HOW WELL DO THEY READ? BRIEF ENGLISH AND FRENCH SCREENING TOOLS FOR COLLEGE STUDENTS

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We translated and report on the psychometric properties of English and French versions of two reading difficulties screening tools for junior/community college students. We administered the Adult Reading History Questionnaire-Revised (ARHQ-R) (Parrila, Georgiou, & Corkett, 2007) to 1889 students enrolled in compulsory language courses in English and French colleges in the language of instruction at the school. Eighty students (4%) self-reported a learning disability. We also administered English and French versions of the Test de lecture - Épreuve de compréhension (Institut de Recherche et d'Évaluation Psychopédagogique Inc., 2000) to 432 college students. We categorized all participants into adequate, poor and very poor readers based on each measure and examined scores of students with and without learning disabilities. Although there were significant differences among groups under regular testing times, extended time *resulted in comparable reading comprehension scores for all groups. Recommendations based on the findings are made for research and practice.*

Reading difficulties are a substantial concern in North American postsecondary education. Indeed, many students with specific learning disabilities (LDs) have reading difficulties. Furthermore, learning disabilities are amongst the most common disabilities in Canada's junior/community colleges (Lavallée, Raymond, & Savard, 2012). The Learning Disabilities Association of Canada (2002) defines LDs as a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information in individuals with otherwise normal intellectual abilities. The definition notes that LDs may interfere with the acquisition and use of one or more of the following: oral language (e.g. listening, speaking, understanding); reading (e.g. decoding, phonetic knowledge, word recognition, comprehension); written language (e.g. spelling and written expression); and mathematics (e.g. computation, problem solving). (Learning Disabilities Association of Canada, 2002, paragraph 3)

A specific type of learning disability (LD), known as dyslexia, is manifested in reading difficulties related to decoding problems and comprehension difficulties (Couston, 2006). This is the most common learning disability everywhere, including Québec (Mimouni & King, 2007; AQICESH, 2011). However, not all students who have poor readings abilities have an LD. Some students who have difficulty reading have not yet mastered the language of instruction. Other poor readers may, in fact, have an undiagnosed LD (Harrison, Larochette, & Nichols, 2007; Mimouni, 2006). Another explanation may be that reading skills are normally distributed in the population.

Regardless of the reason, it is important to be able to quickly identify students with possible reading

difficulties to help design and implement programs to assist them. Since Canada has both English and French colleges and universities, it is imperative to be able to do this in English and French educational institutions. More to the point, it is important for research to be able to administer the same screening tools to both English and French speaking samples.

To our knowledge, the only measure that exists in both English and French is the Canadian Adult Achievement Test (CAAT) / Test de rendement pour francophones (TRF) (Pearson Assessment, undated). Although the CAAT and TRF were normed on English speaking Canadian and French speaking Quebec samples, respectively, the appropriate version of the measure (i.e., Level D, developed for use for individuals with 11 – 12+ years of formal education) does not exist in French. In addition, the Reading Comprehension subtest takes 40 minutes to administer, thereby not qualifying as a *brief* screening tool.

Therefore, one of the goals of this investigation is to provide information on the validity and reliability of the translations of two brief (i.e., 10 minutes or less) screening measures. The goal was not to repeat the original validation, nor to propose these screening tools as valid instruments for the diagnosis of a learning disability. The goal is to provide information on the psychometric properties of the translations.

We selected the oft used 9-item Elementary Education Subscale of the Adult Reading History Questionnaire-Revised (ARHQ-R) (Parrila, Georgiou, & Corkett, 2007) to allow us to rapidly screen students into adequate, poor and very poor reader categories. This measure has been validated in English and used in several primarily Canadian studies (Deacon, Cook, & Parrila, 2012; McGonnell, Parrila, & Deacon, 2007; Lefly & Pennington, 2000; McGonnell, Parrila, & Deacon, 2007: Parrila, Corkett, Kirby, & Hein, 2003). It asks students about their reading experiences in elementary school and takes approximately five minutes to administer. In accordance with established practice (Vallerand, 1989), we used translation and back-translation, and evaluated the French version's psychometric properties.

We also needed a brief, inexpensive reading comprehension screening test in both French and English that we could adapt for online administration. Since we could find no valid bilingual measure we translated the reading comprehension portion of the Test de lecture - Épreuve de rapidité et de compréhension (Institut de Recherche et d'Évaluation Psychopédagogique Inc., 2000) in to English. This screening test takes approximately 10 minutes and consists of 11 one-paragraph stories followed by 4-option multiple choice items. These items consisted of literal questions (asking the reader to pick out specific details from the text).

Because we needed large samples to validate the translations, here we report not only on the psychometric properties of these tools, but also on the scores of three groups: very poor readers, poor readers and adequate readers, with and without a self-reported LD. Moreover, we also report on reading comprehension scores using both the typical 10-minute (speeded) administration as well as an extended time of 20 minutes. Extended time is one of the most frequently requested and accorded accommodations for students with LDs (Gregg & Nelson, 2012, Fichten, Jorgensen, Havel, & Barile, 2006; Hadley, 2007; Mimouni & King, 2007; Ofiesh, Mather, & Russell, 2005), in spite of the substantial controversy about its use (e.g., Lesaux, Pearson, & Siegel, 2006; Lovett, 2010).

