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L1 and L2 reading comprehension in Dutch higher education students with and without dyslexia: effects of test type and linguistic skills

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ABSTRACT

Reading is one of the most important skills in higher education. Various students show problems with reading, which can lead to problems with text decoding, reading comprehension, or both. In this study, we investigate the L1 (Dutch) and L2 (English) reading comprehension performance of students with and without dyslexia. Participants were presented with two short texts, and their reading comprehension was tested via two different test types: (1) a free recall test (i.e. summary writing) and (2) a true/false test, composed of literal and inferential questions. In addition, the students were timed during text reading and tested on L1 and L2 language proficiency and print exposure, to study if and how these skills relate to their reading comprehension performance. In L1, both student groups performed equally well on literal true/false questions, but students with dyslexia performed poorer on inferential questions and summary writing. In L2, students with dyslexia performed worse on both types of true/false questions and the summary writing. Language proficiency was shown to play the most prominent role in reading comprehension skills of higher education students.

KEYWORDS

Dyslexia; higher education; reading comprehension; free recall test; true/false test

Introduction

It is well established that proficient reading is an important skill in higher education (Onwuegbuzie and Collins 2002). To successfully progress through academic curricula, a student needs to master a wide range of literacy skills among which reading comprehension (RC) might be the most important. It is a complex skill in which different reading subskills and processes play a role (Meixner et al. 2019). Faggella-Luby and Deshler (2008, 234) describe it as '*integrating the reader's understanding of text with the reader's prior knowledge and applying new knowledge to novel learning situations*'. Faggella-Luby and Deshler propose that word identification, language comprehension and executive processes are fundamental for RC, being all strong predictors of RC outcome.

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Dyslexia and reading comprehension

Students with dyslexia form a group of higher education students that demonstrate reading and RC problems (e.g. Callens et al. 2012; Pedersen et al. 2016; Swanson and Hsieh 2009). It was demonstrated by studies of C. J. Miller et al. (2006) and Ransby and Swanson (2003) that many variables, such as phonological processing, naming speed, word decoding, vocabulary, working memory and general knowledge, are involved in RC.

Simmons and Singleton (2000) studied the RC performance of students with and without dyslexia on answering literal and inferential multiple-choice questions. The authors found students with dyslexia performed more poorly on inferential questions. They suggested that this difference could potentially be caused by impaired working memory (WM) skills, as information needs to be held and processed in active short-term memory (L. M. Miller, Cohen, and Wingfield 2006). Focusing simultaneously on decoding and comprehension might be too demanding (L. M. Miller, Cohen, and Wingfield 2006). Pedersen et al. (2016) reported that when Danish students with and without dyslexia had to retell a story after reading, which students with dyslexia made more errors and had more trouble constructing meaningful relations in the text.

Another obstacle that students with dyslexia must tackle within RC is answering open, or essay-type questions (Coleman et al. 2009; Tops et al. 2013). Studies from Sterling et al. (1998), Coleman et al. (2009) and Tops et al. (2013) demonstrated that students with dyslexia write shorter texts with more errors than students without dyslexia and need more time to write texts.

Present study

The current study was designed to examine L1 and L2 RC skills of students with and without dyslexia. A group of Dutch students with dyslexia and a group of controls were matched on age, gender, and field of study, and compared on RC in both L1 (Dutch) and L2 (English). We focus on differences between performances on a free recall test (i.e. summary writing) and a true/false test. To achieve this, the students were asked to study short texts in L1 and L2 subject to one of the two possible test types. Reading time and language proficiency were also added as potential linguistic predictors (Faggella-Luby and Deshler 2008). Altogether, we came to the following research questions:

(1) What are the differences in L1 and L2 reading comprehension performance between higher education students with dyslexia and matched students without dyslexia?
(2) Does test type, i.e. free recall vs. true/false questioning, influence the outcomes of L1 and L2 reading comprehension performance for higher education students with dyslexia and matched students without dyslexia?
(3) Are reading fluency and language proficiency significant predictors of L1 and L2 reading comprehension test performance?

We expect that students without dyslexia will outperform students with dyslexia, showing clearer differences on the free recall tests compared to the true/false tests

(Pedersen et al. 2016). Additionally, we expect a significant relation between RC and language proficiency (Bizama, Saldaño, and Rodriguez 2019; Motallebzadeh, Tabatabaee Yazdi, and Tong 2016).

