The Writing Strategies of Post-Secondary Students with Writing Difficulties

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Abstract

Writing samples were examined from 42 post-secondary students with or without writing difficulties. Guided by the Simple View of Writing (Berninger et al., 2002), the samples were examined for evidence of difficulties with lower-order transcription processes and higher-order composition skills. Retrospective reports on writing strategies were also obtained. The students with writing difficulties achieved significantly lower scores across both dimensions of writing than the students without difficulties. For those with writing difficulties, strategy reports indicated an awareness of difficulties with lower-order (e.g., spelling) writing skills and an over-emphasis on these skills during the writing process, compared to the students without writing difficulties. Results are discussed in relation to the cognitive and linguistic aspects involved in skilled writing in adulthood, and the implications for accommodations and interventions for students struggling with writing at the post-secondary level.

For post-secondary students with a history of literacy-based learning disabilities (LD) writing persists as an area of difficulty and has been described as the most prevalent academic skills problem, exceeding students' other academic difficulties (Ganshcow, 1984; Gregg, 1983; Plata, Zelhart, & House, 1995; Singleton, 1999). While reading skills may be compensated for in many adults in higher education (e.g., Bruck, 1992; Lefly & Pennington, 1991; Snowling, 2000) writing is more difficult to remediate at a younger age, and is less likely than reading to be compensated into adulthood contributing to

marked difficulties in written expression at the adult level (Hatcher, Snowling, & Griffiths, 2002). Writing skills are also essential to success at the post-secondary level since most evaluation methods across the content areas require some degree of written expression (Connelly, Campbell, MacLean, & Barnes, 2006; Richardson & Wydell, 2003).

The simple view of writing has been posited as a useful framework to explain the cognitive basis of writing difficulties in students with literacy-based LD (Berninger et al., 2002). According to the simple view of writing, problems with lower-level skills involved in transcription (e.g., spelling, handwriting, punctuation) constrain the enactment of higher level composition skills (e.g., planning, organization, revising) for writers with a history of literacy-based learning difficulties. Within this model, working memory is taxed in that cognitive resources are expended for transcription purposes at the expense of higher-level composition. For skilled writers, there is a degree of automaticity in the enactment of lower level skills that frees up valuable working memory resources for higher level composing (Berninger, 1999; Hoskyn & Swanson, 2003; Torrance & Galbraith, 2006). This contemporary view of writing is a modification of the influential model developed by Flower and Hayes (1981) that posited the purposeful, goal directed cognitive activities that are coordinated within a skilled writing system (Berninger & Swanson, 1994).

Several studies have examined the impact of transcription processes on the writing skills of post-secondary students with LD (see Li & Hamel, 2006, for a review). For example, handwriting fluency has been found to affect both the quantity and quality of essays produced by struggling college-level writers (Connelly, Dockrell, & Barnett, 2005; Hatcher et al., 2002) and spelling difficulties have been found to have a direct impact on the lexical diversity and range of vocabulary used by writers (e.g., Sterling, Farmer, Riddick, Morgan, & Matthews, 1997; Wengelin, 2005). Research also indicates that this lack of automaticity in transcription skills is rooted in the cognitive and linguistic deficits across reading and writing component processes. For example, several studies have shown that for adults with a history of reading and spelling disabilities, phonological processing deficits persist (e.g., Bruck, 1992; Greenberg, Ehri, & Perin, 1997) impacting reading fluency, reading comprehension, and transcription skills in writing (e.g., Connelly et al., 2006; Lesaux, Pearson, & Siegel, 2006; Snowling, Nation, Moxham, Gallagher, & Frith, 1997; Wilson & Lesaux, 2001). Post secondary accommodations (e.g., extended time on exams) for students with a history of reading-related deficits are aimed at reducing the impact of these persistent processing deficits.