The following hypotheses were made. (1) Scores on the English and French versions of the measures will provide similar results, (2) There will be a moderately strong relationship between the two measures of reading ability, (3) Students with a self-reported LD will score more poorly on both measures than students without a self-reported LD, and (4) Both students who read poorly and those with a self-reported LD will have substantially higher reading comprehension scores when they are allowed extended (double) time, while students who are adequate readers will benefit only minimally.

Method
Measures
Adult Reading History Questionnaire - Revised (ARHQ-R) - Elementary Education Subscale. This 5-point Likert-type scaled measure is available in English in Parrila et al. (2007) (the French version of the measure is available from the authors). It was recently found to be an effective screening measure for good and poor university students by McGonnell, Parrila, and Deacon (2007), who used a 9-item version of the measure (items 1-9). We also used these 9 items. Mean scores on the ARHQ-R range from 0 to 1, with lower scores indicating less, and higher scores indicating more difficulty reading in elementary school. Items are simply worded and inquire about elementary school reading experiences (e.g., *How*

much difficulty did you have learning to read in elementary school?). A mean between 0 and .25 indicates no reading problems (Adequate reader), scores equal to or greater than .37 suggest poor reading ability (Very Poor reader), and scores between these two suggest some reading difficulties in college (Poor reader) (Deacon et al., 2012; McGonnell et al., 2007). The measure has been used in several studies (e.g., Parrila et al., 2007; Lefly & Pennington, 2000; McGonnell et al., 2007: Parrila et al., 2003). Parrila et al. (2007) reported a mean of .62 (SD = .15) for 28 university students with self-identified reading problems, and a mean of .12 (SD = .08) for a control group of 27 students. The mean score for 10 participants with reading difficulties who had been diagnosed with an LD was .71 (SD = .13). It was .58 (SD = .14) for those with reading difficulties who had not been diagnosed.

Reading Comprehension Test. The reading comprehension component of the Test de lecture - Épreuve de compréhension (Institut de Recherche et d'Évaluation Psychopédagogique Inc., 2000) is a timed test that lasts 10 minutes. The English version of the measure is available from the authors. It consists of 11 one-paragraph stories followed by 4-option multiple choice questions. A sample item is as follows:

> *Last summer, Patricia spent her holiday with her cousin Anne, who lives in Ontario. Upon return, she was glad to see her parents after being away for a month. She told her parents that every morning, at about nine o'clock, she went swimming and running with her cousin. In the afternoon, Anne and her cousin had so much fun they did not see the time pass. They visited the zoo, historic sites and saw shows. In the evening, they listened to music and went to bed around 10 o'clock.*

> *1. What does Patricia tell her parents about?*

> *a) her visit to the zoo*
> *b) the shows*
> *c) her departure*
> *d) her stay at her cousin's*

Originally designed for elementary and high school, this measure has recently been normed for French language college students (Mimouni, 2009). Norming was carried out using a paper and pencil version without informing students about the time limit. Scoring is determined by the number of correct responses after 10 minutes. Based on Mimouni's results, college students are classified as Adequate, Poor or Very Poor readers according to cutoffs. Students who score fewer than 30 correct out of 44 multiple choice items are considered Very Poor readers, those who score between 30 and 35 correct are considered Poor readers, and those who score 36 or more are considered Adequate readers.

The measure, in paper format, has been administered to several populations (King, Mimouni, & Courtemanche, 2006; Mimouni & King, 2007), including students from French language junior/community colleges, where the mean score of *normal readers* was 37.24 (SD = 5.80). The mean for college students from remedial reading courses was 28.21, and the mean score of college students with an LD was 25.79 (SD = 6.30). Similarly, the mean for 39 college students enrolled in a compulsory French course was 37.33 (SD = 5.74) and it was 28.04 (SD = 9.21) for students with reading difficulties, and 26.70 (SD = 6.00) for 28 students with dyslexia (Mimouni, 2009).

Participants
All participants were enrolled in a 2 or 3-year junior/community college diploma program in one of three urban colleges: one where the language of instruction was English and two where it was French. It should be noted that in Québec, where the study was carried out, all students attend a junior/community college after successfully completing a high school diploma. Only after graduation from junior/community college can they go on to 3-year university Bachelor's programs. Students may enroll either in a 2-year pre-university stream or in a 3-year career/technical stream. Regardless of stream, all students must take a minimum of two compulsory English courses (or French in French language colleges).

Sample 1 included 1889 students. All were over age 18 and all were enrolled in one of three Montreal area public junior/community colleges (1 English and 2 French): 731 were enrolled in an English college (59% females, 41% males) and 1158 in the two French colleges (53% females, 47% males). The median age of all the students was 19. All had completed at least one semester of studies. Eighty of these students (4.0% in the English college and 4.4% in the French colleges) self-reported *a learning disability*

such as dyslexia (53% were female, 47% were male); 59% of them indicated being registered to receive disability related services from their college.

Sample 2 included 432 students. Seventy-five of them (43 from the English college and 32 from the French colleges) self-reported a *learning disability such as dyslexia* (77% female, 23% male). The mean age for students both with and without an LD was 20. Among students with an LD, 25 (33.8%) indicated that they also had Attention Deficit Hyperactivity Disorder. The rate was 5.3% among students without an LD. Most (83%) students with an LD were registered to receive disability related services from their college; there was no significant difference between French and English colleges.

