulties with authentic text rather than word lists.

Students with learning disabilities (LD) who enter undergraduate college programs are faced with a daunting number of reading assignments each week. In their study of the literacy demands of undergraduate curriculum, Carson, Chase, Gibson and Hargrove (1992) found that both faculty and students ranked reading ability as the most important skill for academic success at the college level. They also found that the average weekly reading assignment for one course could be over 80 pages. These reading passages have more words that are unfamiliar, difficult, technical, abstract and long. However, decades of research indicate that the most common type of reading problem for students with LD is their inability to accurately and fluently identify printed words (Ehri & Wilce, 1983; Torgesen & Wagner,

1998). Yet, little information is presently available regarding the precise nature of reading abilities in students with (LD) who attend college. A few studies have investigated reading problems of college students with LD through the use of real and nonsense word lists (Kitz & Tarver, 1989), the evaluation of standardized measures of phonological segmentation and word attack skills (Vogel & Adelman, 1990), and the use of context in word identification and tasks requiring naming words and non-words (Ben-Dror, Pollatsek, & Scarpati, 1991).

Kitz and Tarver (1989), using lists of real and nonsense words and a phoneme reversal task with LD college students with LD and 10 college students without LD, found the group with LD scored significantly lower on all tasks. The students with LD showed weaknesses in their ability to quickly manipulate phonemes to form new words and to decode real and nonsense words at monosyllabic and polysyllabic levels. The subjects with LD had all participated in an extensive language intervention program.

Vogel and Adelman (1990) comparing high school and college records of 110 college students with LD to a randomly selected peer group of 153 college students without LD, found the group with LD scored significantly lower on a measure of phonological segmentation abilities and word attack skills. The authors interpreted these results as a confirmation of continued phonological deficits and incomplete word attack skills in adults with learning disabilities. A similar interpretation can be made from Bruck's study (1990). Standardized and experimental reading tasks were administered to 20 college students with childhood diagnoses of dyslexia, and to 20 age-matched and 15 reading-matched control subjects. The word recognition skills of the college students with dyslexia were inaccurate and particularly slow. They did not use word recognition processes that are appropriate for their age level or, in some cases, for their reading level. Bruck found that the students with dyslexia over-relied on sound-spelling strategies despite their poor phonological awareness skills.

Using a similar group of subjects, Ben-Dror et al. (1991) compared 20 college students with LD to 20 age-matched college students without LD and to 20 younger students who were matched on reading age. Tasks requiring naming words and non-words, regular and irregular words, and the use of context in word identification were used. The college students with LD were the slowest in all tasks requiring identification of words in isolation and in context. In particular, they had extreme difficulty in naming non-words.

The research on college students with LD indicates that the word attack and word recognition skills that were problematic as children apparently

continue to be problematic into adulthood. However, none of the studies have evaluated these students using the materials they must read on a daily basis, a college textbook. Vogel and Adelman (1990) based their conclusions on a review of standardized assessment results. Other studies employed word lists of real or pseudo words to evaluate word attack skills and phonological processes (Ben-Dror et al., 1991; Bruck, 1990; Kitz & Tarver, 1989). Participant selection and sample characteristics are also issues when reviewing studies of college students with learning disabilities. Some studies have used samples that are a mixture of college students and other participants (Ben-Dror et al., 1991; Bruck, 1990). For the majority of studies involving college students with and without LD, the groups selected were controlled for ethnicity, gender, age, and perhaps a score from some achievement or assessment instrument. Factors that could affect interpretation of comparisons, such as college major, college level (freshman vs. senior, undergraduate vs. graduate), and type of learning disability are not usually controlled. The quantity of reading required can vary significantly among college majors as well as with the year in college. Thus, the literacy experiences of college students with different majors and at different college levels can vary greatly within and between control groups.