There is some evidence to indicate that in contrast to their transcription deficits in writing, the higher level composition skills of post-secondary students with LD are intact and are actually better developed than the higher level composition skills of poor-writers without LD. For example, post-secondary students with LD have been found to have better comprehension of the higher-level components of the writing process, produce more coherent text structure than age-matched under-prepared writers (e.g., Gregg & Hoy, 1989) and generate more sophisticated text than under-prepared college writers (e.g., Greg & Hoy, 1990). In comparison, less-skilled post-secondary writers without LD perform poorly across both lower and higher level dimensions of the writing process (e.g., Gregg & Hoy, 1990). Considered together with the research on transcription deficits in writing, post-secondary students with LD (in contrast to under-prepared writers) possess higher-level writing skills necessary to produce text of good quality, but are impeded from using these skills effectively in their writing due to a lack of automaticity in transcription skills at the lower level.

A recent study has provided some contradictory findings in relation to the simple view of writing, however. Connelly et al., (2006) investigated the writing skills of students with dyslexia attending university in the UK. These researchers examined group differences between students with dyslexia, chronological age-matched, and spelling-skill matched controls on a number of literacy-related measures and on a direct assessment of writing. The writing assessment was scored based on a combination of holistic (i.e., ratings of overall essay quality) and analytic (i.e., ratings of ideas and development, organization, and textual coherences) scoring criteria within the simple view of writing framework. These researchers found that even though university students' writing was constrained at the lower levels by poor spelling and handwriting associated with a limited capacity working memory system, their ability to generate and organize their ideas and the quality of sentence structure and grammar in their writing – all higher level writing skills – were intact and did not differ from the higher-level writing skills of the age-matched controls. Not only did these students possess higher level writing skills (as the research would suggest), they were also able to apply these skills successfully despite being constrained at the lower level by transcription deficits. Such a finding apparently contradicts the negative impact transcription deficits have to writing quality as espoused by the simple view of writing.

The present study is therefore aimed at examining the writing skills (based on an analysis of essay quality) and writing approaches (based on an analysis of self-report data) of post-secondary students with a history of literacy-based LD and current writing difficulties. While the research that has

been conducted with post-secondary writers with and without difficulties has employed either direct measures of writing assessment *or* interviews and surveys about students' writing knowledge and behaviour, few studies have employed a combined direct assessment of writing with students' own reports of their approach to the writing task. Arguably, a combined methodology may provide rich insight into both the product and process of post-secondary students' writing. Guided by the simple view of writing, we therefore conducted analyses across students' written texts and their retrospective reports of their approach to writing. The primary goal was to see whether students with writing difficulties would produce text of good quality and similar to students without writing difficulties despite transcription problems (consistent with the findings reported by Connelly et al., 2006) or whether their transcription difficulties would impact the quality of the written text, in keeping with the simple view. We were also interested in examining the kinds of strategies students reported using while writing, and whether students with writing difficulties would report the use of higher level strategies to the same extent as the students without writing difficulties.

Method

Participants

The students who participated were mostly (95%) undergraduates enrolled in the 2nd or 3rd year of a 4-year degree program at a university in the Canadian west. The remaining 5% of participants were undergraduate students in their 4th year and one graduate student in the first year of a master's program. From an initial sample of 30 volunteers who self-referred based on a history of persistent writing problems and current writing difficulties, 20 students (55% female; mean age = 24.3 years, $SD = 3.68$) met the criterion for writing difficulties. To be part of the group with writing difficulties, students' Written Expression standard score from the Wechsler Individual Achievement Test-2nd Edition (WIAT-II, The Psychological Corporation, 2002) needed to be at or below 1 standard deviation below the mean based on a mean of 100 and a standard deviation of 15 (WIAT-II standard score of 85 or lower) corresponding to the 16th percentile.

An additional group of 22 volunteers from the same university (55% female; mean age = 28.5 years, $SD = 5.11$) without a history of learning or writing problems also participated. WIAT-II Written Expression standard scores needed to be within the average range at or greater than a standard score of 92, corresponding to the 30th percentile. An analysis of covariance

(ANCOVA) examining group differences adjusted for age and based on WIAT-II Written Expression standard scores confirmed significant differences between the two groups on the writing measure ($F_{1,39} = 326.66, p < .0005, \eta^2 = .89$). The adjusted mean performance of the group with writing difficulties was significantly lower ($M = 80.40, SE = .95$) than the adjusted mean performance of the group without writing difficulties ($M = 101.7, SE = .90$).