Method

Participants

Sixty students with dyslexia were enrolled in this study. A demographic overview is presented in Table 1. A participant met the criteria for dyslexia when (1) they had a formal dyslexia diagnosis, and (2) they obtained clinical scores (<pc 10) on a Dutch one-minute word reading test (LEMs; Tops, Nouwels, and Brysbaert 2019), and a Dutch pseudoword reading test (de Klepel; Van den Bos et al. 1994) and/or a word dictation test (Depessemier and Andries 2009).

Also, sixty control students without dyslexia were enrolled in this study. Control students were matched as closely as possible to the students with dyslexia on age (±1.5 years), gender and field of study. All students were recruited from university and applied science programmes, including as many different fields as possible. All students had normal or corrected-to-normal vision, and were native speakers of Dutch. L2 level was not measured, as C1 level for English were required to graduate high school. Our study followed the ethical protocol of the Faculty of Arts of the University of Groningen.

Materials - reading comprehension

Texts

Two short texts of a study by Roediger and Karpicke (2006) were used for the RC test. Both texts covered a topic in the field of natural sciences: *the sun* (L1) and *sea otters* (L2). The text about the sun was translated into Dutch and adapted by Vander Beken and Brysbaert (2017) and was matched to the original L2 text as closely as possible.

The text about the sun was 249 words long, and the text about sea otters was 279 words long. Participants were given a time limit of four minutes to read and study each text. They were instructed to raise their hand when they completed their first reading.

Table 1. Demographic overview of the participants.

		Dys ($N = 60$)	NonDys ($N = 60$)
Gender	Female	38	38
	Male	22	22
Age (years)	Mean	21;5	21;4
	Range	18-29	18-27
Type of program	University	37	37
	Applied science program	23	23

Summary and true/false tests

Two different methods were used to assess RC performance: a free recall test in which participants were asked to write a summary of the text, and a test with true/false judgements. Half of the students ($n = 30$) of each group (dyslexia – controls) received the summary writing test. The other half the true/false test. Participants were not aware which test type they would receive.

Participants received the following instructions for the free recall test after reading: 'Write a summary of the text you just read. Be as detailed as you can be'. No time restrictions were given to the participants when writing the summary. The written summaries were checked according to the guidelines provided by Roediger and Karpicke (2006) and by Vander Beken and Brysbaert (2017): the text was divided into 30 keywords. Each idea that was reproduced correctly was awarded with a maximum score of 1. Spelling errors and grammatical errors did not influence the summary score.

In addition, we created a true/false test with 20 statements for each text. This true/false test was based on the 46 statements that were originally developed by Vander Beken and Brysbaert (2017). For the text about the sun, 13 of the 20 statements that we included were literal questions, and 7 were inferential questions. For L2, 16 of the 20 questions were literal questions, and 4 were inferential (Van der Beken & Brysbaert, 2017), showing a difference in literal and inferential questions between L1 and L2, because only statements that did not yield scores around chance level were included. Participants received the following instruction for the true/false test after reading the text: 'Tick the correct answer box for every statement, based on the text you just read'. Participants were not allowed to refer back to the text; no time restrictions were given. All participants completed the true/false test for one language and the summary writing test for the other. Control students always received the same version as their matched peer.

Materials - cognitive tests and questionnaire

L1 proficiency tests

A vocabulary test and a c-test were administered to test participants' L1 proficiency. The vocabulary test was a 75-item Dutch vocabulary test (Vander Beken, Woumans, and Brysbaert 2017). Participants were provided with a multiple-choice format with four answer options per item. Items were either scored correctly (1 point) or incorrect (0 points) with a maximum score of 75.

The c-test (Keijzer 2013) is a variant of the traditional cloze test. Participants were given three short L1 texts with 20 gaps each, for which they had to complete a word. Participants were given a time limit of five minutes per text. Items were either scored correctly (1 point) or incorrect (0 points).

L2 proficiency tests

Participants were tested on a vocabulary test and c-test for L2 proficiency. L2 vocabulary was measured with a lexical decision test, the LexTale test (Lemhöfer and Broersma 2012), containing 40 words of various difficulty levels and 20 non-words. Items were either correct (1 point) or incorrect (0 points) with a total maximum score

of 60. The format for the L2 c-test was identical to the L1 c-test, though the texts were different.