Procedure
The protocol was approved by Dawson College's Human Research Ethics Committee. The ARHQ-R was translated into French by a bilingual team member whose mother tongue is French. As recommended by Vallerand (1989), it was back-translated into English by a different bilingual team member whose mother tongue is English. The entire research team then evaluated discrepancies and made appropriate changes to the French version of the ARHQ-R. This procedure was followed in reverse when translating the Test de lecture - Épreuve de compréhension (Reading Comprehension Test) into English. The French version of the ARHQ-R was pre-tested on a small sample of students as was the English version of the online Reading Comprehension Test.

Sample 1. In the winter 2010 semester, we recruited students who had completed at least one semester of studies in over 100 different sections of compulsory college language courses (English courses in the English college, French courses in the French colleges). Students over age 18 were provided with an information and consent form and asked to complete the ARHQ-R, in paper and pencil format, in the language of instruction at their college. At each college, potential participants were informed that participation would make them eligible to win an iPod (one per college). Participants were also asked about whether they had a *learning disability such as dyslexia* and whether they had registered to receive disability related services for their LD from their college. To avoid confusion with learning difficulties, we specifically included the phrase *such as dyslexia*, a term that is well known in both English and French colleges.

Sample 2. In the fall 2010 semester, we emailed an invitation to visit our bilingual web site to all Sample 1 participants who indicated that we could contact them in the future. To ensure adequate sample sizes of very poor readers and of students with an LD, we recruited additional students from remedial reading courses, campus tutoring centers, as well as from Offices for Students with Disabilities at the three colleges. Potential participants read the online information and consent form and they could choose to complete the Reading Comprehension Test online in either French or English. Also, the participants were informed that they would receive an honorarium of $10 upon completion of the questionnaire. Data from only those students who indicated that their best language was either French or English participated. In addition, we excluded students if their best language was English but they were attending a French college, as well as the converse pattern.

The online questionnaire consisted of a series of demographic questions (gender, age, presence of an LD, etc.) followed by the Reading Comprehension Test, which we adapted to an online format. The online version followed the instructions on the paper and pencil version. A sample item was presented first and students were instructed to read each paragraph, answer all multiple choice questions, and not to go back and forth between paragraphs (although students could go back if they wished to do so). They were asked to work as quickly as possible and they were told they had up to 20 minutes to complete the test.

As on the paper and pencil version, we did not indicate the number of test items and we presented each of the 11 paragraphs with its 4 associated questions on a series of 11 screens. We counted the number of correct and incorrect responses at 10 minutes, as is customary for the paper and pencil version, and at 20 minutes to evaluate the impact of extended time on scores. Because the online version was not supervised, as suggested by others (e.g., Prince, Litovsky, & Friedman-Wheeler, 2012), an experimenter, blind as to the student's status (student with or without an LD) discarded data whenever she encountered problematic scores. When they had completed all questions or at the end of 20 minutes, whichever came first, participants were thanked for their time and the Reading Comprehension Test was closed.

Results

Psychometric Properties

Gender. There were no significant differences between males and females, either with or without an LD, on either the ARHQ-R or the Reading Comprehension Test. Therefore, subsequent analyses ignore the gender variable. These include t-tests, correlations, and Chi-Square tests.

Language. For translation of a measure to be adequate, it is important that there be no significant differences between scores on the French and English versions. Therefore, we carried out a series of analyses to evaluate the psychometric properties of the English and French versions as well as to assess possible differences between them.

Differences between scores on English and French versions. Although we generally prefer to use 2 x 2 ANOVA (2 Language x 2 LD Status) to avoid Type 1 error, here the goal was to find *no* significant differences. Although it is not possible to prove the null hypothesis, we deliberately chose to use the less conservative multiple t-tests to show that the English and French versions of the measures are truly similar.

The results show that there is no significant difference between scores of non-LD students from English and French colleges on either the ARHQ-R (M = .25, SD = .15, and M = .26, SD = .16, respectively), t(1807) = .62, p = .537, or on the Reading Comprehension Test (M = 36.51, SD = 7.62, and M = 36.30, SD = 7.67, respectively), t(255) = .22, p = .821. The same is true for students with an LD on the ARHQ-R (M = .52, SD = .27, and M = .58, SD = .22, respectively), t(78) = 1.09, p = .281, as well as on the Reading Comprehension Test (M = 33.14, SD = 6.45, and M = 30.42, SD = 6.65, respectively), t(72) = 1.76, p = .084. Arffman (2010) noted that measures in the two different languages should have equal standard deviations. It can be seen in the scores above, as well as in Table 2, that standard deviations are very similar for English and French versions on both measures.

Internal consistencies need to be high and similar. The results also show that both English and French versions of the ARHQ-R have similarly high internal consistency reliabilities: Cronbach's alpha scores are as follows: for the 29 English students with an LD, alpha = .920; for the 695 students without an LD, alpha = .793; for the 55 French students with an LD, alpha = .851, and for 1165 French students without an LD, alpha = .823. Because we obtained only total scores after 10 and 20 minutes on the Reading Comprehension Test, no internal consistencies could be calculated for this measure.