The students with writing difficulties volunteered based on a call for participants with history of literacy-based learning difficulties and currently experiencing writing difficulties at university. The group without writing difficulties answered a general recruitment poster for a study examining adult writing skills in students with no history or current difficulties with writing. All participants received feedback on their writing strengths and weaknesses from graduate students training in school psychology and special education and supervised by the first author, a certified school psychologist. Based on an orally administered background questionnaire, all students were reported to be in good health, had no visual or auditory impairments, spoke English as a first language, had never sustained any head injury and were right-handed. None of the students in the comparison group reported ever having had learning difficulties, but 60% of the group of students with writing difficulties reported that they had received some form of special education with 20% having received a formal diagnosis of learning disabilities from a school psychologist or registered psychologist during elementary school. None of the students had received an updated psychoeducational assessment since beginning post-secondary studies, and none of the participants was currently receiving accommodations or learning support at the post-secondary level. All of the participants completed a larger battery of measures assessing the cognitive and linguistic aspects of persistent writing difficulties at the post-secondary level and the writing strategies used by students. Only the results of the writing achievement and writing strategy data are reported here.

General Language and Literacy Measures

Expressive Vocabulary. The Vocabulary subtest of the Wechsler Adult Intelligence Scale -3rd Edition (WAIS-III, Wechsler, 1997) was administered to assess students' expressive vocabulary skills. On this task, students were shown 33 increasingly more difficult words, one at a time and in isolation and were asked to orally define the word (e.g., "What does aptitude mean"). The examiner wrote down students' responses. Starting and stopping points followed the administration instructions from the WAIS-III manual. Responses were scored either 2, 1, or 0 points according to the criteria set out in the

manual. Testing was discontinued after six consecutive scores of 0 were obtained. Responses were scored by two independent raters, both graduate level research assistants, and a high inter-rater reliability estimate was obtained ($r = .98$). Raw scores were converted to standardized scaled scores ($M = 10$, $SD = 3$) based on the WAIS-III normative sample.

Phonological short-term and working memory. The Digit-Span subtest of the WAIS-III was administered according to standardization procedures. This task is made up of two components, digit span forward and digit span backward. On the forward task, students repeated increasingly longer number sequences verbatim. On the backward task, students listened to increasingly longer number sequences presented by the examiner and were required to repeat them in the backward order. While digits forward is considered a measure of verbal short-term memory, digits backward has an executive functioning component that loads heavily on working memory, according to the WAIS-III manual. Examining performance separately across each of the digit span tasks was important since limited phonological short-term memory and working memory capacity have been associated with transcription deficits in adults (Connelly et al., 2006; Hatcher et al., 2002; Hoskyn & Swanson, 2003). The appropriate starting and stopping points as described in the administration manual were followed and scaled scores were used. Raw scores were recorded separately for forward and backward tasks and the total score was converted to standardized scaled scores ($M = 10$, $SD = 3$) based on the WAIS-III normative sample.

Word Recognition. The Letter-Word Identification subtest from the Woodcock-Johnson Tests of Achievement-Third Edition (WJ-III; Woodcock, McGrew, & Mather, 2001) was administered according to standardized procedures to assess students' word-level reading skills. This test consists of a total of 76 items beginning with single letters and progressing to increasingly more difficult unrelated words. Students were asked to read as many words as possible, one at a time. Testing was discontinued when students made six consecutive errors. Raw scores were converted to standard scores ($M = 100$, $SD = 15$) based on the WJ-III norms.

Decoding. The Word Attack subtest from the WJ-III was used to assess students' graphophonemic knowledge. This test consists of 31 increasingly more difficult pseudowords that contain letter patterns that are phonetically consistent in English orthography (e.g., fap, stotion). Students read each item one at a time. Testing was discontinued when students made six consecutive errors. Raw scores were converted to standard scores ($M = 100$, $SD = 15$) based on the WJ-III normative sample.