Though problems with reading are the primary reason for referral, not all students with LD experience reading difficulties. When comparing a mixed group of students with LD to a group without LD, one may actually find some student with LD whose strength is reading. Considering the lack of specific information available on the reading characteristics of college students with LD when reading college texts, a carefully controlled study is needed comparing the reading characteristics of college students with LD to their college peers without LD using authentic materials.

At the postsecondary level, few standardized, norm-referenced tests adequately assess the reading characteristics of college students with LD. Typically, the available assessment materials measure silent reading achievement of college students with an achievement score reported as a grade equivalent, standard score or percentile. Of the standardized tests available, none give a diagnostic picture of reading proficiency in material similar to a college textbook. Hughes and Smith (1990) have suggested that informal types of assessment, such as a curriculum-based assessment, might be more productive in identifying specific problems, such as decoding, in college students with a reading learning disability. The information gathered could also be used when making decisions about interventions or accommodations.

Oral reading assessment is used widely as a means of assessing an

individual's reading ability, particularly decoding skills. Miscue analysis is a model for evaluating oral reading at any age or reading level and has been widely used in reading research for more than three decades (Christie & Alonso, 1980; K. S. Goodman, 1969; Y. M. Goodman & Burke, 1972). Since reading samples in a miscue analysis can be taken from actual content texts at a college level, the results would be representative of the college student's daily tasks. Miscue analysis allows an investigation of the oral reading miscues, and the reading strategies used by the reader that facilitate or hamper reading comprehension. Significance is attached to the patterns established from the reader's response to the meaning and grammar of the text, not to any single miscue. Since a miscue analysis has the advantage of offering an evaluation using college level texts, it would be an appropriate means of comparing the reading decoding skills of college students with LD to their peers without LD.

In summary, the research has shown that college students with learning disabilities still exhibit problems with word recognition accuracy and fluency when presented with real or pseudo words in lists. Several studies indicated that the college students with LD had word recognition skills more similar to much younger students than to their college peers. However, the extent to which these word recognition problems persist for the students with LD when they read college texts is unknown.

The present study focused on the reading decoding skills of a sample of undergraduate college students with LD in reading who were matched by class status, college major, reading achievement score, and GPA, to a group of peers without LD. Reading passages from a college text with two types of text structures were selected, and a miscue analysis system was developed. The quantity and quality of oral reading miscues and the influence of text structure on either the quantity or quality of miscues were analyzed. Three specific questions were addressed: (a) Do college students with LD miscue orally read words at the same rate as their peers without LD? (b) Is there a difference in the quality of miscues between the two groups? (c) Does the type of text structure influence the number or quality of miscues for either group?

Method

Participants

The participants were 40 undergraduate students attending Florida Atlantic University. All were successfully matriculated upper division students who had, for various possible reasons, not initially passed the College Level Academic Skills Test (CLAST) reading test (a state required college achievement test). All successfully passed the test a second time when allowed double-time. The participants voluntarily participated in

the study and were awarded service hours, which were recorded on their college transcripts. They were divided into two groups: college students with LD and a control group of college students without LD.

Twenty students in this study had current documentation of a learning disability (LD) in reading and received special services at the university. All of these participants had been identified during childhood as having reading learning disabilities and had received special education services during their K-12 school years. The current LD evaluation results met the university criteria of average to above average intellectual ability (Full Scale IQ 85 or better), a minimum 1.5 standard deviation between measures of aptitude and achievement in reading, and a processing deficit. Individual interviews were conducted with each of the participants with LD to determine the extent of reading problems and their current system for coping with those problems. All reported a long history of reading problems that included: slow, laborious reading rates; difficulties with comprehension, particularly sorting out the major ideas from supporting details; poor general vocabularies; and difficulty decoding large words, particularly content-specific words. The students reported the need to reread material many times for maximum comprehension as their main coping mechanism. Some students reported that they relied on others to interpret the text for them, or they did not read the textbooks. These problems are similar to those reported by Runyan (1991) in a study of college students with and without learning disabilities.