Categorization. We divided students with and without an LD into Adequate, Poor, and Very Poor reader categories based on recommended cutoffs for each measure. Here, too, we found no significant differences in frequencies between French and English versions, whether students did or did not have an LD, either on the Reading Comprehension Test, X^2 (2,75) = .96, p = .618; X^2 (2,357) = 1.69, p = .429, respectively, or on the ARHQ-R, X^2(2,1809) = .04, p = .979, for students without an LD (it was not appropriate to run X^2 tests on the ARHQ-R frequencies for students with an LD because the frequencies are lower than 5 in more than 20% of the cells). Frequencies can be seen in Table 1, which shows that students with an LD were significantly more likely to be categorized as Poor and Very Poor readers on both the ARHQ-R, X^2(2,1889) = 147.55, p = .000, and on the Reading Comprehension Test, X^2(2,432) = 13.16, p = .000, than those without an LD, although a substantial number of students with an LD were classified Adequate readers on the Reading Comprehension Test.

Table 1. Categorization of English and French Language Students According to the Two Measures

Measure		Category		
		Adequate Reader	Poor Reader	Very Poor Reader
ARHQ-R - English college	LD	5	5	19
	Non-LD	391	166	145
ARHQ-R - French college	LD	4	3	44
	Non-LD	622	259	226
Reading Test - English college	LD	15	13	15
	Non-LD	86	40	30
Reading Test - French college	LD	8	10	14
	Non-LD	97	58	46

Means for the LD and Non-LD groups in each category in Table 2 shows the Reading Comprehension Test means for students with and without an LD in each of the 3 groups are similar. The same is true for the ARHQ-R, with one exception. Scores of Very Poor readers with an LD are worse than those of Very Poor readers without an LD. This is similar to results reported by Parrila et al., (2007), who showed that students with reading problems who had an LD had substantially worse scores (M = .71, SD = .12) than those with reading problems who did not have an LD (M = .58, SD = .14). Students with an LD who had and those who did not have Attention Deficit Hyperactivity Disorder did not differ significantly on either measure.

Table 2. Mean ARHQ-R and Reading Comprehension Scores of Students With and Without an LD

|												
					Category							ANOVA test: 3 Categories
	Adequate Reader			Poor Reader			Very Poor Reader			Entire Sample		
	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	
Reading Comprehension Test												
LD	40.39	2.89	23	32.30	1.77	23	25.52	3.32	29	32.16	6.78	75	F(2,72)=1419.25, p=.000
Non-LD	40.94	2.67	183	32.44	1.85	98	25.39	3.08	76	35.30	6.79	357	F(2,354)=1066.55, p=.000
ARHQ-R												
LD	0.15	0.06	9	0.31	0.03	8	0.65	0.18	63	0.56	0.24	80	F(2, 77)=50.65, p=.000
Non-LD	0.15	0.07	1013	0.32	0.03	425	0.48	0.09	371	0.25	0.15	1809	F(2,1806)=3272.26, p=.000

Registration for college disability related services. The results show significantly worse ARHQ-R scores for students with an LD who indicated that they had registered for disability related services (M = .62, SD = .24) than for those with an LD who had not done so (M = .47, SD = .22), t(69) =2.65, p = .010. On the measure of reading comprehension, although the results also followed the direction of poorer scores for those who had registered (M = 31.86, SD = 8.07) than for those who had not done so (M = 32.72, SD = 7.36), the t-test was not significant, t(41) = .28, p = .78.

Relationship between ARHQ-R and Reading Comprehension Test scores and categories. As there were no significant differences between English and French versions of the two measures, we combined scores for the two language groups and correlated ARHQ-R and Reading Comprehension Test scores for students with and without an LD separately. The sample sizes for these comparisons are relatively small, since these comparisons require that participants complete both measures. Results show that for students both with and without an LD, scores were modestly correlated, r(12) = -.348, p = .222, and, r(135) = -.378, p = .000, respectively. We also wanted to examine the extent to which the ARHQ-R and the Reading Comprehension Test categorized students in similar ways. Here, too, the results indicate moderate relationships between categories for both students with, r(12) = .633, p = .015, and without an LD, r(135) = .399, p = .000. These correlations also provide some evidence of concurrent validity for the two measures.