Questionnaire

Prior to the assessment, participants were asked to fill in a background questionnaire created by the first author. The questionnaire included questions about print exposure for Dutch and English.

Procedure and study design

The tasks were administered individually and were part of a larger test protocol. All participants were granted written permission to use their data for research purposes. Before testing, participants completed the questionnaire. Testing of the participants took place in a quiet room at the university and lasted for 2,5 to 3 h for the total protocol. Participants were given a 30-min break halfway through.

Half of the participants started with the L1 tests and half of the participants started with the L2 tests, for which group assignment was randomised. To minimise the chance of interference between the languages, tests were presented in separated testing blocks.

Analysis

Data were analysed using R (R Core Team 2013) and IBM SPSS Statistics 26 (IBM Corp 2019). Different statistical approaches were used to study our research objectives.

The differences on language proficiency and print exposure (PE) and reading time were examined with a One-Way ANOVA, with Diagnosis as the independent variable and the language proficiency and PE scores as the dependent variable.

We determined the differences on reading time and the true-false (TF) test and free-recall (FR) test in L1 and L2, to test our first hypothesis. The overall between-group differences were tested with two separate two-way ANOVAs with Diagnosis, and either Test Type *or* Language, as independent variables. Additionally, the between-group results of the inferential and literal questions for both TF tests and the number of errors for the FR tests were evaluated with a One-way ANOVA with Diagnosis as the independent variable.

Lastly, a hierarchical multiple regression analysis was carried out to analyse the effects of the linguistic predictor variables, i.e. reading time, language proficiency and PE, on the RC scores of the participants.

Results

The goal of this study is to report on the differences and similarities between students with dyslexia and peers without dyslexia on reading and RC, the effect of different test types, and the effect of several linguistic predictor variables on the RC outcome.

Assessing the participants' L1 and L2 proficiency level

Participants' L1 and L2 proficiency levels were assessed to explore possible between-group differences (see Table 2). One participant with dyslexia and one participant without dyslexia were excluded from the analysis, because both did not finish the L2 C-test.

Table 2. Language proficiency results.

	Dys (n = 59)		NonDys (n = 59)			
	M	*SD*	M	*SD*	*p*	*d*
Language proficiency						
L1 Vocabulary	54.0	9.4	62.4	10.6	<.001*	.84
L2 Vocabulary	68.6	10.3	75.8	12.7	<.001*	.61
L1 C-test	43.2	5.7	50.2	4.7	<.001*	1.34
L2 C-test	30.5	7.7	39.1	7.8	<.001*	1.11
PE						
L1 PE	11.6	4.0	11.1	3.0	.437	−.14
L2 PE	12.3	3.6	12.4	3.7	.823	.03

Note. L1/L2 Vocabulary = score on vocabulary test [Max. = 100], L1/L2 C-test = score on c-test [Max. = 60]; L1 PE = total score on L1 PE [Max = 20]; L2 Print Exposure = total score on L2 print exposure [Max. = 25]; Dys = dyslexia group; NonDys = control group; *$p < .001$; d = Cohen's d.

Students with dyslexia performed significantly worse on L1 Vocabulary, $F(1, 118) = 15.04$, $p < .001$, and on the L1 C-test, $F(1, 118) = 42.84$, $p < .001$, showing large effect-sizes (d = .84 and d = 1.34, respectively). Similar results were found for L2 language proficiency. Students without dyslexia outperformed students with dyslexia on L2 Vocabulary, $F(1, 118) = 11.01$, $p < .001$) and L2 c-test, $F(1, 117) = 27.81$, $p < .001$), with a medium effect size for Vocabulary (d = .61), and a large effect size for the L2 C-test (d = 1.11). No effects were found for PE.

Reading time and reading comprehension

Participants' reading fluency

Reading time is roughly normally distributed, presenting overall longer reading times for students with dyslexia compared to their non-dyslexic peers and for L2 compared to L1 (see Table 3). Students with dyslexia read the text significantly slower during their first attempt in both L1, $F(1, 117) = 23.02$, $p < .001$, and L2, $F(1, 117) = 19.87$, $p < .001$.

Participants' reading comprehension

The mean scores, percentage of mean scores and standard deviations for the True/False tests (TF) and Free-Recall tests (FR) can be found in Table 4.