The other 20 participants were university students whose primary language was English. They had never been identified as having a learning disability nor had they participated in reading intervention programs. This criterion was set to control for the effects of second language and possible undiagnosed reading disability. The potential participants were solicited from a list of college students who had taken the reading section of the CLAST twice. Students who initially fail the CLAST must take the test the following semester with double time. There is no remediation requirement prior to the second attempt.

The potential participants from this list were categorized according to class status (junior or senior), the CLAST reading score, and college of major. Since college major may influence the type and amount of reading required in college courses, an equal number of participants with and without LD were represented from each college. Lists divided by college major were developed with the names of potential subjects whose CLAST reading scores fit within the range of reading scores produced by the participants with LD. Forty-one potential participants without LD were contacted by mail and asked to participate in the study (34 responded). Six of these potential participants were excluded. Five

of these students had a primary language other than English. The sixth student, who had a history of participation in remedial reading programs, disclosed he had been referred for a learning disabilities assessment. Of the remaining potential participants, 20 students consented to participate in the study.

Thus, the two groups of students were similar in many ways except for the diagnosis of a learning disability. By matching the subjects on several variables (age, GPA, college of major, class status, and reading scores) this study provided comparability of experimental and control groups. Table 1 provides demographic information for all participants.

Table 1

Descriptions of Participants: With Learning Disabilities (LD) and Without Learning Disabilities (NLD)

	LD (<i>n</i> = 20)	NLD (<i>n</i> = 20)
Gender		
male	11	12
female	9	8
Age		
mean	25	24
range	21 - 29	21 -28
Race		
Anglo	18	19
African-American	2	1
GPA		
mean	2.80	2.85
<i>SD</i>	.49	.46
range	1.9-3.6	2.0-3.5
State Exam		
Reading Score		
mean	307	308
<i>SD</i>	11	11
range	293 - 328	295- 330
Colleges		
Arts & Humanities	1	1
Business	6	6
Education	4	4
Engineering	1	1
Science	4	4
Social Science	4	4

Procedure

Reading Selections. The reading passages selected for the study were taken from a 1994 college textbook (*Social Problems* by Eitzen & Zinn) used in introductory college courses on social problems. To control for the possibility that any of the participants would have read the passages prior to the study, the textbook selected was not used at the university. Each passage was between 500 to 700 words in length and was a complete subsection within a chapter. Since enumeration and historical text structures are commonly found in college textbooks, one passage from each structure was selected. The enumeration passage dealt with current issues in education, and the historical text structure dealt with a history of the feminist movement.

Miscue Analysis Scoring. A scoring form, similar to forms developed by Y. M. Goodman, Watson, and Burke (1987), was developed and used to record and categorize the oral reading miscues. All reading responses that differed from the text were counted as a miscue. Dialect differences in pronunciation were not counted as miscues, and a repeated miscue of the same word would count as one miscue as long as the function of the word remained the same.

All miscues were rated in the three categories of Total Number of Miscues, Graphically Similar Miscues and Self-Correction Miscues. A Graphically Similar miscue had two out of three parts of the word (beginning, middle or end) similar to the text word. For instance, the miscue "doorman" would be scored as graphically similar to the text word "dormant." If a participant self-corrected a miscue, the scoring stopped for that particular miscue with these three categories. Only uncorrected miscues were scored for Syntactic Acceptability, Semantic Acceptability, and Meaning Change (as assessed by the evaluators). Syntactically Acceptable miscues were grammatically acceptable in the context of the sentence. The participant produced a grammatically correct sentence, even though it may not be correct within the context of the entire paragraph or reading selection. Semantically Acceptable miscues were miscues whose meaning was similar to the text word in a meaningful sentence. If a miscue was judged to be either syntactically unacceptable or semantically unacceptable, the scoring procedure stopped. Otherwise, the miscue would be evaluated in the last category, Meaning Change Miscues. Scoring for this category answered the question, "Does the syntactically-semantically acceptable miscue result in a change of meaning in the text as a whole?" This category focused on how much of the message of the text has been altered by the reader's miscue.