Differences Between Students With and Without an LD
Distribution of scores. It can be seen in Figure 1 (a and b) that the distribution of scores for students without an LD on both the ARHQ-R and the Reading Comprehension Test depart from normal and are skewed, such that a disproportionate number of students obtain high scores. For students with an LD, on the other hand, Figure 1 (c and d) shows that scores on both measures more closely resemble a normal distribution. This suggests that both measures have ceiling effects, that they do not discriminate at the higher end of reading ability, and that these tests are too *easy* for college students who are adequate readers.
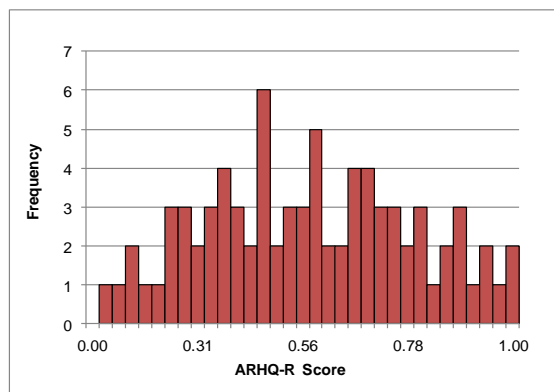
We examined the Reading Comprehension Test scores of students with and without an LD who fell into the adequate category of the ARHQ-R. Although there were very few students with an LD in the Adequate reader group, there was no significant difference between scores of students with (M = 41.33 SD = 1.58) and without an LD (M = 37.85, SD = 6.65), t(92) = .903, p = .369. The same is true for Very Poor readers on the ARHQ-R, where the mean Reading Comprehension Test scores of students with an LD (n = 11) was 30.36 (SD = 6.56) while it was 31.24 for the 25 students without an LD (SD= 5.29), t(34) = .425, p = .673. There were insufficient numbers of students in the Poor category to carry out a comparison.
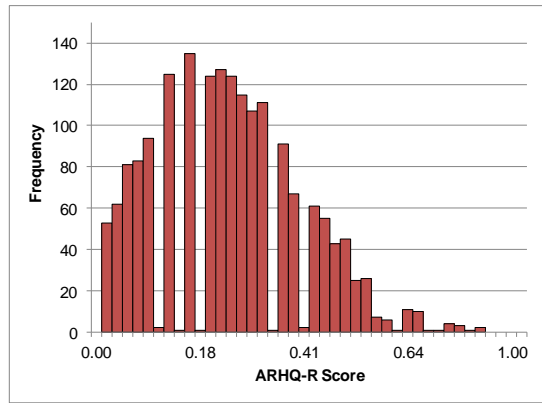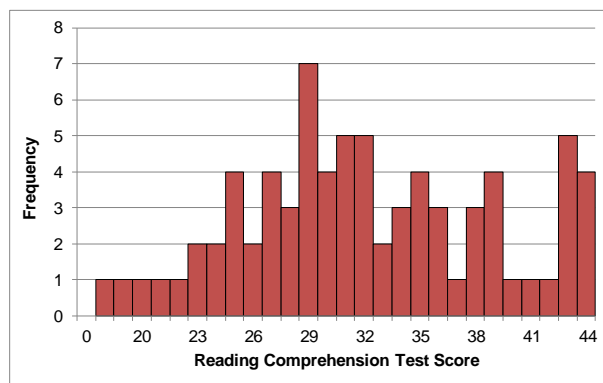
Figure 1a. Non-LD students' ARHQ-R scores
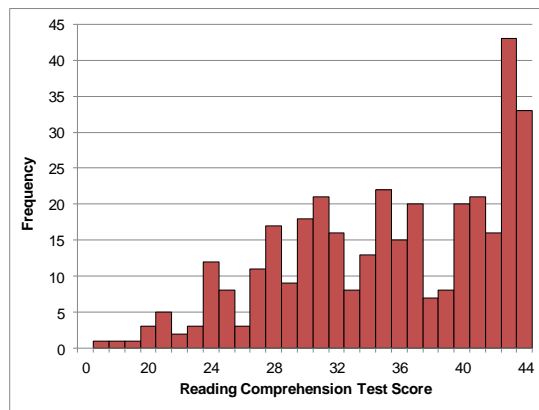
Figure 1b. Non-LD students' reading comprehension scores


**Figure 1c. ARHQ-R scores of students with LD**

Figure 1d. Reading comprehension scores of students with LD

We conducted a series of one-way analysis of variance (ANOVA) comparisons on ARHQ-R and Reading Comprehension Test scores of students in the different groups (4 Groups [Non-LD Adequate, Non-LD Poor, Non-LD Very Poor readers, LD]). As expected, Figure 2 and test results show a significant Group main effect, $F(3,1885) = 1854.89$, $p = .000$, on the ARHQ-R. Moreover, post hoc tests show that all groups are significantly different from each other, with the LD group having the worst and the Adequate reader group having the best scores.
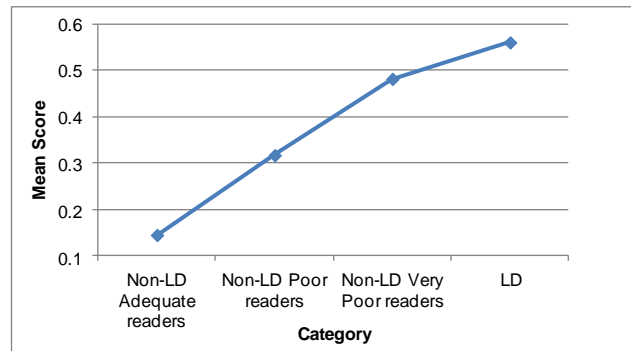
Figure 2. Significant ARHQ-R Group main effect