Spelling. The Spelling subtest of the WJ-III was administered. This task consists of 59 words that gradually become more difficult in terms of spelling-sound regularity and frequency. Students were orally presented the word once in isolation, once in a sentence, and again in isolation. Testing was discontinued when students made six consecutive errors. Raw scores were converted to standard scores ($M = 100$, $SD = 15$) according to the WJ-III norms.

Writing Assessment

Essay. Students completed the essay task (prompt A) from the WIAT-II. This task was chosen because it is a direct norm-referenced measure of expository writing that may be considered more ecologically valid and thus more representative of the academic writing demands of post-secondary students (Connelly et al., 2006). Strong reliability and validity estimates are also reported in the WIAT-II manual, especially for inter-rater reliability ($r = .87$). The task was administered according to standardized procedures described in the test manual. Students were also told that they could use scrap paper for a rough draft if they wished, and that their final product would not be penalized for cross-outs or re-writing. As per standardized instructions, students were instructed that they had 15-minutes to finish their essay.

Scoring. Essays were transcribed via the word processor maintaining errors in spelling and punctuation as well as any cross-outs to eliminate the potential bias in essay quality associated with poor handwriting (Graham & Weintraub, 1996). Each essay was scored by two raters who were fully trained in the administration and scoring procedures for the WIAT-II. One of the raters was not involved in the data collection, and at the time of rating the essays, was unaware of the purpose of the study. Raters were also blind to the essay writer's group membership (i.e., writing difficulties vs. no writing difficulties). Students' written text was analyzed according to the analytic scoring criteria published in the WIAT-II manual. Scores across the lower (i.e., mechanics) and higher levels (i.e., organization, theme development, vocabulary) were recorded. For example, for Mechanics (max. 9) scores were based on the number of spelling and punctuation errors of the written text. The Organization total score (max. 17) was based on such elements as sentence structure, sequencing, and whether an introductory sentence or paragraph was evident. Theme Development (max. score 8) was based on such qualities as the essay containing only on-topic information and ideas as well as evidence to back-up the supporting argument. The Vocabulary (max. 7) score indicated the use of varied words in the essay. A high inter-rater agreement was established across the essay assessment with estimates ranging from 87% (Theme Development)

to 96% (Mechanics), consistent with the published inter-rater reliability estimates in the WIAT-II manual. For each student, scores were recorded as percentage correct based on the analytic criteria across each of the four areas (mechanics, organization, theme development, and vocabulary). The number of words written was also coded for each student.

Writing Strategy Self Reports

Strategy reports were elicited as a window into students' writing behaviour and their reported approach to the essay task. Following the completion of the essay writing task, students were asked to report on their writing strategies by verbally responding to the following prompt: "Tell me what you did to write this essay". Additional prompts used included "Tell me more" or "Explain what you mean" when further clarity regarding the nature of the student's approach to the writing task was warranted. Reports were audiotape recorded for later transcription.

Scoring and coding of strategy self-reports. Extending a methodology used to examine the strategy self-reports made by diverse groups of spellers (e.g., Harrison, 2005; Steffler, Varnhagen, Friesen, & Trieman, 1998), the statements made by students on their approach to the writing task were initially coded into eleven broad categories. These strategy categories were: spelling, handwriting, punctuation, grammar, sentence structure, organization, planning, editing, revising, lexical choice, and other. The simple view of writing provided a theoretical framework for subdividing the categories further into the most commonly reported in terms of proportion of strategies involving transcription (i.e., lower level skills) and composition processes (i.e., higher level skills). For the lower level strategies, statements that referred to spelling, handwriting, and punctuation (e.g., "I made sure my spelling was okay"; "I tried to make sure you could read what I wrote"; "I made sure I put a period at the end of each sentence.") were coded within one category. Students' strategies were coded as higher level if they made reference to planning (e.g., "First, I thought about what I wanted to write and got some ideas in my head and then I put them down."), organization which also included reference to sentence structure (e.g., "I tried to list my points in order."; "I tried to make sure my writing flowed and made sense together"), and revision which included reports of editing as well as revising text (e.g., "I kept going back and reading what I wrote and switching things around if it didn't make sense"; "I re-read my sentences to make sure they made sense and went back and fixed some words"). Where multiple strategies were reported (e.g., "I tried to make sure I spelled things okay and that the sentences all made sense with each other") each strategy was coded separately.