Data Collection

Each participant was tested individually in a private office for one session of 30 to 45 minutes. Participants were asked to orally read each passage, which were presented in random order. The oral readings were tape recorded, later transcribed verbatim, and the miscues were scored.

Scoring

Two independent raters and myself completed the transcription and categorization of the miscues. The independent raters, both with extensive experience in language development, were trained in transcribing and scoring miscues during two 90 minutes training sessions. Practice materials that duplicated the oral reading tasks of this study were developed for the training. Three practice participants (students with learning disabilities in reading) were recruited who fit the criteria for subject selection except for class standing. The tape recordings and transcriptions of their oral reading miscues were used as the training materials.

The tape-recorded oral reading miscues and self-corrections of the 40 participants were independently transcribed on copies of the original texts by a second rater and myself. Of the 1,195 miscues recorded for all participants on both oral-reading selections, the second rater and I agreed on all but 6 words. The differences were resolved jointly by replaying the tapes at varying speed and tone settings. The transcribed oral reading miscues were then transferred to a Miscue Analysis Scoring Form.

The oral reading miscues were then analyzed and categorized on the Miscue Analysis Scoring Form by a second rater and myself. Interrater agreement by miscue category was:

1) Graphically Similar: 100% for the feminist movement selection. 99% for the education passage; 2) Self-corrected miscues: 100% for both selections; 3) Syntactically Acceptable miscue: 95% for the feminist selection. 91% for the education passage; 4) Semantically Acceptable miscue: 92% for the feminist article, 93% for the education; 5) Meaning Change miscue: 92% for the feminist passage, 95% for the education article.

Design and Data Analyses

For the statistical analyses, the Total Miscues category used the raw score total number of miscues for each reading selection. For the remaining categories the number of miscues in each was calculated as a percentage of the total number of miscues for each reading selection. The use of percentages of miscues to determine error rate is typical of methods used in miscue analysis (Harris & Sipay, 1990). Graphically Similar miscues

were the percentage of the total miscues that were graphically similar to the text word. Self-corrected miscues were the percentage of the total miscues that were self-corrected. The raw scores of the last three categories of miscue types (Syntactically Acceptable, Semantically Acceptable, and Meaning Change) were reconfigured into two categories: No-Loss-of-Meaning and Loss-of-Meaning. No-Loss-of-Meaning miscues were the percentage of the total miscues that were syntactically and semantically acceptable, and did not cause a meaning change in the text as a whole. Loss-of-Meaning miscues were the percentage of the total miscues that were either: 1) syntactically unacceptable; 2) syntactically acceptable, but semantically unacceptable; 3) or syntactically and semantically acceptable, but resulted in a change of meaning for the entire text.

The mean raw scores of the total number of miscues and the mean percentages of the four types of miscues were the dependent variables in repeated measures factorial analyses of variance with group membership (LD, NLD) as the between-subjects factor, and text structure (historical and enumeration) as the within-subjects factor. Due to multiple analyses of variance and the need to control for Type I error, the alpha level selected for testing was set at .01.

Table 2
Total Number of Miscues and Percentages of Types of Miscues by Text Structures

Group		LD		NLD	
		HY	EN	HY	EN
Total Miscues	M	26.15	26.75	3.60	3.25
	(SD)	(14.15)	(14.72)	(2.39)	(2.38)
% Graphically Similar	M	88	83	92	90
	(SD)	(11)	(11)	(18)	(19)
% Self-Corrected	M	20	20	39	39
	(SD)	(17)	(16)	(34)	(35)
% No Meaning Loss	M	21	26	34	30
	(SD)	(14)	(18)	(32)	(31)
% Loss of Meaning	M	58	54	26	31
	(SD)	(18)	(19)	(32)	(34)
HY = historical text		EN = enumeration text			

Results

Table 2 summarizes the means and standard deviations of the total number of miscue raw scores, as well as the percentages for the types of miscues (Graphically Similar, Self-corrected, No-Loss-of-Meaning, and Loss-of-Meaning) for the college students with and without learning disabilities when reading two different types of text structures.