To evaluate the impact of extended time (20 minutes instead of 10) on the Reading Comprehension Test scores of the 4 groups (Non-LD Adequate, Non-LD Poor, Non-LD Very Poor readers, LD) we performed a 2-way repeated measures ANOVA: 4 Groups x 2 Times (10 minutes, 20 minutes). Both the Group, $F(3,416) = 230.65$, $p = .000$, and the Time, $F(1,416) = 2483.24$, $p = .000$, main effects were significant, as was the interaction, $F(3,416) = 337.56$, $p = .000$. Best seen in Figure 3, this shows that the groups differed at 10 minutes, with non-LD Adequate readers having substantially better scores than students with an LD or non-LD Poor readers who, in turn, had better scores than Non-LD Very Poor readers. By 20 minutes, all groups improved, to the point where their scores were very similar.
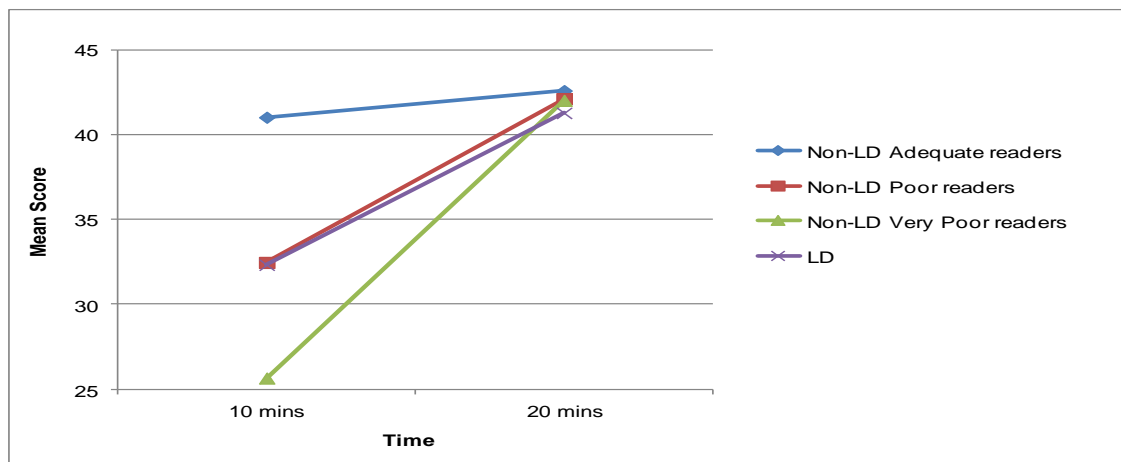
Figure 3. Effect of regular and extended time on reading comprehension scores

Discussion
Psychometric Properties of the Two Screening Instruments
Translations and linguistic differences. We predicted (hypothesis 1) that scores on the English and French versions of the measures would provide similar results. The results confirm this prediction. There were no significant differences on either measure between English and French versions between students with an LD, or between students without an LD. The same was true when we divided participants without an LD into Adequate, Poor and Very Poor categories where, once more, there were no significant differences between the two language groups. We were able to test the internal consistency reliability of the ARHQ-R. The results show good psychometric properties on both the English and French versions for students as well as for students without LDs. Modest correlations between the ARHQ-R and the Reading Comprehension Test for the various groups provide evidence related to concurrent validity.

Relationship between ARHQ-R and the Reading Comprehension Test. We predicted (Hypothesis 2) that scores on the two measures would be related. This hypothesis, too is confirmed as our results show that scores on the two measures are modestly correlated both for students with and without an LD. When we grouped students into Adequate, Poor and Very Poor categories, the results for students without an LD were very similar. For students with an LD, however, the relationship between ARHQ-R and Reading Comprehension Test categories was substantially stronger (r = .633), suggesting that the ARHQ-R does a good job of predicting Reading Comprehension Test category for this population.

Gender. There were no differences between males and females with an LD either on the ARHQ-R or the Reading Comprehension Test. The same was true of students without an LD.

Distribution of scores. The results show that both the ARHQ-R and the Reading Comprehension Test fail to discriminate at the high end, as there were pronounced ceiling effects on both measures. At the lower end of reading proficiency, however, both for poor and very poor readers without an LD and for students with an LD, both measures performed as expected and resulted in normal appearing distributions. Thus, both measures can be useful as screening tools for reading difficulties.

The mean reading comprehension score of students with an LD was somewhat higher than expected given previous findings (King et al., 2006; Mimouni, 2009; Mimouni & King, 2007). There are three possible explanations for this. First, our sample of students with an LD was based on self-identification. Thus, it is possible that some of them did not have a diagnosable LD. Other possibilities include the lack of homogeneity within the LD classification, so that students with an LD do not necessarily have reading difficulties (Learning Disabilities Association of Canada, 2002). Moreover, approximately 1/3 of the sample also had Attention Deficit Hyperactivity Disorder, and it has been shown that college students with this disorder performed significantly better on an online multiple choice task than they did on paper-and-pencil testing (Lee, Osborne, & Carpenter, 2010).

As for ARHQ-R, the mean of the entire non-LD sample was .25, a score substantially worse than the .12 reported by Parrila et al. (2007). The difference may be due to the fact that our sample was comprised of junior/community college students while Parrila et al.'s sample consisted of university students. Also, our sample was quite large (n = 1809) and there was no pre-selection of students, since all were enrolled in compulsory English or French courses. Parrila et al.'s sample, on the other hand, was relatively small (n = 27) and students were described as reporting no history of reading problems. Moreover, their mean score of .12 is similar to our mean score for the Adequate reader category, rather than for our entire sample. Thus, it is possible that selecting students *with no reading problems* samples only the top half of the distribution, and this may not be normative for the entire school.

Cutoffs. When it came to categorization of students as adequate, poor and very poor readers, the ARHQ-R cutoffs identified a large proportion of students with an LD as very poor readers in elementary school, and their scores were substantially worse than those of Very Poor readers without an LD. This finding is consistent with results reported by Parrila et al. (2007).

Categories based on the Reading Comprehension Test, however, did not fare well, since these grouped a third of the students with an LD in each of the three categories, including *adequate reader.* Regardless of whether this is due to the ceiling effect, the online administration of the measure, or to *compensated dyslexics* who have learned effective reading strategies (e.g., McGonnell et al., 2007), this measure, when administered online to junior/community college students with the current cutoffs, does not do a good job of discriminating reading comprehension among students with an LD. We recommend adjusting the cutoffs upward so that a larger proportion of students with an LD are categorized as poor or very poor readers. Figure 3 provides some guidelines.