Table 3. Dyslexic and non-dyslexic students' first-reading times of texts.

	Dys (N = 60)		NonDys (N = 60)			
	M	*SD*	M	*SD*	*p*	*d*
Reading Time						
L1	114.7	30.3	89.6	37.6	<.001*	.85
L2	150.8	35.76	119.31	40.4	<.001*	.82

Note. Reading time = reading time in seconds; Dys = dyslexia group; NonDys = control group; *$p < .001$; d = Cohen's d.

Table 4. Reading comprehension descriptive results.

	Dys ($n = 30$)[1]		NonDys ($n = 27$)[1]			
	M	*SD*	M	*SD*	*p*	*d*
L1 TF						
Total score	14.6 (73%)	1.7	14.6 (73.0%)	1.7	.941	.06
Literal score	10.7 (83.0%)	1.6	10.3 (79.2%)	1.5	.373	.28
Inferential score	3.6 (51.4%)	1.4	4.2 (60.0%)	0.9	.033*	.51
L2 FR						
Summary score	8.7 (29.3%)	3.4	12.1 (40.1%)	4.6	.002*	.86
Errors	8.4	6.0	3.3	2.8	<.001*	1.11
L2 TF	Dys ($n = 30$)[2]		NonDys ($n = 27$)[2]			
Total score	13.4 (67.0%)	2.8	14.5 (73.5%)	1.7	.057^	.65
Literal score	10.4 (65.0%)	2.8	11.6 (72.5%)	1.2	.030*	.56
Inferential score	2.9 (72.5%)	1.1	2.9 (72.5%)	1.0	.903	.001
L1 FR						
Summary score	10.2 (34.1%)	2.9	12.5 (41.3%)	3.0	<.001*	1.05
Errors	6.5	5.0	3.3	4.2	.005*	.69

Note. Total score = score on the true-false test [Max. = 20], also in percentage correct; Literal score = score on the literal questions [Max. = 13 for L1 and 16 for L2]; Inferential score = score on inferential questions [Max. = 7 for L1 and4 for L2]; Summary score = score on the summary test [Max. = 30], also in percentage correct; Errors = spelling errors per summary; Dys = dyslexia group; NonDys = control group. [1]Students with dyslexia and matched control students that were tested on L1 TF were tested on L2 FR; 2Students with dyslexia and matched control students that were tested on L2 TF were tested on L1 FR; *$p < .001$; d = Cohen's d.

To test our first two hypotheses, the differences between the students with and without dyslexia were explored with two separate two-way ANOVAs with Diagnosis and either Language *or* Test Type, respectively, as independent variables.

As to the first ANOVA, main effects were found for Diagnosis, $F(1, 232) = 22.711$, $p < .001$, and Test Type, $F(1, 232) = 75.033$, $p < .001$. There was also a significant interaction between Test Type and Diagnosis for the total RC score, $F(1, 232) = 8.106$, $p = .005$. Bonferroni post-hoc analyses were carried out. The analyses reveal that both the dyslexia group, $p < .001$, and the non-dyslexia group, $p < .001$, perform worse on the FR test than on the TF test. Additionally, students with dyslexia perform worse on the FR test compared to non-dyslexic students, $p < .001$, which was not true for the TF test, $p = .499$.

Regarding the second ANOVA, a main effect was found for Diagnosis, $F(1, 232) = 17.176$, $p < .001$, as well as for Language, $F(1, 232) = 4.526$, $p = .034$. No significant interaction was found between Diagnosis and Language for the RC scores (i.e. average of TF and FR), $F(1, 232) = 1.804$, $p = .181$.

Additionally, the between-group differences of the inferential and literal questions for both TF tests and the number of errors for the FR tests were analysed. Students with dyslexia obtain lower scores than the students without dyslexia on L1 inferential, $F(1, 58) = 4.4$, $p = .039$, and L2 literal, $F(1, 58) = 5.0$, $p = .030$. Also, students with dyslexia made more errors in the FR test in both L1, $F(1, 57) = 8.5$, $p = .005$, and L2, $F(1, 56) = 16.5$, $p < .001$.

Effect of predictors on total TF and FR scores

To test our third hypothesis, we checked the effects of the predictors on the total TF and FR scores. A Multiple Regression Analysis was conducted (see Table 5). In a first regression analysis (Model 1), only diagnosis was included in the model; in a second regression

Table 5. Regression analysis of predictors of True/False (TF) and free recall (FR) test.