Total Number of Miscues. In either text structure, the college students with learning disabilities produced a significantly greater number of miscues than the college students without learning disabilities, $F(1,37) = 56.3, p < .0001$. For instance, in the enumeration text structure, the students with LD miscued an average of 26.75 words compared to the average of 3.25 words for the students without LD. However, no significant effects were found for either text structure, $F(1,37) = .01, p = .908$, or the group \times text interaction, $F(1,37) = .20, p = .661$.

Graphically Similar Miscues. For miscues that were graphically similar to the text word, there was no significant difference between the groups, $F(1,370) = 2.11, p = .155$, nor a significant effect for text structure, $F(1,37) = 1.80, p = .187$. There was also not a significant group \times text interaction, $F(1,37) = .30, p = .589$. Both groups produced high percentages of miscues that were graphically similar to the word in the text. (Refer to Table 2)

Self-Corrected Miscues. Participants who corrected a miscued word were credited with a "self-correct". As seen in Table 2, though the percentages of self-corrections made by the students with LD in either historical or enumeration texts (mean = 20% for each) were lower than the students' without LD self-corrections (mean = 39% for both texts), the results were not significant at the .01 level, $F(1,37) = 5.40, p = .026$. The main effect for text and the interaction between text and group were not significant (text: $F(1,37) = .00, p = .994$; interaction: $F(1,37) = .01, p = .934$).

No-Loss-of-Meaning Miscues. Subjects' miscues were scored as "no-loss-of-meaning" if uncorrected miscues were syntactically and semantically acceptable, and did not cause a change of textual meaning. There were no significant differences for group, text structure, or the group \times text interaction. (group: $F(1,37) = 1.54, p = .222$; text structure; $F(1,37) = .00, p = .983$; group \times text interaction: $F(1,37) = .94, p = .337$).

Loss-of-Meaning Miscues. These miscues were either syntactically or semantically unacceptable or caused a change in textual meaning. In either text structure, the students with LD produced a significantly higher percentage of Loss-of-Meaning miscues (historical mean = 58%; enumeration mean = 54%), $F(1,37) = 13.71, p = .001$. The percentages of loss-of-meaning miscues for the students without LD were significantly

lower (historical mean = 26%; enumeration mean = 31%). The main effect for text was not significant, $F(1,37) = .00, p = .996$, and there was also no significant interaction between text and group. $F(1,37) = 108, p = .305$.

Discussion

This study addressed three questions regarding the oral reading ability of college students with LD when compared to a control group of college students without LD: (a) Do college students with LD miscue orally read words at the same rate as their peers without LD? (b) Is there a difference in the quality of miscues between the two groups? (c) Does the type of text structure influence the number or quality of miscues for either group? In answering these questions, several important results emerged from this study which not only support the findings of other studies, but also make new contributions to the literature.

First, the college students in this study with LD miscued a significantly greater number of orally read words than their peers without LD. This was the most notable piece of evidence that differentiated the college students with LD. For either group, text structure was not a differentiating factor in determining word recognition abilities. The mean total number of miscues from either text was remarkably close within each group (refer to Table 2). Since text structure was not a significant factor when analyzing the total number of miscues for these participants, the data on miscues were collapsed across text structures for total number of miscues. When the data were collapsed across the two reading passages, the 20 college students with LD produced 1058 miscues compared to a total of 137 miscues for the 20 participants without LD. Automatic decoding, which depends on accuracy and fluency, is one prerequisite to effective reading comprehension (Kitz & Tarver, 1989). The students with LD in this study had problems accurately decoding college level text words.