Sample Characteristics
Prevalence. It is important to note that slightly over 4% of students in sample 1, which is representative of the entire populations in participating colleges, self-reported a *learning disability such as dyslexia.* A recent study shows that the rate of undiagnosed LDs was very high in Canadian universities (Harrison et al., 2007), suggesting that many students may be unaware they have this disability. Thus the 4% figure is likely an underestimation of the prevalence of an LD in the junior/community college population. Among students with an LD, approximately 1/3 also indicated that they also had Attention Deficit Hyperactivity Disorder. Such findings, which have also been reported elsewhere (Fletcher, Shaywitz, & Shaywitz, 1999), coupled with the results on differences in reading comprehension, suggest that the

population of students who self-report an LD is by no means homogeneous and that students likely have different needs in an academic context. Parenthetically, it should be noted that the self-reported rate of Attention Deficit Hyperactivity Disorder was approximately 5% among students without an LD, a figure comparable to that recently reported for the adult population of the United States (Kessler et al., 2006). So this disability, too, is quite common in the junior/community college population.

Conceptions of an LD are somewhat different in the English and French colleges, with the French system focusing primarily on dyslexia (Dubois & Roberge, 2010). The definitions used in the English language North American system are broader and can include specific difficulties with reading, memory, thinking, spelling, mathematics, and the ability to listen and to speak (Learning Disabilities Association of Canada, 2002; Li & Hamel, 2003). Therefore, we expected a larger proportion of students to indicate they had an LD in the English college. Contrary to expectations, the rate was slightly, although not significantly greater in the French colleges (4.4%) than in the English college (4.0%).

Registration for disability related services. It is also worth mentioning that only 59% of students with a self-reported LD in the representative sample (i.e., sample 1) indicated that they had registered to receive disability related services from their college and that their ARHQ-R scores were significantly worse than those of students reporting an LD who had not registered. Reasons for not registering are diverse and range from lack of information about available services, wanting to do things *like everyone else,* and not wishing to being singled out as *disabled*, to not wanting to have a record of a disability (Lightner, Kipps-Vaughan, Schulte, & Trice, 2012). Although it is also possible that registered students had been diagnosed with an LD, making them eligible for services, while unregistered students did not have adequate documentation, we believe our findings suggest that registered students had more severe LDs and that they experienced more difficulties in school which needed accommodations. This is consistent with research which shows that graduates who self-reported an LD and who had registered for disability related services had lower college exit scores than graduates with other types of disabilities, while there was no significant difference between graduates with learning and other disabilities among those who had not registered for disability related services (Jorgensen, Fichten, & Havel, 2007).

Notwithstanding poorer reading scores, the literature shows that students who had registered for disability related services from their college experienced fewer obstacles and more facilitators of academic success and that they rated their college experience as easier and more satisfying than nondisabled students or students with disabilities who had not registered for disability related services (Jorgensen, Fichten, & Havel, 2009; Jorgensen, Fichten, & Havel, 2012). Since students with disabilities who had not registered for services were least satisfied with their college experience, students with an LD, even if their disability is relatively mild, may wish to register for services to make their academic lives more productive and more pleasant.

Differences between poor readers with and without an LD. On the ARHQ-R, students who reported an LD had the worst scores. On the Reading Comprehension Test, however, students with an LD and poor readers without an LD had very similar scores. What was surprising is that students with an LD had significantly better scores than the substantial numbers of students without an LD who fell into the *very poor* category (76 of the 357 students). Since none of these students were second language students, it is important to find out about their reading issues.

We have little information to offer about very poor readers who do not report an LD and who are not second language learners. What accounts for their abysmal reading comprehension results? Could these be students with an undiagnosed LD, as suggested by others (Deacon et al., 2012; Harrison et al., 2007), who are not aware of their LD and who have never had any intervention targeted for improving reading? Is reading comprehension simply a normal variant in the population? Although we do not have answers to these questions, we join others who have raised a red flag about the existence of this relatively large group of students in our colleges and universities (e.g., Harrison et al., 2007; Parrila et al., 2007; Mimouni, 2006; Mimouni & King, 2007).

Extended Time
Although Steward and Morris-Wales (2004) acknowledged the popularity of extended time as a disability accommodation, they argued that there is little evidence to support its use. Indeed, there is substantial controversy about this topic (Gregg & Nelson, 2012; Lovett, 2010). Consistent with Hypotheses 3 and 4, our data show substantial and significant differences among groups at 10 minutes on the Reading Comprehension Test which virtually disappeared by 20 minutes (extended time). All groups

improved to the point that the scores of the four groups, including those of students with LDs, were indistinguishable, with the most substantial gain being made by very poor readers without an LD. This finding is consistent with reports in the literature which show that extended time results in comparable outcomes for students with and without an LD (e.g., Lesaux et al., 2006; Mimouni & King, 2007).

Limitations
We have no concerns about the validity of the translations. We do, however, urge caution about the generalizability of the reading comprehension findings on *adequate, poor* and *very poor* readers. First, although the samples were relatively large, we studied students from only three colleges, only one of which was English. Sample 1, whose students completed the ARHQ-R, was representative of the students in the three colleges studied. But sample 2, whose students completed the Reading Comprehension Test, over-sampled poor and very poor readers as well as those with an LD. In addition, because there were relatively few students in the adequate and poor ARHQ-R categories who also completed the Reading Comprehension Test, some analyses are severely under powered. Another concern, although unavoidable given the study design, is that the data are based on self-reports of disability, and not on documented conditions. Also, the Reading Comprehension Test was administered online and this, too, may have affected scores (Higgins, Russell, & Hoffman, 2005; Puhan, Boughton, & Kim, 2007). And finally, the administration of this measure was not supervised.