Across each transcript, the total number of strategies reported was calculated. Next, for each student the proportion of lower level and the proportion of higher level strategies were coded out of the total number of strategies reported. The data were coded by two independent raters, one blind to the overall purpose of the study at the time of data coding and both blind to participants' group membership, and a high inter-rater reliability estimate of .96 for lower level coding and .90 for higher level was obtained. Discrepancies in scoring between the raters were resolved through discussion.

Procedure

Each participant was tested individually on the full battery of measures in one session of approximately 1-hour duration in a quiet university research office. Following the administration of the cognitive, linguistic, and writing measures, the self-report data were collected.

Results

Table 1 shows the means, standard deviations, and *t*-test results (with Bonferroni correction) across the general language and literacy measures. As seen in Table 1, no significant differences were found between the two groups across the expressive vocabulary, digit span (forward, backward, and total score), word recognition, spelling, or decoding tasks ($p > .05$). It is noteworthy that the difference in performance between the groups on the digit span backward task, a measure of working memory performance, approached significance with the students who have writing difficulties achieving lower scores on this measure.

We conducted separate analyses of students' essays and the self-report data for evidence of performance across both the lower and higher level aspects of writing. First, the results of the analyses of students' essays across the two dimensions are presented, followed by the findings from the analyses of students' self reports.

Analyses of Students' Essays

The means and standard deviations across the lower-level (transcription) and higher-level (composition) essay scoring criteria are shown in Table 2. An analysis of group differences indicated that the students with writing difficulties achieved significantly lower scores on the mechanical

Table 1
Performance on Cognitive and Reading-Related Measures Across Groups

Measures	Writing Difficulties ^a		No Writing Difficulties ^b			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
WAIS-III Vocabulary	11.75	2.48	12.05	2.12	-.41	.68
WAIS-III Digit Span	10.35	2.18	11.36	2.48	-1.39	.17
Digits Forward	10.20	1.88	11.23	2.28	-1.58	.12
Digits Backward	7.35	2.07	8.41	1.94	-1.73	.09
WJ-III Letter-Word Identification	104.1	4.48	105.0	6.53	-.46	.64
WJ-III Spelling	109.5	9.43	107.6	7.73	.70	.48
WJ-III Word Attack	98.8	8.47	101.3	5.0	-1.20	.23

Note. WAIS-III = Wechsler Intelligence Scale for Adults-3rd Edition; WJ-III = Woodcock Johnson Tests of Achievement-3rd Edition; ^a *n* = 20 ^b *n* = 22.

aspect of their essay quality ($t = -3.54$, $df = 40$, $p < .001$), as expected. The essays written by the students with writing difficulties contained a preponderance of punctuation and spelling errors indicative of current transcription deficits.

Group differences in higher level composition skills were analyzed with a 2 X 3 repeated measures analysis of variance (ANOVA) with group (writing difficulties, no writing difficulties) as the between subjects factor and higher level composition (organization, theme development, vocabulary) as the within-subjects factor. The results indicated a main effect for group ($F_{2, 40} = 7.56$, $p < .001$, $\eta^2 = .16$) with no significant group by composition skills interaction ($p = .07$). These results were followed-up by *t*-tests with Bonferroni correction. As indicated by the performance means shown in Table 2 across the higher level skills assessed, the students with writing difficulties achieved significantly lower scores than the students without writing difficulties on organization ($t = -7.29$, $df = 40$, $p < .0005$), theme development ($t = -6.29$, $df = 40$, $p < .0005$), and vocabulary ($t = -6.56$, $df = 40$, $p < .0005$). The students with writing