These results confirm the findings of other studies regarding the word recognition abilities of college students with LD (Ben-Dror et al., 1991; Bruck, 1990; Kitz & Tarver, 1989; Morris & Leuenberger, 1990). In this study, the miscues were made while orally reading text passages from a typical college textbook, rather than isolated word lists. This use of authentic materials in the evaluation of reading disabilities has been used with school-age children, but not with college students nor with college textbooks as the source for reading passages.

In answering the second question, this study went beyond tallying miscues to analyze the quality of those miscues. The qualitative differences in the miscues provided some insight into the significance of the greater number of total miscues made by the LD group.

Although the null hypothesis was not rejected for the no-loss-of-meaning miscues, the null hypothesis was rejected for the loss-of-meaning miscues ($p = .001$). This was the most notable qualitative difference in the types of miscues produced by the students with LD (see Table 2). These Loss-of-Meaning miscues could be either syntactically unacceptable or semantically unacceptable. Or, the miscue could be syntactically and semantically acceptable within the sentence, but cause a change in meaning within the whole text. The students without LD had very few total miscues compared to the students with LD. From the data collapsed across text structures meaningful differences emerged. The students with LD averaged 31.8 Loss-of-Meaning miscues for the two reading selections, compared to the students without LD average of 2.25. A participant without LD who made two loss-of-meaning miscues (the mean from the two texts) would have scored a 33% in this category. However, for a participant with LD, a 33% loss-of-meaning rate (from the collapsed data) would have indicated the student miscued 19 words that changed the meaning of the text. The effect this greater number of loss-of-meaning miscues on text comprehension is currently being evaluated in a follow-up study.

Although the null hypothesis was not rejected for the percentage of Graphically Similar miscues produced by both groups, the greater number of total miscues made by the students with LD provided insight into the possible effect on comprehension. For instance, in one passage the words "abolishing", "abolitionist", "abolition" occurred frequently. All of the students with LD miscued at least two of these words. Typically, the "-ing" would be dropped from abolishing. "Abolitionist" was frequently miscued as "abolition" or "abolish." Such miscues change the syntactic or semantic form of the word, and could thus change the meaning of the text. In comparison, only one student without LD misread "abolitionist".

Although the students with LD in the present study self-corrected miscues less frequently (20% for the two text types) than the students without LD (39% for both text types), the null hypothesis for self-corrected miscues was not rejected at the .01 level. Self-correcting while reading is considered a sign of comprehension monitoring (K. S. Goodman, 1969). The reader realizes that the misread word was not correct and re-reads. Willich, Prior, Cumming, and Spanos (1988) found in their study of elementary children with reading disabilities and normally achieving readers that the latter group made a significantly greater number of self-corrections. They concluded that self-correcting while reading is a behavior acquired early for students without problems in reading. Although a statistically significant difference was not found between the

two groups in the percentage of self-corrected miscues produced, the majority of the college students with LD in this study reported a constant need to reread the passages in their textbooks. A lack of self-correcting, which can lead to confusion while reading, may be one explanation for the excessive need to reread textbooks. Bruck (1990) has suggested, in a follow-up study of adults who had been identified during childhood as having dyslexia and continued to have word-recognition deficits as adults, that this deficit might be better described as “arrest” rather than “delay” in the ability to read words. For some of the LD subjects in this study, this might be true.

Lastly, the structure of the text passage, either historical or enumeration, did not influence the quantity or quality of oral reading miscues for either group. The influence of text structures is more closely associated with reading comprehension. Since this study focused on oral reading decoding only, these results are not surprising. Future studies need to explore the effect of text structures when using authentic materials.