	Model 1			Model 2			Model 3		
	β	p	s_e	β	p	s_e	β	p	s_e
Diagnosis	.062	.813	.260	−.216	.479	.303	−.447	.157	.312
Reading fluency				−.262	.092	.153	−.143	.347	.151
L1-LP							.283	.050*	.146
L1-PE							−.280	.042*	.135
Diagnosis	.537	.037	.251	.362	.163	.257	.061	.812	.257
Reading fluency				−.280	.034	.130	−.070	.563	.121
L2-LP							.420	.007*	.142
L2-PE							.233	.074	.233
Diagnosis	.921	<.001*	.231	.846	<.001*	.241	.704	.017*	.285
Reading fluency				.128	.296	.122	−.096	.463	.129
L1-LP							.135	.376	.152
L1-PE							.105	.373	.117
Diagnosis	.786	.002*	.243	.506	.058^	.131	.295	.165	.209
Reading fluency				−.313	.021*	.131	−.204	.043*	.099
L2-LP							.473	<.001*	.101
L2-PE							.256	.011*	.098

Note. Model 1 = diagnosis; Model 2 = diagnosis, reading fluency; Model 3 = diagnosis, reading fluency, LP and PE; Model 4 = diagnosis, reading fluency, LP, PE, WM and Fluid IQ, LP = language proficiency, PE = Print Exposure; WM = working memory; L1/L2 TF = total true/false score; L1/L2 Lit. = literal score; L1/L2 Inf. = inferential score; β = beta; *$p < .05$; se = standard error.

analysis (Model 2) reading fluency was added to the model; in the last regression analysis (Model 3), language proficiency and PE were included in the model.

Language proficiency, with a medium effect of $\eta_p^2 = .065$, and L1 PE with a medium effect of $\eta_p^2 = .074$, significantly predict the L1 TF score, $F(4, 54) = 2.899$, $p = .030$, $R^2 = .177$, in Model 3. For L2 TF, language proficiency, with a large effect of $\eta_p^2 = .125$, significantly predicted the L2 TF score, $F(4, 55) = 8.534$, $p < .001$, $R^2 = .383$, in Model 3.

When L1 FR was predicted, it was found that diagnosis was a significant predictor in all three models. For L2, it was shown that diagnosis was a significant predictor in Model 1, $F(1, 56) = 10.45$, $p < .002$, $R^2 = .157$, and an almost significant predictor in Model 2, $F(2, 55) = 8.51$, $p < .001$, $R^2 = .236$, together with reading fluency, with a large effect of $\eta_p^2 = .085$. In Model 3 it was shown that reading fluency, with a medium effect of $\eta_p^2 = .077$, language proficiency, with a large effect of $\eta_p^2 = .298$, and L2 PE, with a large effect of $\eta_p^2 = .118$, significantly predicted the FR score, $F(4, 52) = 19.67$, $p < .001$, $R^2 = .602$.

Discussion

In this study, we examined the L1 and L2 reading and RC performance of a group of higher education students with and without dyslexia on a TF test and a FR test.

As expected, students with dyslexia needed more time to read and study the texts for both languages, which is in line with our expectations and previous studies (C. J. Miller et al. 2006; Pedersen et al. 2016; Simmons and Singleton 2000).

Performance on the TF tests

The TF test measured how much participants were able to recognise and memorise from the text (Vander Beken & Brysbaert, 2017). No differences were found between the two groups on the total TF score (ca. 73%) for L1. For the L2 TF test, there was also no

significant difference between the groups, even though the group of students with dyslexia scored 67% correct to 73% for the controls.

For the literal and inferential questions, it was demonstrated that the L1 inferential questions were answered significantly poorer by the students with dyslexia, as expected and also supporting the results of Pedersen et al. (2016) and Simmons and Singleton (2000). However, this effect was not demonstrated for L2. We hypothesise that the number of inferential questions for L2 might not have been adequate to find a difference between the groups.

Overall, it was illustrated by our results that language proficiency plays an important role in RC and answering TF questions, which is in line with several other studies (Faggella-Luby and Deshler 2008; C. J. Miller et al. 2006; Simmons and Singleton 2000). Our results even show that the effect of diagnosis is suppressed by the influence of language proficiency: our students with dyslexia perform worse on language proficiency measures.