Future Research
Future research on the relationship between ARHQ-R and Reading Comprehension Test scores should be carried out with more representative samples from several colleges. In such studies, it would be important to ensure that an LD is based on official documentation rather than simply on self-reports. Moreover, it would be important to evaluate the equivalence of paper-and-pencil and online versions of the Reading Comprehension Test. Also, additional norming of the Reading Comprehension Test for college students is needed. A time period less than 10 minutes may be needed to distinguish exceptionally good readers from merely adequate readers.

Since extended time is one of the most common accommodations requested by college students with LDs, more research is required in this area. Our study evaluated scores at *regular time* and *double time* and showed that at double time there were few differences among adequate poor and very poor readers. Would *time-and-a-half* have resulted in similar outcomes? This is an empirical question and deserves additional investigation.

Recommendations
Reading Screening
Colleges should administer the same valid, quick, easy, reading-screening tools, in their preferred language, to all incoming students. These would allow for both exciting research and applied outcomes. First, this would result in comparability of investigations and samples. Second, screening test results could be used to identify potentially poor readers early, allowing for early intervention. Students' scores can also be used to recommend LD testing. Some students will, likely, have a formal report of a learning disability. In this case, reading-screening results could be used to ascertain the nature of students' learning disabilities (e.g., reading. writing, mathematics, etc. – see Learning Disabilities Association of Canada, 2002) and to further validate the screening measures, the evaluations, as well as requested accommodations.

Poor Readers Without an LD
Perhaps the most interesting research question concerns what makes for poor readers who do not indicate that they have an LD. This group of students, often referred to as *garden-variety poor readers* in the literature (e.g., Stoodley, Ray, Jack, & Stein, 2008) requires further examination in terms of who they are and how to meet their needs. Why do some students self-report an LD while other, weaker readers do not do so? Is the difference the actual presence of an LD or is the difference most easily accounted for by examination of who is more willing to assume the burden of a diagnostic label such as an LD. A related question is what makes for poor readers if it is not an LD? Is it poor instruction or instruction that does not work for a particular individual? Is it simply lack of practice reading because of alternate ways of information acquisition such as through DVDs or YouTube? Or do college students have a range of reading abilities where a key percentage of them fall into weak categories? Moreover, it would be of interest to find out how students with an LD who have poor ARHQ-R scores become adequate readers on a reading comprehension test.

Extended Time
Disability service providers often struggle with the decision about which students with an LD should be given extended time on college tests and exams, which usually have both a speed and a power component. There is, however, no consensus on what basis this is to be done (see Ofiesh et al., 2005). The current approach is to provide students with accommodations based on a medical label, such as a diagnosed LD, instead of on functional limitations, such as poor reading comprehension. The present findings of large numbers of poor and very poor readers who did not report an LD suggest a move away from medical labels toward looking at functional limitations.

Our data, which show that students with and without an LD do not differ once they have an ARHQ-R classification, suggest that one possibility is to administer a screening measure such as the ARHQ-R and use its categories for decision making. This could *deny* extended time to approximately 20% of students with an LD who score as adequate readers on the ARHQ-R. Of course, before one could incorporate such a strategy, one would need extensive replication of our findings, a sophisticated *faking scale* for the ARHQ-R, and a large sample of students with a diagnosed LD who complete the ARHQ-R as well as multiple measures of reading speed and comprehension. One should also, of course, provide extended time to the up to 20% of students who score as very poor readers on the ARHQ-R but who do not indicate that they have an LD. There is also the issue of what is to be done with the close to 40% of students with an LD who are not registered to receive disability related services from their college.

Universal Instructional Design
As an alternate to decision making about accommodations, we suggest that wherever possible, colleges follow the tenets of universal instructional design (Barile, Nguyen, & Fichten, 2012; Burgstahler & Cory, 2008; Scott, McGuire, & Shaw, 2003) and provide *extended time* to all students when speed is not of the essence. This could provide adequate opportunity to demonstrate what they have learned not only for students with an LD but also for the substantial numbers of students in the college who are poor or very poor readers, as well as for second (and third) language learners who have not yet mastered the language of instruction at their college.

The large number of poor and very poor readers, the findings on the impact of extended time, the probable large number of students with an LD who do not have formal (expensive) documentation to guarantee them accommodations, and the interesting finding that a substantial number of students with an LD fell into the adequate reader category suggests a move away from the accommodations model to that of universal design of instruction. Exams that do not need a speeded component could be designed so that most students complete it in half of the time allocated. This would give all students *extended time.* Learning/tutoring centers can offer reading effectiveness workshops to *all* students. Those with poor screening test results could be encouraged to attend. These workshops could also provide instruction on information and communication technologies that can assist students to read more effectively. Of course, these technologies should be made available to all students in general use computer labs.

Reading is an essential skill for college success. Those who are at risk in this area need programs and resources made available as soon as they enter college to prevent subsequent difficulties. Let us continue to put all of the odds in the students' favor.

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