Implications

The results of this study focus attention on issues relating to college students with learning disabilities as well as college-bound high school students. All of the students with LD in this study would be considered successful college students as they were upper division students with passing GPAs, and, given double time, had passed the reading section of a state exam. Yet, the results of this study indicated that most of these successful students were struggling to decode the words in college textbooks. Disability service providers on college campuses are faced with the problem of determining appropriate accommodations for college students with LD. Often these decisions are based on inadequate or outdated assessment results. Service providers are also pressured to justify the expense of readers or taped texts, as well as for extended time for exams. The results of this study underscored the importance of designing special support services on the bases of ongoing, individualized assessment. An informal reading assessment, similar to the one used in this study, can yield important diagnostic information about reading errors from authentic college-level reading material. Although the reading selections in this study were based on two types of content text, the procedure could be used with any content-area textbook. The service provider would have a more accurate assessment of the reading problems encountered in specific texts, and would have justification for accommodation recommendations. For instance, a college student who demonstrated word recognition problems could be provided texts on tape. Extended time on exams would allow the student to read and

reread the questions. By utilizing actual texts as a source for assessment and sharing the results, professionals working with college students with LD provide the students an opportunity to analyze and discuss the effect their learning disabilities have on their performance and the effectiveness of various strategies.

Secondly, there are implications for curriculum planning for college-bound high school students with LD. The students with LD in this study had all received special education services for their reading disabilities during the K-12 years. Although they had successfully matriculated to upper division status at a university, their poor word identification skills were still evident. They produced a significantly higher percentage of loss-of-meaning miscues that they did not self-correct. These students might wrongly infer that developing reading skills is more a matter of reading words than maintaining meaning. An important implication for instruction in the elementary and secondary schools is that decoding and comprehension are not unrelated reading tasks, nor should they be taught as isolated skills in the reading curriculum. The use of authentic assessment materials based on high school content texts should be used with college-bound high school students with LD to help determine and use the most effective reading accommodations prior to entering college.

Limitations

Limitations to this study should be considered when generalizing the results. First, the sample of participants was not obtained in a random manner and was limited in size with only 20 students in each group from one university setting. However, the students with LD in this study were similar to those participating in other studies involving college students with learning disabilities (Gajar, 1987; Runyan, 1991; Wilson & Lesaux, 2001). The selection of a control group of subjects within a limited parameter (i.e., similar CLAST scores and same college of major) might have placed artificial limits on the performance results of the subjects without learning disabilities. Variability within the LD sample was another concern. The control for variability is a continual problem within special education research (Gajar, 1987). In this study, an attempt was made to control for variability among the LD subjects by selecting only college students who had a history from childhood of a reading disability and were currently still exhibiting problems with reading. To avoid making a Type II error, power is needed. A small sample size and a reduced alpha level will reduce the power of a statistical test. In this study, the alpha level was set at .01 due to the multiple analyses conducted. As a result, some of the tests of hypotheses for differences

and interactions (e.g. for Graphically Similar, Self-Corrections, and No-Loss-of-Meaning miscues) had low power (ranging from .01 to .364). Therefore, low statistical power was a factor in the failure to reject the null hypotheses for these particular variables.

Summary

The results of this study confirm the findings of previous research that there are distinguishable differences in the reading decoding abilities of college students with learning disabilities when compared to college students without learning disabilities. In addition, this study adds to previous research by documenting the reading decoding difficulties of upper division college students who read authentic text rather than word lists. The problems of word recognition have followed these students into upper division courses. Moreover, these deficiencies persist at a much greater level than those skills displayed by a peer group. The college students with LD produced a far greater number of reading miscues than their peers and self-corrected these miscues less frequently. Their remaining miscues had a better than 50–50 chance of causing a loss of textual meaning. Reading tasks are likely to become more complex in upper division courses. Further investigation is needed to determine the implications of decoding problems for these upper division college readers.

This study investigated word recognition skills, only one aspect of the complex task of reading. Further investigation is needed into the reading comprehension skills of college students with LD when they are faced with college-level reading passages.