Performance on the FR tests

The FR test (i.e. the summary writing test) measured how much students remember of a text they just read without being helped by memory cues or recognition. Students with dyslexia score 33% on the L1 summary and 28% on the L2 summary, whereas students without dyslexia score 43% on L1 and 39% on L2. In both languages, the students without dyslexia outperform the students with dyslexia, suggesting that students with dyslexia struggle more with recalling information and writing it up than their peers (Pedersen et al. 2016). However, no strong effect was found for the linguistic predictors on the L1 summary writing score. We can hypothesise that working memory could be of influence here because good working memory skills allow students in higher education to make better connections in texts (L. M. Miller, Cohen, and Wingfield 2006).

For L2 FR, previous studies suggested that besides a diagnosis of dyslexia, also reading fluency, language proficiency and print exposure play an important role in recalling information in a L2 (C. J. Miller et al. 2006), which was supported by our study. This proves that these linguistic factors are influential when it comes to RC for adults (Faggella-Luby and Deshler 2008). A potential explanation could be that because students with dyslexia lack adequate L2 language proficiency skills causing that writing an L2 text and constructing the necessary information for the summary is more difficult (Landerl & Wimmer, 2008).

Conclusions

It was demonstrated that students with dyslexia perform equally well on the TF tests but perform poorer on both L1 and L2 FR. This is evidence for the fact that both test type and language matter for students with dyslexia. We found proof that linguistic factors are involved in advanced RC, such as reading fluency, language proficiency and print exposure. At the same time, it is shown that students with dyslexia obtain lower scores on these components, except for print exposure, which most likely causes some of their disadvantages in RC.

The question that likely follows is as follows: how to tackle these reported differences in higher education for recognising and recalling texts? We think that it is important to invest more time in language proficiency and writing in general. Furthermore, our results demonstrated that students with dyslexia experience even more difficulties in RC in L2 compared to L1. Students might benefit from testing in L1 and not in L2, therefore students with dyslexia should have the option – if feasible – to choose the language they want to be tested in.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

Bizama, M., D. Saldaño, and C. Rodriguez. 2019. "Fluid Intelligence, Working Memory, Reading Fluency and Comprehension in Chilean School Children." *Electronic Journal of Research in Educational Psychology* 17 (2): 295–316.

Callens, M., W. Tops, M. Brysbaert, and K. Paterson. 2012. "Cognitive Profile of Students Who Enter Higher Education with an Indication of Dyslexia." *PLOS ONE* 7 (6): e38081. https://doi.org/10.1371/journal.pone.0038081.

Coleman, C., N. Gregg, L. McLain, and L. W. Bellair. 2009. "A Comparison of Spelling Performance Across Young Adults with and without Dyslexia." *Assessment for Effective Intervention* 34 (2): 94–105. https://doi.org/10.1177/1534508408318808.

Depessemier, P., and C. Andries. 2009. *Gl&Schr. Test Voor Gevorderd Lezen en Schrijven*. Antwerpen: Garant.

Faggella-Luby, M., and D. Deshler. 2008. "Reading Comprehension in Adolescents with LD: What We Know; What We Need to Learn." *Learning Disabilities Research and Practice* 23 (2): 70–78. https://doi.org/10.1111/j.1540-5826.2008.00265.x.

IBM Corp. 2019. *IBM SPSS Statistics for Windows, Version 26.0*. Armonk, NY: IBM Corp.

Keijzer, M. 2013. "Working Memory Capacity, Inhibitory Control and the Role of L2 Proficiency in Aging L1 Dutch Speakers of Near-Native L2 English." *Brain Sciences* 3 (3): 1261–1281. https://doi.org/10.3390/brainsci3031261.

Landerl, K., and H. Wimmer. 2008. "Development of Word Reading Fluency and Spelling in a Consistent Orthography: An 8-Year Follow-Up." *Journal of Educational Psychology* 100 (1): 150–161. https://doi.org/10.1037/0022-0663.100.1.150.

Lemhöfer, K., and M. Broersma. 2012. "Introducing LexTALE: A Quick and Valid Lexical Test for Advanced Learners of English." *Behavior Research Methods* 44 (2): 325–343. https://doi.org/10.3758/s13428-011-0146-0.