Table 2
Group Performance (Percentage Correct) Across the WIAT-II
Essay Writing Assessment

Criteria	Writing Difficulties ^a			No Writing Difficulties ^b		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Mechanics	62.60	24.57	(23-97)	84.0	13.46	(56-100)
Organization	47.25	12.09	(23-76)	74.41	12.02	(47-94)
Theme Development	47.10	16.26	(25-88)	77.0	14.53	(50-97)
Vocabulary	33.00	13.98	(14-57)	72.09	23.07	(29-100)

^a*n* = 20 ^b *n* = 22

difficulties also wrote significantly fewer words ($M = 150.35$, $SD = 48.52$) in the allotted time than the students without writing difficulties ($M = 180.77$, $SD = 36.87$) ($t = -2.30$, $df = 40$, $p < .02$). Thus, the young adults with writing difficulties in our study showed deficits in both transcription and composition skills in their writing producing shorter essays of lesser quality than the students without writing difficulties.

Analysis of Strategy Self-Reports

We asked students to tell us how they approached the essay writing task in order to examine whether the results from the analysis of the essays would be consistent with what students reported doing while they wrote. We were particularly interested in whether students with writing difficulties would report using higher level compositional skills in their writing, since there is research to indicate that college students with LD possess the higher level skills to produce good essays (e.g., Connelly et al., 2006; Gregg & Hoy, 1989; 1990).

Table 3 shows the means and standard deviations for strategy reports across both dimensions of the writing process by students. The self report data were analyzed by a 2 X 2 repeated measures ANOVA with group (writing difficulties, no writing difficulties) as the between subjects' factor and strategy type (lower-level, higher-level) as the within-subjects factor. The results indicated a

Table 3
Strategy Self-Reports (Percentages) Across Groups
and Writing Dimensions

Strategy Report	Writing Difficulties		No Writing Difficulties	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Lower Level	69.9	15.77	44.4	17.41
Higher Level	30.1	12.56	55.6	16.32

Note: Writing Difficulties $n = 20$; No Writing Difficulties $n = 22$; Lower level = spelling, punctuation, and handwriting; Higher level = planning, organizing, and revising.

significant main effect for strategy type ($F_{2, 40} = 7.73$ $p < .008$, $\eta^2 = .16$) with a significant strategy type by group interaction ($F_{2, 40} = 24.53$ $p < .003$, $\eta^2 = .38$). Follow-up t -tests indicated that the students with writing difficulties reported significantly more strategies at the lower level in their approach to writing than the group without writing difficulties ($t = 4.95$, $df = 40$, $p < .0005$). Students with writing difficulties were therefore more likely to report on their spelling, punctuation, and handwriting in writing the essay than the students without writing difficulties. Conversely, the students without writing difficulties reported significantly more higher level strategies in their approach to writing the essay than the students with writing difficulties ($t = -4.87$, $df = 40$, $p < .0005$). The students without writing difficulties were therefore more likely to comment on planning, organizing, and revising when writing the essay.

A further analysis was conducted to examine within group differences in reported strategy use across the lower and higher level aspects of writing. The results of a paired-sample t -test indicated that the students with writing difficulties reported significantly more strategies at the lower than the higher level in their strategy reports ($t = 5.64$, $df = 19$, $p < .0005$). Students without writing difficulties did not differ in the proportion of strategies reported across lower and higher-level dimensions ($t = -1.50$, $df = 20$, $p = .14$). Thus, based on their reports of how they approached the essay task, the students with writing difficulties relied more on lower level transcription processes (i.e., spelling, punctuation, and handwriting) than higher level composition processes (i.e., planning, organizing, revising) in their writing. Evidence of this approach is also apparent in the large number (67%) of students with writing difficulties who reported

that when writing, they tended to only use words they knew how to spell. Only about half as many of the students with writing difficulties (32%) reported the same constraints on word choice in writing due to spelling.