References

- Ben-Dror, I., Pollatsek, A., & Scarpato, S. (1991, May). Word identification in isolation and in context by college dyslexic students. *Brain and Language, 40*, 471-490.
- Bruck, M. (1990). Word-recognition skills of adults with childhood diagnoses of dyslexia. *Developmental Psychology, 26*, 439-454.
- Carson, J. O., Chase, N. D., Gibson, S. U., & Hargrove, M. F. (1992). Literacy demands of the undergraduate curriculum. *Reading Research and Instruction, 31*(4), 25-50.
- Christie, J. F., & Alonso, P. A. (1980). Effects of passage difficulty on primary-grade children's oral reading error patterns. *Educational Research Quarterly, 5*(1), 40-49.
- Ehri, L. S., & Wilce, L. S. (1983). Development of word identification speed in skilled and less skilled beginning readers. *Journal of Psychology, 75*, 3-18.
- Fleisher, B. (1988). Oral reading cue strategies of better and poorer readers. *Reading Research and Instruction, 27*(3), 35-50.
- Gajar, A. H. (1987). Foreign language learning disabilities: The identification of predictive and diagnostic variables. *Journal of Learning Disabilities, 20*, 327- 330.

- Goodman, K. S. (1969). Analysis of oral reading miscues: Applied psycholinguistics. *Reading Research Quarterly, 5*, 9-30.
- Goodman, Y. M., & Burke, C. L. (1972). *Reading miscue inventory: Manual and procedures for diagnosis and evaluation*. New York: Macmillan.
- Goodman, Y. M., Watson, D. J., & Burke, C. L. (1987). *Reading miscue inventory: Alternative procedures*. New York: R. C. Owen Publishers.
- Harris, A. J., & Sipay, E. R. (1990). *How to increase reading ability*. New York: Longman.
- Hughes, C. A., & Smith, J. (1990). Cognitive and academic performance of college students with learning disabilities: A synthesis of the literature. *Learning Disabilities Quarterly, 13*, 66-79.
- Kitz, W. R., & Tarver, S. G. (1989). Comparison of dyslexic and non-dyslexic adults on decoding and phonemic awareness tasks. *Annals of Dyslexia, 39*, 196-205.
- Morris, M., & Leuenberger, J. (1990). A report of cognitive, academic, and linguistic profiles for college students with and without learning disabilities. *Journal of Learning Disabilities, 23*(6), 355-360.
- Runyan, M. K. (1991). The effect of extra time on reading comprehension scores for university students with and without learning disabilities. *Journal of Learning Disabilities, 24*(2), 104-108.
- Torgesen, J. K., & Wagner, R. K. (1998). Alternative diagnostic approaches to specific developmental reading disabilities. *Learning Disabilities Research and Practice, 13*, 220-232.
- Vogel, S., & Adelman, P. (1990). Extrinsic and intrinsic factors in graduation and academic failure among LD college students. *Annals of Dyslexia, 40*, 119-137.
- Willich, Y., Prior, M., Cumming, G., & Spanos, T. (1988). Are disabled readers delayed or different? An approach using an objective miscue analysis. *British Journal of Educational Psychology, 58*, 315-329.
- Wilson, A. M., & Lesaux, N. K. (2001). Persistence of phonological processing deficits in college students with dyslexia who have age-appropriate reading skills. *Journal of Learning Disabilities, 34*(5), 394-400.

Beverly A. Warde, Ed.D., is an associate professor of special education at Florida Atlantic University in Davie, Florida where she teaches courses in instructional methodologies for special education students, assessment and inclusive education. Her research interests include reading assessment and intervention at secondary and college levels, post-secondary transition issues for individuals with disabilities, adults with learning disabilities in post-secondary settings, and international issues in special education. Correspondence concerning this article should be addressed to her at Florida Atlantic University, Davie, FL 33314. E-mail: bwarde@fau.edu.