Meixner, J. M., G. J. Warner, N. Lensing, U. Schiefele, and B. Elsner. 2019. "The Relation Between Executive Functions and Reading Comprehension in Primary-School Students: A Cross-Lagged-Panel Analysis." *Early Childhood Research Quarterly* 46:62–74. https://doi.org/10.1016/j.ecresq.2018.04.010.

Miller, C. J., S. R. Miller, J. S. Bloom, L. Jones, W. Lindstrom, J. Craggs, M. Garcia-Barrera, M. Semrud-Clikeman, J. W. Gilger, and G. W. Hynd. 2006. "Testing the Double-Deficit Hypothesis in an Adult Sample." *Annals of Dyslexia* 56 (1): 83–102. https://doi.org/10.1007/s11881-006-0004-4.

Miller, L. M., J. A. Cohen, and A. Wingfield. 2006. "Contextual Knowledge Reduces Demands on Working Memory During Reading." *Memory & Cognition* 34 (6): 1355–1367. https://doi.org/10.3758/BF03193277.

Motallebzadeh, K., M. Tabatabaee Yazdi, and K.-W. Tong. 2016. "The Relationship Between EFL learners' Reading Comprehension Ability and Their Fluid Intelligence, Crystallized Intelligence,

and Processing Speed." *Cogent Education* 3 (1): 1228733. https://doi.org/10.1080/2331186X.2016.1228733.

Onwuegbuzie, A. J., and K. M. T. Collins. 2002. "Reading Comprehension Among Graduate Students." *Psychological Reports* 90 (3): 879–882. https://doi.org/10.2466/pr0.2002.90.3.879.

Pedersen, H., R. Fusaroli, L. L. Lauridsen, and R. Parrila. 2016. "Reading Processes of University Students with Dyslexia – an Examination of the Relationship Between Oral Reading and Reading Comprehension." *Dyslexia* 22 (4): 305–321. https://doi.org/10.1002/dys.1542.

Ransby, M. J., and H. L. Swanson. 2003. "Reading Comprehension Skills of Young Adults with Childhood Diagnoses of Dyslexia." *Journal of Learning Disabilities* 36 (6): 538–555. https://doi.org/10.1177/00222194030360060501.

R Core Team. 2013. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. http://www.R-project.org/.

Roediger, H. L., and J. D. Karpicke. 2006. "Test-Enhanced Learning: Taking Memory Tests Improves Long-Term Retention." *Psychological Science* 17 (3): 249–255. https://doi.org/10.1111/j.1467-9280.2006.01693.x.

Simmons, F., and C. Singleton. 2000. "The Reading Comprehension Abilities of Dyslexic Students in Higher Education." *Dyslexia* 6 (3): 178–192. https://doi.org/10.1002/1099-0909(200007/09)6:3<178::AID-DYS171>3.0.CO;2-9.

Swanson, H., and C. Hsieh. 2009. "Reading Disabilities in Adults: A Selective Meta-Analysis of the Literature." *Review of Educational Research* 79 (4): 1362–1390. http://www.jstor.org/stable/40469100.

Tops, W., M. Callens, E. van Cauwenberghe, J. Adriaens, and M. Brysbaert. 2013. "Beyond Spelling: The Writing Skills of Students with Dyslexia in Higher Education." *Reading & Writing* 26 (5): 705–720. https://doi.org/10.1007/s11145-012-9387-2.

Tops, W., A. Nouwels, and M. Brysbaert. 2019. "Leestest 1-minuut onder Nederlandse studenten." *Stem-, Spraak- En Taalpathologie* 24:1–22. https://sstp.nl/article/view/26110/33076.

Van den Bos, K. P., H. C. Lutje Spelberg, A. J. M. Scheepstra, and J. R. de Vries. 1994. *De Klepel: Een test voor de leesvaardigheid van pseudowoorden*. Amsterdam: Pearson.

Vander Beken, H., and M. Brysbaert. 2017. "Studying Texts in a Second Language: The Importance of Test Type." *Bilingualism: Language and Cognition* 21 (5): 1–13. https://doi.org/10.1017/S1366728917000189.

Vander Beken, H., E. Woumans, and M. Brysbaert. 2017. "Studying Texts in a Second Language: No Disadvantage in Long-Term Recognition Memory." *Bilingualism: Language and Cognition* 21 (4): 1–13. https://doi.org/10.1017/S1366728917000360.