Discussion

This study shows that for a group of post-secondary students with writing difficulties and a history of literacy-based LD, both the quality of essays and the approach to essay writing differ from those of their post secondary counterparts without writing difficulties. Students with writing difficulties produced essays with more spelling and punctuation errors across the lower level transcription aspects of writing. Their essays at the higher level were less organized, contained limited theme development, and unsophisticated vocabulary compared to those of the students without writing difficulties. The finding that students with writing difficulties experienced more spelling problems in their essays, compared to the absence of spelling difficulties when spelling was assessed in isolation (i.e., WJ-III Spelling subtest), is consistent with previous research. For example, Gregg, Hoy, & Sabol (1988) reported that in their examination of spelling strategies of post-secondary students with and without writing difficulties, even when students were able to avoid using words they could not spell, they still made more spelling errors in their writing than their peers without writing difficulties. Writing is a complex cognitive task with multiple skills being executed simultaneously (McCutcheon, 2006). If lower level aspects of the writing process are not automatized for the students with writing difficulties, as evident in their transcription deficits, the cognitive resources required for the higher level composition skills will be taxed consistent with the simple view of writing. It is interesting that even though the mean performance on the digit span backward task was not significantly different between the two groups, this difference approached significance. Working memory constraints have been found to be associated with reduced writing performance in young (e.g., Connelly et al. 2006; Hatcher et al., 2002) and older adults, including the elderly (e.g., Hoskyn & Swanson, 2003). Indeed, more empirical research is needed on the cognitive aspects of adult writing across the lifespan (Li & Hamel, 2006).

An additional cost of poor spelling in writing was reflected in the limited range of vocabulary used by the students with writing difficulties. Evidence for the limited use of vocabulary by the students with writing difficulties was found in both the evaluation of the quality of the written essays and the reports by students with writing difficulties that they only chose words that they knew

how to spell. This limited lexical diversity in writing affects overall writing quality and has been reported elsewhere as characterizing the writing of adult dyslexics (e.g., Wengelin, 2005). It is interesting to note that expressive vocabulary as assessed by the WAIS-III fell within the average range for the students with writing difficulties (based on comparisons with the normative sample). Hence, the problem with lexical diversity in writing for the group with difficulties is likely due to transcription (i.e., especially spelling) rather than language expression.

The finding that students with writing difficulties also performed more poorly than the students without writing difficulties on the higher-level aspects of their essays, while consistent with the simple view of writing, does not replicate the results reported by Connelly et al. (2006). Timed writing tasks were used in our study and the Connelly et al. study, although the students in our study wrote for 15 minutes (as per WIAT-II administration) and the students in the Connelly et al. study wrote for 30 minutes. Indeed, research has indicated that students with LD and writing difficulties require extra time to complete written tasks (e.g., Hatcher et al., 2002). It is therefore possible that the reduced quality of writing produced by the students with writing difficulties in our study may be due to time. Arguably, we chose the essay subtest from the WIAT-II because the task is more similar to a timed expository essay writing task that students would be required to complete under written exam conditions. None of the students with writing difficulties were currently receiving accommodations for writing (e.g., extra time, use of spell checkers or dictionary) making the task even more relevant to their current writing difficulties. If students had difficulties with this task, they probably also have difficulties writing under similar conditions in their coursework. Further research could explore the benefits of extra time to the essay writing quality across both transcription and composition aspects of writing for students with writing difficulties.

Including students' own reports of their writing behaviours provided rich data beyond that evident in students' essays. The analysis of essays showed that students with writing difficulties achieved lower scores across both dimensions of the writing process. By including students' own reports of how they approached the task, we found that students with writing difficulties reported more lower-level strategies in their approach to writing the essay. Thus, students with writing difficulties were more likely to say that they were worried about their spelling or their handwriting while writing the essay compared to the students without writing difficulties.

We did not find evidence that students with writing difficulties were using higher level processes in their reported approaches to the essay task,

however. These findings differ from the results reported by others employing writing surveys and direct measures of writing performance (e.g., Gregg & Hoy, 1989; 1990), but are consistent with the results from interviews conducted with less-skilled younger writers who reported an over-emphasis on the lower level aspects of the writing process (e.g., Graham, Schwartz, & MacArthur, 1993). Our research has extended this finding to young adults with writing difficulties. It is possible that our self-report methodology was more similar to the interviews conducted by Graham et al. than to the studies employing other measures including surveys. However, future research should examine alternate methods for assessing students' approach to writing including rating scales and interviewing techniques. Whether these methods will provide any greater insight beyond having students report *how* they wrote an essay remains to be examined. Having students "think aloud" while they compose, although used extensively with children and in research examining bilingual writing skills, is thought to interfere with the cognitive processing activated during writing altering the writing task for students (Roca De Larios, Murphy, & Marin, 2002).

It is also important to note that based on their own approach to writing, the group of students with writing difficulties still reported higher level strategies in their writing (i.e., 30% of the strategies reported were higher-level strategies), albeit not to the same degree as the students without writing difficulties (i.e., 55%). The students with writing difficulties apparently possess some strategies at the higher-level, but are likely impeded from engaging these strategies effectively due to their transcription deficits and an overemphasis on transcription while they write. In comparison, the students without writing difficulties described more of a balanced approach across both aspects of writing, reporting strategies across both lower and higher-levels to the same degree. It is interesting that in the evaluation of the quality of the essays written by students without difficulties, they achieved higher scores across both dimensions of writing than the students with writing difficulties. By eliciting students' own reports on their approaches, we were able to obtain evidence of coordination across both writing dimensions in the writing approach of the students without writing difficulties. This evidence would not have been apparent by an analysis of students' essays alone.

While we have mentioned some limitations in our research already, two additional considerations are acknowledged. Firstly, our sample size was relatively small and limited the kinds of statistical analyses we would have liked to have conducted including correlation and regression analyses. Secondly, whether or not the students with writing difficulties who participated are actually LD is also debatable and we did not require any formal documentation

of a diagnosis for the students with a history of literacy-based LD. While research has indicated some support for the validity of self-report data in identifying adults with a history of LD (e.g., Gilger, 1992, this approach may not have been successful in our study. More research is needed to examine the possibility of subtypes of disabled writers, those with generally poor writing, those with word-specific processing deficits (i.e., phonological processing), and those with more pervasive language and communication impairments. One study has attempted to begin this analysis of writing subtypes with children (e.g., Wakely, Hooper, Kruif, & Swartz, 2006), but much more research is needed to further knowledge about the cognitive and linguistic aspects of writing and individual differences in writing performance across the lifespan.

Several implications may be drawn from our research to inform instructional support and accommodations at the post-secondary level. First, and in keeping with the Canadian Council on Learning's (2005) recent summary on adult literacy, literacy learning is life-long and adults must be provided opportunities across the lifespan and across multiple contexts to use or risk losing their literacy skills. Higher education represents a prime opportunity for young adults with writing difficulties to enhance their literacy skills through writing (e.g., Ehren, Lenz, & Deshler, 2004) within the context of formal learning. Instructors and faculty members must be informed and aware of the special needs of students with writing difficulties and the ways in which these students' needs may be accommodated (e.g., extra time, oral examinations, the use of assistive technology, etc.) and teaching and assessment methods can be differentiated (Li & Hamel, 2006; Scott, 1991). Tutors within writing programs at the post-secondary level require a basic understanding of the cognitive aspects of writing in order to more capably target individual students' needs and match these with appropriate instructional support (Li & Hamel, 2006).

Whether writing difficulties at the post-secondary level are associated with prior poor instruction, or with individual differences in the cognitive and linguistic processes required for writing, it is never too late to intervene for the sake of improved literacy (Allen, 1995). As more students pursue post-secondary education and as post-secondary institutions become more inclusive, response to the special learning needs of post-secondary students will be essential for their success.

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